Deadmans Run
Lincoln, Nebraska

US Army Corps of Engineers

Section 205 -
Flood Risk Management

Final
Integrated Feasibility Report and Environmental Assessment

August 2018

EXECUTIVE SUMMARY

This flood risk management study is being carried out under the authority of Section 205 of the 1948 Flood Control Act, (P.L. 80-858), as amended. Under Section 205, the Corps is authorized to study and construct projects (structural and/or nonstructural) to reduce the risks of flooding, loss of life, and property damage in partnership with state and local governments. The non-federal sponsor for this study is the Lower Platte South Natural Resources District (LPSNRD) in Lincoln, Nebraska. In April of 2012 the LPSNRD submitted a request for the U.S. Army Corps of Engineers (Corps or USACE) – Omaha District to analyze potential solutions to reduce flood risks within the city of Lincoln.

This study is needed to address the significant flood risk within the almost completely urbanized Deadmans Run watershed in Northeast Lincoln, Nebraska. The purpose of this study was to: 1) quantify the flood risks and related flood problems associated with the Deadmans Run watershed within Lincoln, Nebraska, 2) formulate and evaluate alternative plans to address those flood threats, 3) compare those plans against one another based on costs, benefits, and impacts, and 4) select a recommended plan for implementation that would reduce the existing flood risk within the community.

Historical urbanization and development has led to an increased flood risk within the city of Lincoln. The primary problems associated with the existing flood risk within the study area are potential life loss, property damage, emergency response costs, and transportation network disruptions associated with high-water flood events. The Expected Annual Damages (EAD) associated with these problems, within the study area, under the existing conditions are just under $2.0M.

Flood risk management measures were developed collaboratively with input from the city of Lincoln, LPSNRD, other local and state resource agencies, and the Corps. The solutions investigated included structural measures (levees, channels, etc.), nonstructural measures (floodproofing, relocations, etc.), and a combination of both structural and nonstructural measures. Over a dozen flood risk management measures were identified and screened before being developed into alternatives. A total of four alternatives, including No Action, were evaluated and compared, and based on economic benefits and costs a preferred plan was selected and recommended for implementation.

The selected plan for the Section 205 Flood Risk Reduction Feasibility Study, includes a widened channel from Cornhusker Highway upstream to just east of 48th Street (approximately 1.4 miles), replacement of the existing concrete mat and gabions with riprap sized to mitigate streambed erosion and construction of a concrete flume under the BNSF Railroad bridges. This recommended plan consists of increasing the channel capacity to convey the flows associated with the 1% Annual Chance Exceedance (ACE) event, constructing a concrete flume under the existing railroad structures, reconfiguring the access road and underlying culvert to a series of commercial properties along the bank of the channel, and environmental mitigation throughout the project footprint to ensure there is no negative impact on the existing local ecosystem. The recommended flood risk management plan has an estimated total project cost of just over $14.2M.

The recommended plan, as developed in this feasibility study and updated in Section 4.4, will reduce flood risks for 487 structures in the Deadmans Run 1% ACE floodplain. This plan would reduce the EAD from $1,946,800 to $520,810 (a 73.0% reduction), resulting in economic benefits of $1,425,990. After accounting for the annualized project costs, the annual net benefits for the recommended plan are $895,610, producing a project benefit to cost ratio (BCR) of 2.69.

The estimated cost-shared total for project implementation is $14,235.000. Of the total cost, $1,726,000 is for land, easements, rights-of-way, relocation, and disposal costs (LERRDs), for which credit will be given to the sponsor. Of the total cost, the federal portion is approximately $9,253,000 and the non-federal portion is approximately $4,982,000. Of the total non-federal portion, approximately $3,256,000 will be provided in cash and $1,726,000 will be provided in LERRDs. Estimated average annual cost for operations, maintenance, repair, replacement, and rehabilitation is $25,010.

Finding of No Significant Impact

DEADMANS RUN
LINCOLN/LANCASTER COUNTY, NEBRASKA
INTEGRATED FEASIBILITY REPORT AND ENVIRONMENTAL ASSESSMENT

The U.S. Army Corps of Engineers, Omaha District (Corps), has conducted an environmental analysis in accordance with the National Environmental Policy Act of 1969, as amended, Council on Environmental Quality guidelines and the Corps' implementing regulations. The Corps assessed the effects of the following actions in the Final Feasibility Study and Environmental Assessment, dated 17 Aug 2018, for Deadmans Run in Lincoln, Nebraska. The final recommendation is contained in the Final Integrated Feasibility Report, dated 17 Aug 2018. These reports are incorporated herein by reference.

The selected alternative for the Section 205 Flood Risk Reduction Feasibility Study, Alternative #1, includes a widened channel from Cornhusker Highway upstream to just east of 48th Street (approximately 1.4 miles), replacement of the existing concrete mat and gabions with riprap sized to mitigate streambed erosion and construction of a concrete flume under the BNSF Railroad bridges. Based on the feasibility study analysis, the selected alternative, once implemented, would provide flood risk management at the 1% annual exceedance level to 487 structures within the 100-year floodplain. This would result in an expected reduction in annual damages of $1,425,990. The cost of construction, including real estate is estimated at $14,235,000, which will be cost shared with the local sponsor. The preferred plan has an estimated net annual benefit to the nation of $895,610 and a benefit to cost ratio of approximately 2.69:1.

In addition to the "no action" alternative, three alternatives with varying levels of flood risk reduction were evaluated, including the recommended plan. The recommended plan was identified as the National Economic Development (NED) plan and is also the environmentally preferred alternative. All practicable means to avoid and minimize adverse environmental effects have been incorporated into the recommended plan. The recommended plan would not result in any impacts to federally-listed threatened or endangered species or their designated critical habitat, would have no impact to sites listed on or eligible for inclusion on the National Register of Historic Places, and would not significantly affect any wetlands or waters of the U.S., nor any important wildlife habitat.

The recommended plan will result in unavoidable impacts to approximately 28.5 acres of vegetation in the floodplain of the project footprint. Most of the vegetation within this impact area consists of highly disturbed upland areas and managed turf grasses. Included in the 28.5-acre impact area is approximately 2.34 acres of mature trees classified as an Eastern Riparian Forest community. To mitigate for these unavoidable impacts, the Corps will stabilize the newly graded stream banks with approximately 17.5 acres of native grasses. Furthermore, a wetland bench will be constructed on one bankside for the length of the project footprint, resulting in an additional 5 acres of wet-mesic habitat. Approximately one acre of native trees will be replaced in the upper extent of the right-of-way where tree removal will occur.

Technical and economic criteria used in the formulation of alternative plans were those specified in the Water Resource Council's 1983 "Economic and Environmental Principles for Water and Related Land Resources Implementation Studies." All applicable laws, executive orders, regulations, and local government plans were considered in the evaluation of the alternatives. Based on the results of the impacts, it has been determined that no significant impacts would occur as a result of implementing the recommended plan, Alternative 1. The proposed action would not have any unavoidable adverse effects, nor would it result in the irreversible or irretrievable commitment of resources. Proceeding with the recommended plan would not significantly or adversely impact the affected environment, additionally, no significant cumulative effects would be expected.

I have reviewed the integrated Deadmans Run Feasibility Report and Environmental Assessment, the information provided by interested parties and the information provided in this Finding of No Significant Impact. It is my determination that the recommended plan does not constitute a major federal action that would significantly affect the human environment; therefore, preparation of an Environmental Impact Statement is not required.

Date: 17 Aug 2018

John L. Hudson, P.E.
Colonel, Corps of Engineers
District Commander

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LIST OF ACRONYMS

ACE	Annual Chance Exceedance
ATR	Agency Technical Review
BA	Biological Assessment
BCR	Benefit to Cost Ratio
BMP	Best Management Practice
CAA	Clean Air Act
CAP	Continuing Authorities Program
cfs	cubic feet per second
CLOMR	Conditional Letter of Map Revision
CRSA	Cost Risk and Schedule Analysis
CWA	Clean Water Act
cy	cubic yards
D&I	design & implementation
DOI	Department of Interior
DQC	District Quality Control
E&D	Engineering & Design
EA	Environmental Assessment
EAD	Expected Annual Damages
ECB	Engineering and Construction Bulletin
ECP	Environmental Condition of Property
EIS	Environmental Impact Statement
EJ	Environmental Justice
EO	Executive Order
EPA	U.S. Environmental Protection Agency
EQ	Environmental Quality
ER	Engineer Regulation
ESA	Endangered Species Act
FCSA	Feasibility Cost Share Agreement
FEMA	Federal Emergency Management Agency
FHU	Felsburg, Holt and Ullevig
FIS	Flood Insurance Study
FONSI	Finding of No Significant Impact
FPMP	Floodplain Management Plan
FRAM	Flood Risk Adaptive Measures
FWCA	Fish and Wildlife Coordination Act
FWOP	future without project
FY	Fiscal Year

HEC-FDA	Hydrologic Engineering Center Flood Damage Reduction Analysis
HEC-HMS	Hydrologic Engineering Center Hydrologic Modeling System
HEC-RAS	Hydrologic Engineering Center River Analysis System
HTRW	Hazardous, Toxic and Radiological Waste
IDC	Interest During Construction
LERRD	lands, easements, rights of way, relocations, disposal areas
LPSNRD	Lower Platte South Natural Resources District
MBTA	Migratory Bird Treaty Act
MOR	Memorandum of Record
MRRP	Missouri River Recovery Program
NAAQS	National Ambient Air Quality Standards
NAVD88	North American Vertical Datum of 1988
NDEQ	Nebraska Department of Environmental Quality
NDOR	Nebraska Department of Roads
NED	National Economic Development
NEPA	National Environmental Policy Act
NESCAP	Nebraska Stream Condition Assessment Procedure
NET	Nebraska Educational Telecommunications
NFIP	National Flood Insurance Program
NGPC	Nebraska Game and Parks Commission
NHPA	National Historic Preservation Act
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge and Elimination System
NRCS	Natural Resources Conservation Service
NWD	Northwestern Division
NWI	National Wetlands Inventory
OMRR&R	operations, maintenance, repair, replacement, and rehabilitation
OSE	Other Social Effects
PAL	Planning Aid Letter
PDT	Project Delivery Team
PED	Preliminary Engineering Design
PEL	Planning and Environmental Linkages
PL	Public Law
PM	particulate matter
PMP	Project Management Plan
PPA	Project Partnership Agreement
RED	Regional Economic Development
RTSD	Railroad Transportation Safety District
S&A	Supervision & Administration
SCI	Stream Condition Index
SHPO	State Historic Preservation Office
SOW	Scope of Work
SWPPP	Storm Water Pollution Prevention Plan
TSP	Tentatively Selected Plan
UNL	University of Nebraska – Lincoln
USACE	U.S. Army Corps of Engineers

USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WRDA	Water Resources Development Act
WSE	water surface elevation

1 PURPOSE AND NEED

1.1 INTRODUCTION

The Deadmans Run channel begins in southeast Lincoln, and runs northwest through the city until it reaches its confluence with Salt Creek in north Lincoln; as shown in Figure 1. The Deadmans Run watershed is almost completely urbanized and has contributed to numerous past flood events in that area of Lincoln. Due to the high density of residential and commercial properties within the Deadmans Run floodplain, and the previous history of flooding, a request for the U.S. Army Corps of Engineers (Corps or USACE) – Omaha District to analyze potential solutions to reduce risks within the city was received in April of 2012.

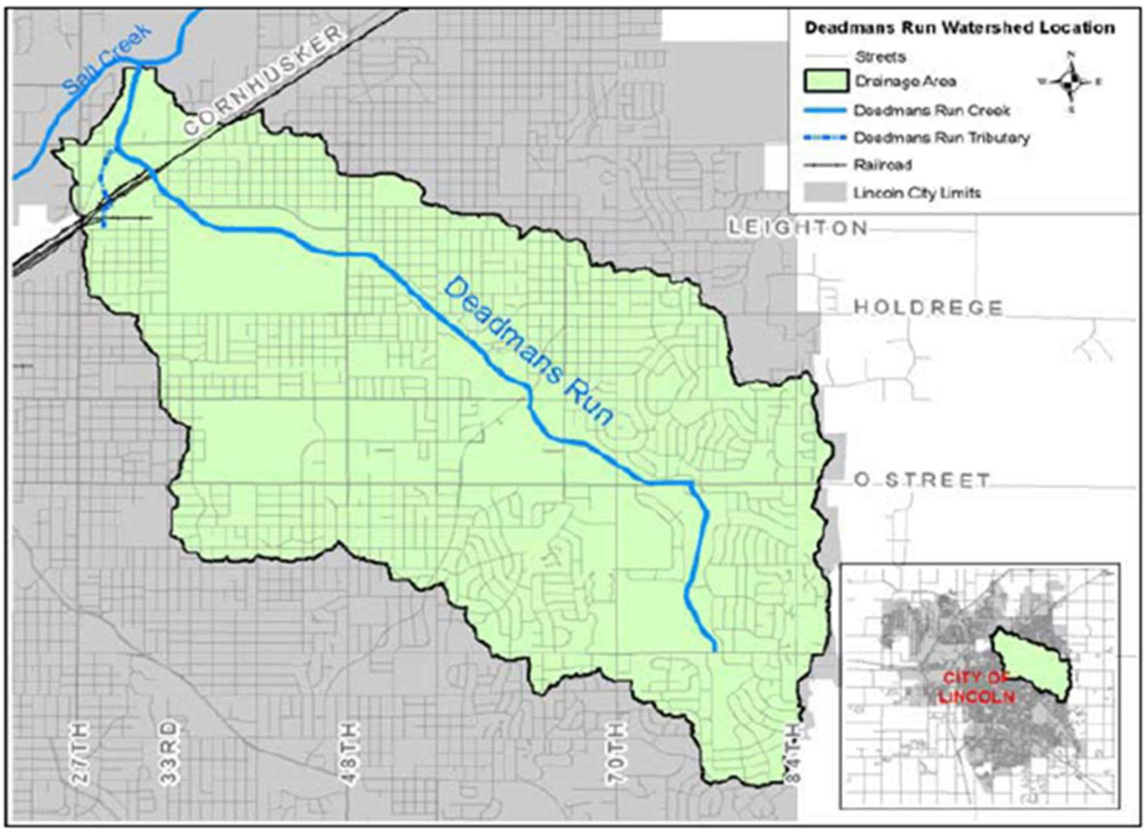

Figure 1. Deadmans Run Watershed Location

1.1.1 STUDY AUTHORITY

This feasibility study is being conducted under the authority of Section 205 of the 1948 Flood Control Act, (P.L. 80-858) as amended. Under Section 205, the Corps is authorized to study and construct projects (structural and/or nonstructural) to reduce the risks of flooding, loss of life, and property damage in partnership with state and local governments. Projects implemented under the Section 205 authority are formulated for flood risk management in accordance with current policies and procedures governing projects of the same type that are specifically authorized by Congress. Section 205 projects are typically cost-shared 65 percent federal and 35 percent non-federal, with the federal share being limited at $10 million. Exceptions to this cost-share percentage, allowing the non-federal sponsor to cost-share more than 35 percent of the study costs, require a waiver approved by USACE Headquarters.

1.1.2 THE STUDY PROCESS

Continuing Authorities Program (CAP) Section 205 projects are conducted in two phases: the feasibility phase which results in an Integrated Feasibility Report, and the Preliminary Engineering Design (PED) phase which results in final design plans and specifications and construction of the project. Feasibility costs which exceed an initial $100,000 allocation of federal funding are cost-shared 50 percent federal and 50 percent non-federal, in accordance with a Feasibility Cost Share Agreement (FCSA) specific to the feasibility study. If the project is approved and advances to the design and implementation phase, all costs for that phase are cost-shared 65 percent federal and 35 percent non-federal in accordance with the terms of a Project Partnership Agreement (PPA) which would be prepared for the project at the start of that phase.

1.1.3 STUDY SPONSOR

The Lower Platte South Natural Resources District (LPSNRD) served as the cost-sharing sponsor throughout the feasibility study. The LPSNRD, also partnered with the City of Lincoln to leverage technical expertise, institutional knowledge, and resources from the city in support of completing the study. The FCSA for this study was signed on August 21st, 2014, providing for the 50-50 cost share between the Corps and the LPSNRD.

Lincoln is in Nebraska's First Congressional District. Congressional representatives for the study area include U.S. Representative Jeff Fortenberry, and U.S. Senators Deb Fischer and Ben Sasse.

1.2 STUDY AREA AND SCOPE

The initial study area for this feasibility study was the entire Deadmans Run watershed within the City of Lincoln. However, upon further analysis and review of existing information, specifically the "City of Lincoln, NE Deadmans Run Watershed Master Plan" (CDM, 2007), it was determined that studying the entire Deadmans Run watershed would be beyond the scope of the Section 205 program limits. The December 2007 Master Plan, prepared by CDM Smith Inc. (CDM) for the City of Lincoln and the LPSNRD, identified a project to address the flood concerns throughout the entire watershed with a total cost of approximately $49 million. This watershed wide plan had a benefit-to-cost ratio (BCR) of 0.79, and was therefore never implemented.

Due to the current Section 205 Program per project authorized cost limit being just over $15.3 million, $10 million Federal and approximately $5.3 million non-Federal, the joint non-federal sponsor-Corps project team selected to study the area from just upstream of the 48th Street Bridge (upstream) to the channel's confluence with Salt Creek (downstream); as shown in Figure 2. Also included in this feasibility study was an unnamed stream, given the label the West Tributary under this project. The West Tributary is shown in light blue in Figure 2.

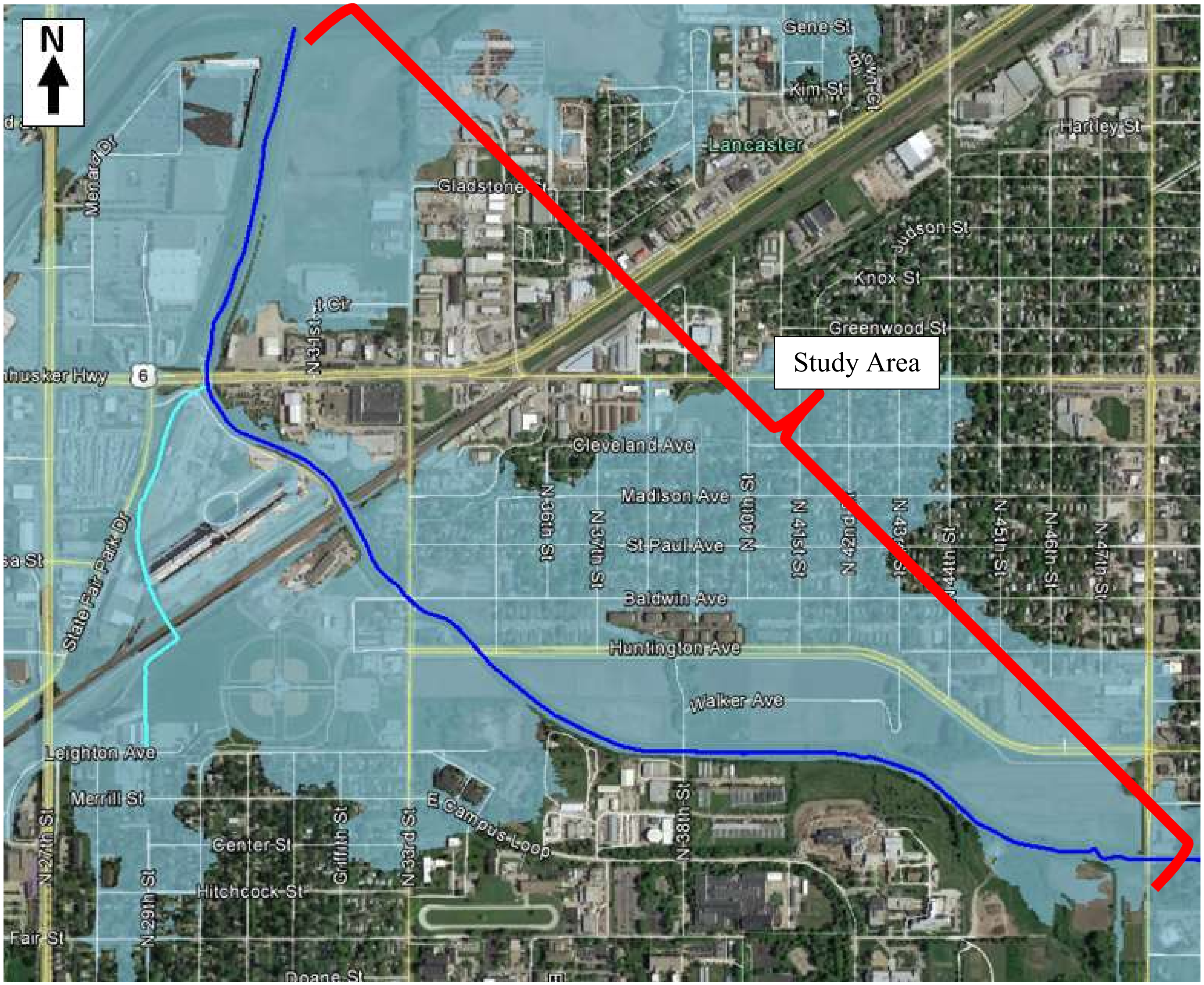

Figure 2. Deadmans Run Study Area with Existing 1% Annual Chance Exceedance (ACE) Event Floodplain (light blue)

The scope of the study involves quantifying the flood risks and related flood problems associated with Deadmans Run within Lincoln, formulating and evaluating alternative plans to address those flood threats, comparing those plans against one another based on benefits and impacts, and selecting a recommended plan for implementation. Corps feasibility studies follow rigorous planning procedures established in accordance with the "Principles and Guidelines for Water and Related Land Resources Implementation Studies" published by the U.S. Water Resources Council in March 1983 (commonly referred to as the Principles and Guidelines). In addition, this report presents integration of both the feasibility analysis following Corps' current policy, as well as an Environmental Assessment (EA) in compliance with the National Environmental Policy Act (42 U.S.C. § 4331 et seq.) (NEPA). Figure 3 presents a side-by-side representation of how the Corps' six-step planning process aligns with the typical EA process.

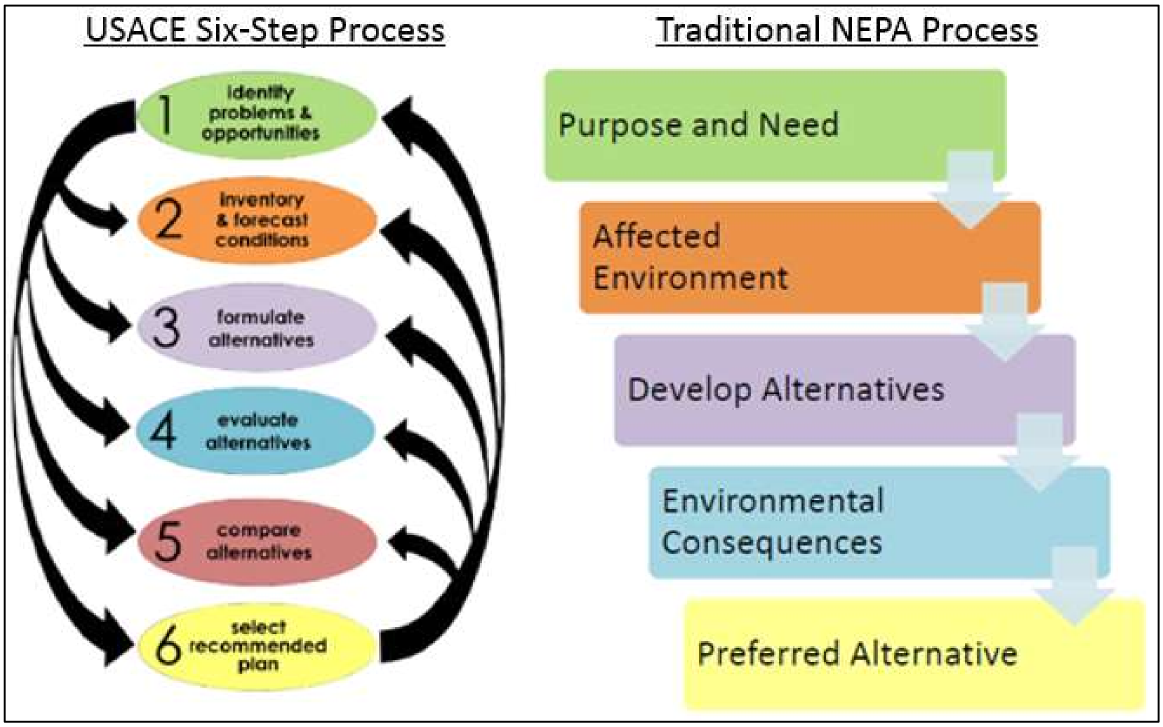

Figure 3. Comparison of the USACE Six-Step Planning Process and NEPA Process

1.3 PROBLEMS AND OPPORTUNITIES

The Corps project delivery team (PDT) and the non-federal sponsor held a facilitated workshop on June 30th, 2015 to brainstorm and collaborate on the development of the problems, opportunities, objectives, and constraints associated with this study. During this workshop a wide array of initial measures was discussed and qualitatively analyzed. Table 1 shows the initial list of measures, individual means of addressing flood risk, that were qualitatively assessed by the group. Each measure was evaluated in terms of the following project objectives:

1. Reduce damages associated with flood risk
2. Reduce life loss and safety impact associated with the existing flood risk

3. Decrease the size of the existing regulatory floodplain
4. Provide a more stable channel that can withstand high flows without significant erosion.

Additionally, each measure was qualitatively assessed its impacts on the existing transportation infrastructure, ecosystem, and real estate (acquisition). The last item assessed for each measure was if the measure would provide opportunities for benefits other than those associated with flood risk reduction. The results of the qualitative assessment for each measure are also shown in Table 1. Additional project information developed during this workshop is further discussed in the following sections.

Table 1. Summary Measures from June 30, 2015 Facilitated Workshop

Measure	Objectives				Impacts			Opportunities			Total
	Decrease Costs	Decrease Life & Health	Dec. 100-yr Flood Plain	Dec. Channel Erosion	Bridges & Trans	Real Estate	Env.	Eco - Restoration	Recreation	Water Quality	
Conveyance Imp. w/ Bridges	1	1	1	1	1	-1	0	1	1	0	6
Pervious/Rain Barrels & Onsite Local Treatments	1	0	0	1	0	0	1	1	1	1	6
Conveyance/Channel Imp	1	1	1	1	-1	-1	0	1	1	0	4
Bridge Improvements	1	1	1	0	1	0	0	0	0	0	4
Detention	0	0	0	1	1	-1	0	1	0	1	3
Subgrade Detention	0	0	0	1	1	0	0	0	0	1	3
Buyouts	1	1	0	0	0	-1	0	1	1	0	3
Elevate	1	1	0	0	0	0	0	0	0	0	2
Huntington Raise	1	1	1	0	0	-1	0	0	0	0	2
Levees Left	1	0	1	0	-1	-1	0	0	1	0	1
Levees Right	1	0	1	0	-1	-1	0	0	1	0	1
Flood Warning	0	1	0	0	0	0	0	0	0	0	1
Huntington Lower	0	-1	1	0	0	-1	0	0	0	0	-1
Alter Wedgewood	0	1	0	0	0	-1	-1	0	-1	1	-1

Note: The measures were all qualitatively assessed, where 1 = will accomplish, 0 = will potentially accomplish, and -1 = will not accomplish.

1.3.1 HISTORY OF FLOODING

The longstanding history of flooding within the Deadmans Run watershed is summarized in the events detailed below:

1923 Flood. On September 29th flooding occurred in the mostly undeveloped Deadmans Run Watershed, with reports of Deadmans Run flowing across 48th Street several feet deep just east of the University of Nebraska at Lincoln (UNL) Agricultural Campus.

1950 Event. On May 8th heavy rainfall fell over southeast Nebraska causing Salt Creek to experience flooding. These high water levels on Salt Creek led to backwater effects and flooding in the lower Deadmans Run watershed.

1951 Floods. Multiple storm events occurred on June 1st and 2nd in Lincoln, with the 24-hour rainfall total being just over 4.6 inches. Flooding in the Deadmans Run watershed was extensive, with debris reported to be four feet high in a fence near the intersection of 48th and Francis Street following the storm events.

1957 Flood. On July 1st a significant storm event, with an approximate 2.9 percent ACE for a six-hour precipitation event, occurred in Lincoln, Nebraska. By 1957 urbanization of the Deadmans Run floodplain was well underway and there was considerable property damage associated with this storm event. Much of the right bank floodplain was inundated several feet deep, and this included a new subdivision of homes that was being built (Figure 4).

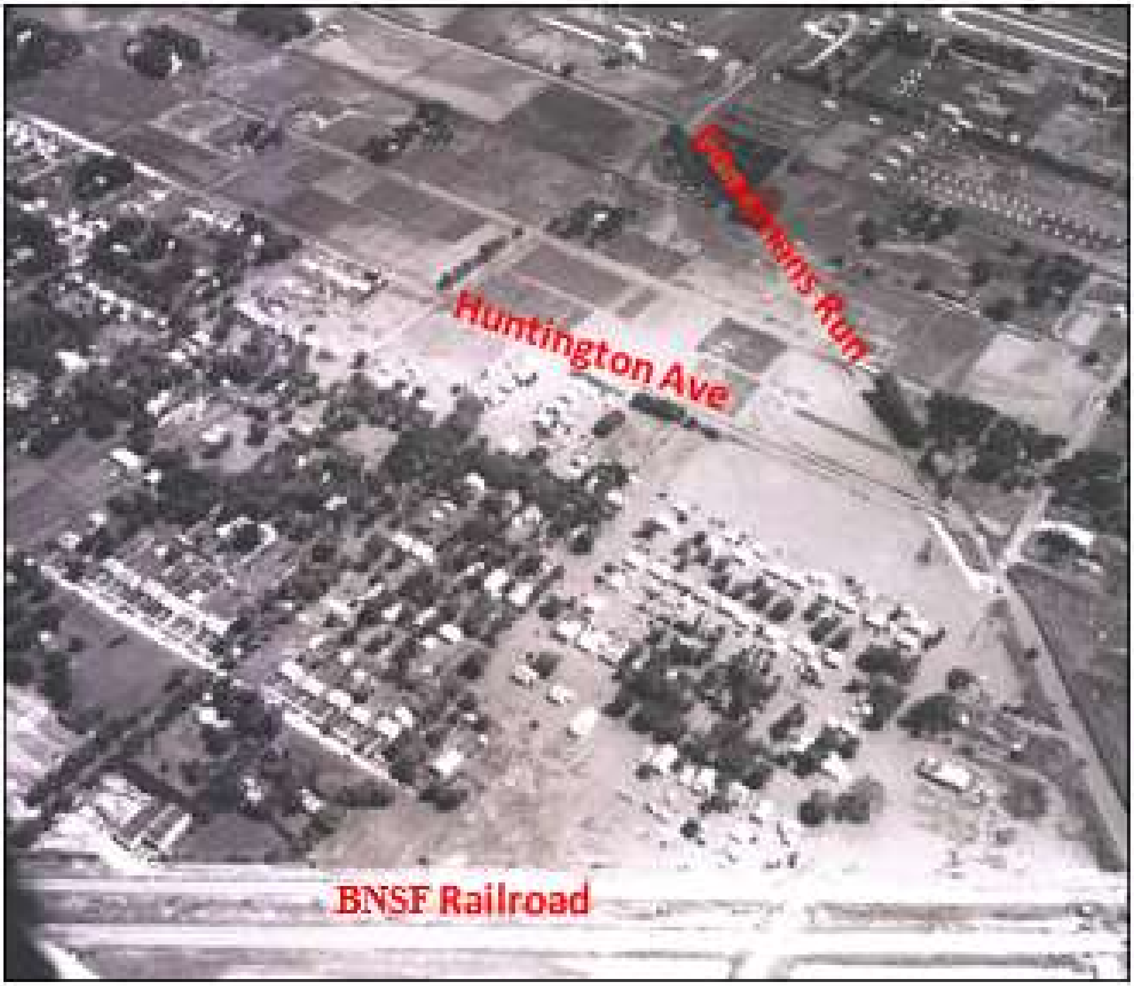

Figure 4. Aerial Photo, Looking Southeast, of the July 1957 Flood on Deadmans Run

<u>1963 Event</u>. Rainfall from an intense storm on June 24th caused near bank full flow and minor flooding along Deadmans Run. Streambank erosion at Adams Street caused some damage.

<u>1989 Event</u>. On September 8th, storms caused minor flooding and high water on Salt Creek and its tributaries, including Beal Slough, Antelope Creek and Deadmans Run. On Deadmans Run, the flood peak stayed within the channel. Though the rainfall in September 1989 had a similar 24-hour total to the rainfall that caused the 1957 flood, the heavy rain was broken into two separate squalls, separated by little rain for a period of over three hours. The spacing of these pulses of rainfall and the small size of the watershed allowed runoff to drain to the watershed outlet between pulses, freeing channel capacity and illustrating the “flashy” nature of the Deadmans Run watershed.

<u>2014 Event</u>. Very heavy rain struck parts of Lincoln on September 30th and October 1st, with high water reported on Deadmans Run and nearby streams, including Salt Creek. On Deadmans Run, the flood peak stayed within the channel. Though the 24-hour rainfall total from this storm was among the higher amounts historically recorded for the

24-hour duration in Lincoln, approximately 6.6 inches, the heavy rain was broken into two separate events, separated by little rain for a period of over two hours. The spacing of these pulses of rainfall allowed the small, flashy watershed to drain between pulses which resulted in flows remaining in the channel. If rainfall had been more concentrated, the event would likely have produced out-of-bank flooding.

2015 Event. Very heavy rain fell over a wide area of the Salt Creek Basin on May 6th, causing flooding of roughly a two percent ACE event along many of the Salt Creek levees through Lincoln. Deadmans Run flows remained in channel and were estimated to be only between a 20 and 10 percent ACE discharge at the 38th Street Bridge. The 24-hour rainfall was greater than six inches measured at the Salt Creek at 70th Street precipitation gage, but the heavy rain was again broken into two separate squalls, separated by little rain for over two hours.

2016 Event. Very heavy rain accompanied at least three small tornados in and around Lincoln late on May 10th. The storm's rainfall was approximately five inches, as indicated by radar across the southern portion of the Deadmans Run watershed. However, the lower, northern, portion of the watershed received much less rainfall than the upper, southern, portion of the watershed, so flooding was limited to tributary overflows.

1.3.2 PROBLEMS

It was determined that the primary problems associated with the study area are potential life loss, property damage, emergency response costs, and transportation network disruptions associated with high-water flood events. The Expected Annual Damages (EAD) associated with these problems, within the study area, under the existing conditions are just under $2.0M.

1.3.3 OPPORTUNITIES

The following items were identified during the June 30th workshop as the major opportunities for this study, which were focused on throughout the feasibility study:

- Reduce overall flood risk to the community.
- Green spaces along the channel that could potentially be repurposed for detention/retention.
- Existing riparian habitat is degraded presenting an opportunity to restore the existing ecosystem.
- Opportunity exists to improve the instream water quality to restore the environmental functions and quality of the stream habitat.
- Improvements to community property values if the flood risk can be mitigated.

1.4 OBJECTIVES AND CONSTRAINTS

1.4.1 OBJECTIVES

In accordance with Engineer Regulation (ER) 1105-2-100 Appendix E, objectives are to be specific, flexible, measurable, realistic, attainable, and acceptable. For this study there were two sets of objectives, the Federal Objective, which every Corps planning study shares, and the project objectives, which are developed on a per project basis. These objectives are detailed below.

Federal Objective. The federal objective of water and related land resources project planning is to provide contributions to National Economic Development (NED) consistent with protecting the Nation's environment, pursuant to national environmental statutes, applicable executive orders, and other federal planning requirements. Contributions to NED are the direct net benefits that accrue locally, and to the rest of the Nation overall. The NED plan is the plan with the greatest net economic benefit. The flood risk management objective is to reduce the risk of flooding for the community, and increase the protection of life safety.

Project Objectives. In addition to the federal objective, the LPSNRD and the City of Lincoln requested that the proposed project would aid the local community's economy by reducing the risk of flood damages to existing businesses and residences. The objectives for the plan formulation effort include:

- Reduce the potential for loss of life, property damage, negative transportation and commerce impacts, and degraded channel stability caused by flooding along Deadmans Run in Lincoln, Nebraska;
- Reduce the damages associated with flooding from Deadmans Run by providing economically feasible, environmentally sensitive, and socially acceptable flood risk reduction solutions for the City of Lincoln; and
- Reduce emergency response and transportation network disruption expenses associated with high-water events throughout the Deadmans Run Watershed.

It should be noted that each objective was developed such that the objective would be accomplished by the year 2021 (estimated year project implementation will be complete) and that each objective would continue to be achieved throughout an entire 50-year project life.

1.4.2 PLANNING CONSTRAINTS AND CONSIDERATIONS

Potential project constraints were discussed during the June 30th, 2015 meeting between USACE, the LPSNRD, and the City of Lincoln. The following is a list of the significant project constraints the team was able to compile:

- Minimize impact on the UNL's agricultural research plots along Deadmans Run.
- Maintain the connectivity of the existing transportation infrastructure.
- Downstream channel width limitations due to the existing Salt Creek levees at the confluence of Deadmans Run with Salt Creek.
- Wedgewood Lake requires constant water surface levels on the upstream extent of the channel to avoid impacting properties around the lake
- Mitigate environmental impacts in the limited habitat found within the existing highly urbanized watershed.

2 CURRENT AND FUTURE CONDITIONS

2.1 PLANNING HORIZION

The base year, or year implementation of the project is estimated for completion, for this study is 2021. Planning projects are developed with a Period of Analysis of 50 years. At the time of writing, the City of Lincoln and the LPSNRD have expressed intentions of replacing and widening three bridges; 33rd, 38th and 48th Street bridges, that cross Deadmans Run within the study area. The 48th and 38th Street Bridge modifications and the 33rd Street Bridge installation will be initiated prior to the federal Section 205 Project by the non-federal Sponsor and will be constructed prior to or during construction of the federal Section 205 Project. As a result, there will be a localized reduction in stage and localized increase in velocity immediately upstream and downstream, respectively, of each bridge during a 100-year event (or 1% ACE event). However, overall channel velocities and flow capacity through the study area will continue to be limited by the size of the existing channel.

While general timing of flows and extent of flooding would remain similar to existing conditions, the impact of these bridges being widened and having an increased capacity will allow additional channel flow to propagate downstream changing timing of how the flows interact with flow coming from the West Tributary. As such, the City has also indicated that they will be constructing an approximate 7.7-acre detention basin off-channel near the West Tributary to capture these downstream flows from Deadmans Run as a result of the bridge replacements.

Concurrent to this feasibility study, a Planning and Environmental Linkages (PEL) study being conducted by the City of Lincoln/Lancaster County Railroad Transportation Safety District (RTSD) is also assessing a framework for the long-term implementation of transportation improvements in the 33rd Street and Cornhusker vicinity of Lincoln. There is some overlap between the Section 205 study area and the PEL study area. While the City has indicated that transportation infrastructure plans could lead to some changes within the watershed, it is unclear at this time if these changes will have significant impacts to development in the area.

2.2 EXISTING CONDITIONS

The existing conditions are an inventory of watershed conditions at the present time or very recent past. For this study, the existing conditions were based on the conditions within the study area in calendar year 2016. These existing conditions serve as the baseline with which to compare formulated alternatives future with-project condition and future without-project condition. The information used to develop and define the existing conditions comes from baseline surveys of current conditions, field surveys and desktop reviews of previous studies and projects within the study area.

2.2.1 PREVIOUS STUDIES

Flood Insurance Study, FEMA (1979) – The original Flood Insurance Study (FIS) included hydrologic and hydraulic analyses for the City of Lincoln that were completed by USACE, Omaha District, for the Federal Emergency Management Agency (FEMA). The original study included flood elevations, floodplain boundaries, and floodway data. Detailed study methods were used in Deadmans Run from the Salt Creek confluence upstream to A Street.

Reevaluation of Computed Flood Discharges for Deadmans Run at Lincoln, NE (1989) – A flood frequency analysis was conducted as part of a FEMA FIS. Discharge revisions from the study were not large compared to the flood frequency distribution in use, with discharge changes ranging from a reduction of 13 percent at A Street to an increase of 11 percent at the mouth.

Deadmans Run Section 205 Reconnaissance Study (1993) – This unpublished initial assessment report of flood problems and potential solutions used the 1989 flood insurance hydrology and hydraulics, with the damage analysis based on the flood insurance profiles and flood outlines. The study was terminated following a nation-wide defunding of all Section 205 Studies.

Deadmans Run Section 22 Study (2003) – This study was an economic evaluation of future flooding impacts on the floodplain given two potential development scenarios in the flood fringe.

Deadmans Run Watershed Master Plan, CDM (2007) – The Deadmans Run Watershed Master Plan was developed as part of a larger effort to develop Master Plans for all watersheds in the City of Lincoln and future growth areas. The three major elements of the plan are floodplain management, capital improvement projects and benefit-cost analysis. Some of the capital improvement projects were developed for flood damage reduction. Benefit-cost analysis of the formulated projects did not yield any Section 205 Program-compatible flood risk reduction projects likely to have a federal interest.

Deadmans Run September 30th-October 1st, 2014 Storm Summary Report (2014) – An unpublished Corps Report prepared by the Omaha District Hydrologic Engineering Branch provided high water marks, rainfall, runoff, and stage information on the high water event after six inches of rain fell on the basin in 18 hours. High water marks were collected by Corps staff the morning after the event.

2.2.2 EXISTING PROJECTS

There are no existing Corps flood risk reduction projects in the Deadmans Run Watershed. Salt Creek has a series of Corps levees along most of its length throughout the City of Lincoln. The Salt Creek levees generally provide flood risk reduction up to approximately the two percent ACE event. An example of these levees, located at the confluence of Deadmans Run and Salt Creek, is shown in Figure 5.

Figure 5. Confluence of Deadmans Run and Salt Creek during May 2015 Flood
Note: Picture taken from atop the northern Salt Creek Levee.

Many channel stabilization and grade control projects have been built along Deadmans Run since the 1960s and 1970s. These projects featured measures such as gabions and other grade and erosion control structures on both the main channel and on some tributaries. Wedgewood Lake, near the upstream end of the basin, was built as a recreational feature in the middle of the 20th Century, but it has minimal effect on flood flows when operated at its normal pool elevation.

2.2.3 HYDROLOGIC ANALYSIS

The hydrology of Deadmans Run has been evaluated several times in the past 25 years, as part of FEMA Flood Insurance Studies, other technical evaluation, and most recently as part of this study. Each of the previous studies performed flood frequency analysis for selected locations along the Deadmans Run channel. This study developed a hydrologic model for use in updating the frequency analysis, while defining the discharge-frequency relationship for many locations along the channel. The model was calibrated to historic observed data and can be used as a tool for evaluating the effectiveness of flood damage reduction measures formulated for the watershed.

2.2.3.1 ***DISCHARGE-FREQUENCY UPDATE***

The flood flow frequency analysis yielded results that were fairly similar to prior flow frequency analyses. The resultant of the discharge frequency distribution for the 1% ACE event produced peak discharges that were close to those from the 1993 Section 205 Feasibility Study, and those from the 2007 Master Plan developed by CDM (City of Lincoln, 2007). Table 2 shows a comparison of the peak discharges between the different studies at selected locations along Deadmans Run.

Table 2. Comparison of Discharge-Frequency Relationships

Location	Drainage Area (mi^2)	1% ACE peak flows (cfs)		
		1993 Section 205 (Ref. 4)	CDM 2007 (Ref. 3)	2017 Section 205 Study
At mouth	9.618	9,660	9,078	***9,890***
At 38th Street	6.931	8,410	8,193	***8,397***
Below 48th Street	6.571	8,530	8,628	***8,489***
Above 48th Street	5.709	7,210	7,426	***7,045***
At Cotner Blvd.	4.259	5,780	6,350	***5,645***
Below 66th Street	3.559	4,980	5,764	***5,336***
Above 66th Street	3.373	3,330	5,534	***4,976***
Below O Street	1.901	2,790	3,066	***3,148***
Above O Street	1.239	1,760	1,876	***2,031***
At A Street*	0.424	1,360	1,007	***1,599***
*Drainage area is listed as 1.1 mi^2 in 1993 Section 205 Study (Ref. 4)				

2.2.3.2 ***HYDROLOGIC MODEL***

The Corps' Hydrologic Engineering Center Hydrologic Modeling System (HEC-HMS) Model Version 4.0 was used for the watershed hydrologic modeling of this feasibility study. The results from the 2007 report by CDM were used as the basis for the hydrologic model for this study. The National Oceanic and Atmospheric Administration (NOAA) Precipitation Frequency Atlas 14 (NOAA, 2014) was used for the rainfall frequencies and durations applied to the sub basins of Deadmans Run. The model included computations at the range of frequencies required for the eight point Hydrologic Engineering Center Flood Damage Reduction Analysis (HEC-FDA) evaluation (50 percent, 20 percent, 10 percent, four percent, two percent, 1%, 0.5 percent, and 0.2 percent ACE events).

Based on historical records indicating that flood damages are minimal for the more frequent storms and because the focus of the study is on flood events less frequent than the 10 percent ACE event, the storm and sanitary sewer system was not modeled. Storm sewer collection systems become important for their contribution to floods of a 10 percent ACE event magnitude or more frequent. The onset of flooding in most of the floodplain does not begin until an event more severe than the four percent ACE event occurs.

A model sensitivity analysis was performed for rainfall and soil infiltration loss. The model output of instantaneous peak discharge was then compared to 1% ACE event peak flows from earlier studies at several locations within the basin to evaluate the results and select a final infiltration loss. The results are noted in Appendix E, and they show consistency between the modeled 1% ACE event peak discharge to peak discharges from earlier studies, suggesting the use of an overall infiltration loss of 0.30 inches per hour for this largely urbanized basin.

A significant rainfall event fell on the watershed during the development of the hydrologic model but was not captured by the U.S. Geological Survey (USGS) 38th Street gauge installed the following day. When the September 31, 2014 flow estimate at the bridge became available from the USGS later in the study, the event was modeled for model verification. HMS estimated a peak flow of 3,020 cfs at the 38th Street Bridge while the USGS estimated a peak flow of 3,680 cfs. Note that the USGS estimate was not available at the time the HMS model was being calibrated otherwise the contractor would have been instructed to calibrate to this estimated flow. The difference between these two flows is 22% with the model result the lower of the two values. It should be kept in mind, however, that the October 2014 flow was not captured at a gauge but estimated from an indirect measurement with high water marks using a provisional rating curve. The storm produced 6.60 inches of rain in 24 hours starting the night of September 30th, 2014, which was recorded by a tipping bucket rain gage on the Salt Creek at 27th Street in Lincoln. This gage is located about a mile northwest of the mouth of the confluence of Deadmans Run with Salt Creek. The September 30th event was not captured by a stream gage.

Following this high water event in 2014, the USGS installed a gaging station at the 38th Street Bridge on Deadmans Run. A subsequent high water event happened on May 6th, 2015, providing the only event, so far, for which both the Deadmans Run stage and rainfall were recorded in sufficient detail to allow for comparison of the peak intensity and peak gage height. The peak discharge for that event was estimated to be 3,360 cubic feet per second (cfs), which again fell between a 20 percent ACE event and a 10 percent ACE event estimated from the adopted hydrologic model results. The 24-hour rainfall of 6.08 inches, on the other hand was roughly a 2.5 percent ACE event.

The HEC-HMS model was developed without calibration data available; no stream gage was installed on Deadmans Run until after the September 2014 event and the USGS indirect estimate of the 2014 discharge at the 38th Street Bridge was not available until after the model was delivered. The peak flow estimated at the bridge by the USGS was 3,680 cfs; the HMS model produces a peak flow of 3,020 cfs for this event. The difference between these two flows is 22 percent with the model result the lower of the two values. It should be kept in mind, however, that the October 2014 flow was not captured at a gauge but estimated from an indirect measurement with high water marks using a provisional rating curve. The error in indirect measurements varies from seven to 16 percent (USGS, 1984) which approaches the difference between the two flows.

The HEC-HMS model was used to compute peak discharges for eight major frequencies at key locations along Deadmans Run with the results provided in Table 3 below.

Table 3. Discharge Frequency Distribution at Key Locations Along Deadmans Run

Location	Drainage Area (Mi^2)	Frequency Storms							
		2-year	5-year	10-year	25-year	50-year	100-year	200-year	500-year
At mouth	9.618	1,681	3,053	5,026	6,940	8,399	9,890	11,677	14,174
At 38th Street	6.931	1,440	2,644	4,429	5,981	7,163	8,397	9,839	11,929
Below 48th Street	6.571	1,409	2,627	4,483	6,167	7,320	8,489	9,871	11,922
Above 48th Street	5.709	1,207	2,228	3,742	5,102	6,045	7,045	8,259	10,105
At Cotner	4.259	922	1,722	2,815	3,833	4,676	5,645	6,768	8,376
Below 66th Street	3.559	842	1,627	2,833	3,796	4,615	5,336	6,388	8,042
Above 66th Street	3.373	794	1,534	2,623	3,489	4,187	4,976	6,133	7,684
Below O Street	1.901	434	858	1,483	2,094	2,594	3,148	3,695	4,477
Above O Street	1.239	317	602	1,012	1,390	1,683	2,031	2,369	2,845
At A Street*	0.424	161	338	711	1,082	1,358	1,599	1,888	2,237

*Element "A Street" drainage area is listed as 1.1 square miles in Section 205 Study (Ref. 4).

2.2.4 HYDRAULIC ANALYSIS

The hydraulic analysis was performed to define the water surfaces that can be expected from floods of various frequencies in the Deadmans Run channel and floodplain. Hydraulic modeling was completed to evaluate water surface elevations for existing and future without-project conditions. The computed water surface profiles were used to develop stage-discharge relationships for use in the economic models.

*2.2.4.1 **HYDRAULIC MODEL***

The hydraulic modeling was completed using the Hydrologic Engineering Center's River Analysis System (HEC-RAS) Version 5.0 (October 2014). That model was updated from an earlier HEC-RAS model prepared by CDM in 2007, using Version 3.1.3. When updating the hydraulic model for the Deadmans Run Feasibility Study, the stationing of the cross sections was maintained unless otherwise noted in Appendix F. Channel cross section orientation and stationing were taken directly from the CDM model, with the overbank cross sections delineated from a digital terrain model, using data generated from a 2010 LiDAR survey. Furthermore, a comparison of the Manning's n-values used in the 2007 CDM HEC-RAS model to more recent aerial imagery showed that, for the most part, the values used still reflect the current land use conditions, so no large scale changes were made in channel roughness.

Hydraulic structure information was taken directly from the 2007 CDM HEC-RAS model, which was based on surveys and design drawings. The field visit included visual verification of hydraulic structure geometry for all bridges and culverts that were included in the 2007 CDM HEC-RAS model. Discrepancies noted during the field visit were minor; therefore, the hydraulic structure information from the 2007 CDM HEC-RAS model was used for all structures in the updated model. The bridge modeling approach was updated for several structures to include momentum to account for water flowing around piers or estimated friction forces, and the high-flow method was updated to "energy only" or "pressure and/or weir" as necessary.

The 2007 CDM HEC-RAS models used an iterative process to split flow into different conveyance areas. The updated model includes the addition of a junction and lateral weirs, which allows flow diversion to be simulated in HEC-RAS without requiring iterative steps through an external program. The split flow junction was incorporated into the updated HEC-RAS model to simulate flow split into the West Tributary. The 2007 CDM HEC-RAS models used the normal depth as the boundary condition for Deadmans Run and the known water surface elevation (WSE) as the boundary condition for the West Tributary. With the addition of the junction, the West Tributary boundary condition is set through the junction in HEC-RAS.

Additionally, the HEC-RAS model was updated to include the addition of lateral structures to facilitate in the flow transfer between Deadmans Run and the West Tributary. The upstream-most lateral weir goes from the upstream extent of the West Tributary to the BNSF Mainline Railroad Bridge. The downstream-most lateral weir goes from the Mainline Railroad Bridge to the confluence of Deadmans Run and the West Tributary. The lateral weirs were placed along the West Tributary with a headwater position from the right overbank.

The flows used in the new hydraulic model are based on the new hydrologic analysis and use the same locations for flow change. For comparison purposes, the same flow distribution locations are used. Comparison of the WSE differences between the updated model and the 2007 CDM model for all cross sections showed that the mean difference between the two steady state models for Deadmans Run was negative 0.09 feet, with a maximum difference of 2.42 feet. Further details of this comparison, as well as further investigation into any significant differences, can be found in Appendix F.

The Steady HEC-RAS model was converted to an Unsteady HEC-RAS model in order to better model flood risk reduction alternatives. The steady-state HEC-RAS model developed by CDM was updated and converted to unsteady-state model by incorporating the hydrographs directly from the HEC-HMS model as lateral inflows to the channel system. The existing conditions unsteady HEC-RAS model was updated to evaluate existing conditions for all flow frequencies (see Section 2.1 in Hydraulic Appendix for more HEC-RAS modeling history).

To validate the hydrologic and hydraulic model predictability, the September 30th, 2014 storm was predicted using the HEC-HMS hydrographs and HEC-RAS unsteady model, and stages at selected locations were compared with the recorded high-water marks. The results of this comparison are in Table 4.

Table 4. Comparison of Unsteady HEC-RAS Model with 2014 High Water Marks

Site	Cross-section Station	Latitude	Longitude	High-Water Mark (Ref. 13) (feet, NAVD88)	Model Elevation (feet, NAVD88)	Difference (feet)
Cornhusker and 29th Street	2654	40.84282	-96.6782	1133.38	1132.46	0.92
Huntington and 35th Street	5699	40.83697	-96.6705	1142.75	1143.99	-1.24
38th Street Bridge (DS)	7200	40.83543	-96.666	1146.55	1148.26	-1.71
38th Street Bridge (US)	7288	40.83542	-96.6656	1146.61	1148.64	-2.03
48th Street Bridge HMW1	10871	40.83319	-96.6533	1156.86	1156.94	-0.08
48th Street Bridge HMW2	10871	40.83316	-96.6535	1156.57	1156.94	-0.37
N 56th Street and Holdrege high-water mark 1	14390	40.8275	-96.6435	1168.93	1169.07	-0.14
N 56th Street and Holdrege High-Water Mark 2	14390	40.82768	-96.6438	1168.84	1169.07	-0.23
N 56th Street and Holdrege High-Water Mark 3	14300	40.82781	-96.644	1168.03	1169.08	-1.05
1st Bridge below Cotner	17237	40.82255	-96.6362	1172.12	1172.32	-0.2

2.2.4.2 ***CHANNEL STABILITY***

Field reconnaissance of the Deadmans Run channel bed and banks helped define the current stream stability conditions. The stream stability is an important parameter which can affect the channel capacity, or conveyance, of a stream during a flood event. Conditions discussed below include bank and bed mobility, surface roughness, erosion, and the sustainability of channel erosion protecting measures.

The Deadmans Run watershed has been a source of flooding for several decades. Based on observations during field reconnaissance, the flat terrain and mild slope of the stream could be factors contributing to the floods. Historically, it is believed that the channel was probably in balance with the runoff and sediment from the prairie that made up the watershed. As settlement pushed into the basin, changing land use and increasing the impervious area throughout the watershed, storm events yielded larger amounts of runoff. With less sediment from the surrounding area, the channel began down cutting and head cutting upstream. By the middle of the 20th Century, many of the channels within the watershed were deeply incised as noted in Figure 6, which is a picture of the Deadmans Run channel northwest of 52nd and Francis Streets in 1967. In response to the increasing erosion problem, a large portion of the Deadmans Run channel bed and banks were covered with fabric-formed concrete mats and gabion cages, installed by the LPSNRD and City of Lincoln over many years (Figure 7). Since installation of the erosion control measures, the channel and banks have remained relatively stable during the past few decades. No signs of erosion were found where erosion protection measures are in place.

Figure 6. Channel Erosion Northwest of 52nd and Francis Streets in 1967

Figure 7. Channel Stabilization Northwest of 52nd and Francis Streets in 2014

A detailed computer model was set up to simulate potential erosion and sediment deposit in the Deadmans Run channel (sediment module of HEC-RAS version 5.0). Details of the input and outputs of this model can be found in Appendix F. Table 5 presents a summary of which reaches are essentially stable, which are aggrading, and which are eroding, taking into account any existing erosion control measures. The only three reaches exhibiting erosion issues are the reach between 38th Street and 48th Street, the reach in the immediate vicinity of the railroad bridges, and the reach at the downstream end of the channel, above its confluence with Salt Creek. These three locations have erosion on the banks and channel bed, and deep and wide pools have formed in some reaches as a result of the erosion. Channel vegetation in the reach from 38th Street to 48th Street is not well maintained, and the banks near the main channel are covered by woody vegetation, which adversely affects the channel capacity.

Table 5. Channel Stability Trends along Deadmans Run

Reach	River Stations	Range of Effective Channel Invert Change (ft)	Stability Status
52nd Street to 48th Street	12511.81 - 10871.31	-0.03 to 0.06	Stable
48th Street to East Campus Bridge	10805.46 - 7287.619	-0.53 to 0.98	Unstable
38th Street Bridge to 35th Street	7255.56 - 5651.412	-0.05 to 0.04	Stable
35th Street to 33rd Street	5498.354 - 5025.529	-0.17 to 0.00	Stable
33rd Street to Rail Spur Bridge (West of 33rd Street)	4879.017 - 4209.876	-0.02 to 0.03	Stable
Rail Spur Bridge (West of 33rd Street) to Cornhusker Bridge	4185.715 - 2777.996	-0.06 to 0.73	Aggradation
Cornhusker Bridge to Downstream Extent	2653.878 - 614.2941	0.57 to 1.89	Aggradation

2.2.5 PHYSICAL SETTING

2.2.5.1 ***GEOLOGY, TOPOGRAPHY, AND SOILS***

In the State of Nebraska, two major geographic regions occur. Lancaster County falls in the Dissected Till Plains which span over the eastern fifth of Nebraska along the Missouri River (CALMIT, 2007). Within the Dissected Till Plains bedrock can be over 200 feet deep. In general, the Deadmans Run basin is an eroded and dissected till plain which was covered by two eolian deposits, Peorian Loess and Loveland (loess-clay) formations.

The highest elevation within Lancaster County is about 1,520 feet in the northwestern part of the county and the portion with the lowest elevation, 1,080 feet is in the northeastern part of the county where Salt Creek leaves the county. The relief is dominantly gentle to strong slopes (NRCS, 1980).

A desktop review of soils within and closely surrounding Deadmans Run was conducted utilizing the Natural Resources Conservation Service (NRCS) Web Soil Survey tool. The most dominant soil types found alongside Deadmans Run were Kennebec complex and Wymore-Aksarben complex. All soil classifications depicted were silt loam or silty clay loam. The majority of parent material is alluvium or loess (NRCS, 2014).

A majority of the Deadmans Run channel is protected with a fabric formed concrete mat lining. This lining often extends several feet up the channel banks. In some areas, gabion baskets line the channel banks to protect against erosion. Most of these measures were implemented between 1984 and 2005. Historical records and the bank and channel bed erosion protection are evidence that the near surface soils along the Deadmans Run channel are highly susceptible to erosion when left unprotected. Any alterations to the existing cross section of Deadmans Run will require special considerations for embankment protection, but even with protection, undermining and erosion can occur. The tributary outfall between 38th Street and 48th Street on the north end of the UNL campus, shown in Figure 8, is an example of the undermining on a section of the concrete matting.

Figure 8. Eroded Tributary Outfall Between 38th St. and 48th St.

2.2.5.2 ***PRIME FARMLAND***

Prime farmland within the study area was also assessed. The U.S. Department of Agriculture (USDA) considers prime farmland to be land that has the best combination of physical and chemical characteristics that is readily available for producing crops. Prime farmland has the soil quality, growing season and moisture supply needed to economically produce sustained high yields of crops when treated and managed according to acceptable farming methods. Prime farmlands are not excessively erodible or saturated with water for a long period, nor do they flood frequently, or are protected from flooding. Utilizing the NRCS Web Soil Survey tool, a prime farmland assessment was conducted to determine the potential of prime farmland within the study area as shown in Figure 9.

As depicted in Figure 9, there are some areas of prime farmland adjacent to the study area; which are located near the confluence of Deadmans Run and Salt Creek (north of Highway 6 and west of N 33rd Street). These two locations of prime farmland fall closest to the study location, however, are heavily surrounded by businesses and residential structures.

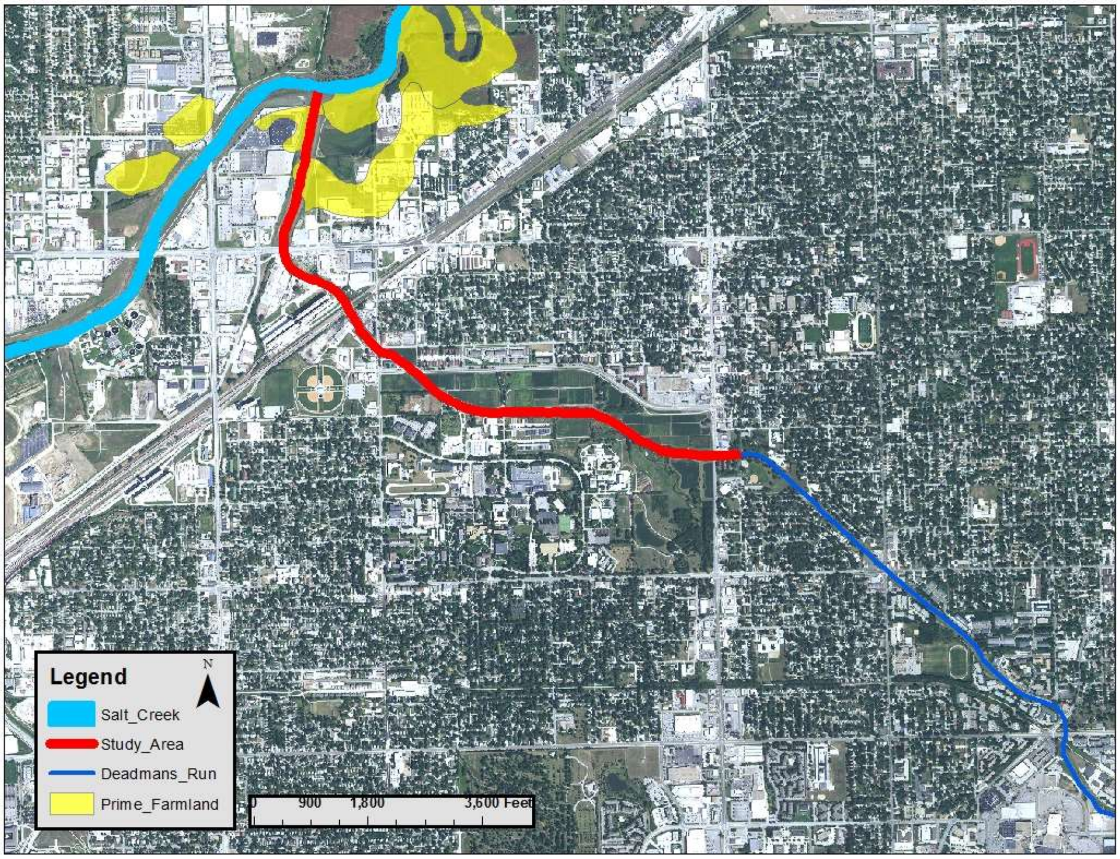

Figure 9. Prime Farmland Surrounding the Deadmans Run Channel (Yellow) (Map Derived From NRCS Soil Report, 2014 for Lancaster County, Nebraska)

Although not identified as prime farmland by the NRCS, the UNL's agricultural research plots are found within the study reach. Historical information dating back many decades has been collected and maintained on these plots, making mitigation of disturbance to these soils a high priority for the non-federal sponsor.

*2.2.5.3 **CLIMATE***

Nebraska has a continental climate characterized by extreme temperatures with frequent and sudden changes. The central region has an average annual temperature of 50ºF. The record low for the state was recorded in Morrill County on February 12th, 1899 at -47ºF, the record high of 118ºF was in the town of Minden on July 24th, 1936. Windstorms, blizzards, hailstorms and droughts are all typical weather events that occur in Nebraska (NESTATE, 2014). Table 6 depicts monthly averages taken at the station located near the Lincoln University Power Plant from 1981 to 2010.

Table 6. Average Maximum and Minimum Temperature and Precipitation for Lincoln, Nebraska from 1981 to 2010

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Avg. Max. Temperature (°F)*	35.1	39.6	51.5	63.6	73.6	83.7	88.6	85.9	78.2	66.1	50.8	37.1	62.9
Avg. Min. Temperature (°F)*	13.7	18.2	27.8	38.7	50.2	61.1	66.9	63.7	53.5	40.7	28.2	17.1	40.1
Avg. Total Precipitation (inches)*	0.63	0.85	2.08	2.63	4.65	4.77	3.87	3.85	2.98	2.18	1.39	0.98	30.86

* Values are from the Lincoln University Power Plant weather station, approximately 2 miles southwest of Deadmans Run. Source: National Climatic Data Center, http://www.ncdc.noaa.gov/oa/ncdc.html

*2.2.5.4 **HAZARDOUS, TOXIC, AND RADIOLOGICAL WASTE (HTRW)***

An Environmental Condition of Property (ECP) Phase I evaluation was performed for the Deadmans Run floodplain, with the site reconnaissance taking place in February 2015. The study included 191 different properties covering approximately 269 acres. The Phase I study was conducted in accordance with ASTM Standard practice E 15270-13, with the limitations, exceptions and scope modifications noted in Appendix L. As part of this evaluation, environmental databases were queried, aerial photos were examined, a site visit was conducted and knowledgeable city personnel were interviewed. The purpose of the Phase I evaluation is to provide a summary of properties within the Deadmans Run watershed that will need to be considered as potential flood risk reduction alternatives are evaluated. The costs to remediate contaminants are the responsibility of the local sponsor and may add to the cost of the project to the sponsor.

Several properties of potential were identified, some adjacent to Deadmans Run, which required consideration when evaluating flood risk reduction measures. The primary focus for this project is in the lower reach of the basin downstream of 56th Street. It is noteworthy that there is a high concentration of properties, having the potential for pollutants to be found, located downstream from 33rd Street. Some of the identified sites between 33rd Street and Cornhusker Highway are located close to the Deadmans Run channel. This is an area where excavation could take place if the channel is to be enlarged, levees constructed, or bridges replaced as part of a flood risk reduction plan. The sites of concern noted in the field investigation of the Phase I Evaluation can be found in Appendix L.

It has been determined that the level of precision provided at the feasibility phase will not allow for the team to confidently determine whether or not any identified sites will be disturbed, and to what level those site would be disturbed. Therefore, it is recommended that this effort be performed during design of any potential project, and the Phase II investigation, if necessary, also be performed at that time.

*2.2.5.5 **AIR QUALITY***

The Clean Air Act (CAA) (42 U.S.C. § 7401 et seq.), enacted in 1970 tasked the U.S. Environmental Protection Agency (EPA) to establish National Ambient Air Quality

Standards (NAAQS) to protect public health and welfare and to regulate emissions of hazardous pollutants. The Nebraska Department of Environmental Quality (NDEQ) monitors air quality throughout the State. Sources of suspended particulate matter and air pollutants in the proposed project area include agriculture, urban and industrial activities.

Lancaster County has two monitoring stations located in the City of Lincoln, one monitors $PM_{2.5}$ (particulate matter) and the other monitors ozone. Ambient monitoring that is being conducted indicates that the City of Lincoln is meeting established NAAQS and considered in attainment. AIRNow.gov is a website launched by EPA in the spring of 2005 and has national participation. This tool is used to relay real-time data to members of the public as well as predict conditions several hours into the future. All of the State of Nebraska's ozone, particulate and meteorological data can be found on this network (NDEQ, 2013).

2.2.5.6 ***NOISE***

Sources of noise in the proposed project area result from the agriculture, urban and industrial activities which all take place within close proximity. Due to the heavily urbanized setting of the study area and close association with the university campus, traffic is likely the primary contributor of year-round noise pollution.

Some land areas may be considered sensitive to noise. Noise sensitive receptors are land uses associated with indoor and or outdoor activities that may be subject to stress or interference from noise. This typically includes residential dwellings, transient lodging, hospitals, educational facilities and libraries. The majority of the study area is considered urban or commercial; however, Deadmans Run within the study area passes through a portion (known as "East Campus") of UNL. East Campus would be considered sensitive to noise.

2.2.6 ECOLOGICAL SETTING

2.2.6.1 ***VEGETATION AND TERRESTRIAL HABITAT***

Vegetation in eastern Nebraska was historically a tallgrass prairie with a limited extent of woody vegetation found adjacent to rivers and streams. Prior to 1855 a distinct prairie-forest ecotone restricted to floodplains, terraces and other uplands bordering riparian areas existed. It is thought that lack of fire intensity and frequency allowed woody vegetation to colonize the region. Presently, cottonwood (*Populus deltoides*), bur oak (*Quercus macrocarpa*), American basswood (*Tilia americana*), and rough-leaved dogwood (*Cornus drummondii*) are more common than they were prior to settlement of the region (Rothenberger, 1989).

Of all the grassland types found in North America, the tallgrass prairie has been considered to be the most devastated with a national loss of approximately 95 percent. One of the best-studied tallgrass prairies is Nine-mile Prairie, located near Lincoln where 291 native prairie plants still exist over approximately 10 square miles. Species such as big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), Indiangrass (*Sorghastrum nutans*), switchgrass (*Panicum virgatum*), and several sunflower (*Helianthus* spp.) species are presently and historically common species found in this region (Johnsgard, 2007).

Within the study area footprint, vegetation and native diversity are limited and invasive species and turf vegetation are common along the riparian corridor, as Deadmans Run is heavily urbanized; shown in Figure 10. There are several invasive, non-native and noxious weeds found in the State of Nebraska. According to the University of Georgia Early Detection and Distribution Mapping System (2014), in Lancaster County, 226 species are considered introduced. It is noted that not all of the 226 species are considered noxious in the State of Nebraska, but are considered noxious to the United States and may be listed as noxious elsewhere in the country.

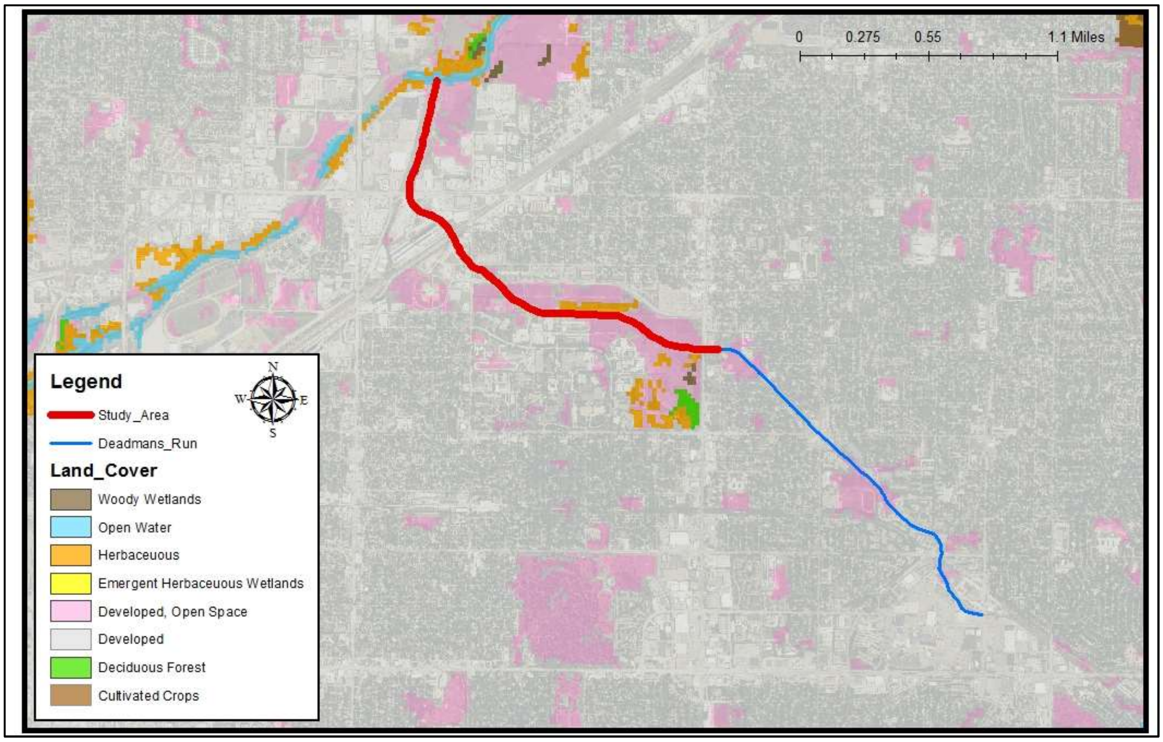

Figure 10. General Land Cover along Deadmans Run

The area along the channel that has the highest vegetative biodiversity and ecological value is the portion of the stream adjacent to the UNL's East Campus. Existing conditions of this area include vegetation reminiscent of the historic conditions (Eastern Riparian Forest community). This community has a state rank of S3. This rank, as defined by the National Heritage Program is "State Vulnerable," due to a restricted range and relatively few populations, recent and widespread declines and other factors make this community vulnerable to extirpation (Rolfsmeier & Steinauer, 2010). Early on in the feasibility study process, this area was noted as the highest ecologically-functioning portion of the project area. However, because the stream is situated in a highly urbanized setting, indicator species and expected riparian communities are not overly present within or adjacent to the project area and this small segment along the stream within the East Campus area still functions poorly as riparian habitat. The remnant functional value of this area is primarily derived from the presence of large wood (living and dead) which plays an important role in protecting river banks, reinforcing floodplains and creating and stabilizing landforms with which new woody vegetation may form (Camporeale et al., 2013). Trees and shrubs have been shown to play an important role in providing microclimate modifications and shading, streambank stabilization, inputs of organic litter and woody debris to aquatic systems, water and nutrient runoff cycling, wildlife habitat and general foodweb support for a wide range of both aquatic and terrestrial organisms (Sweeney, 1992).

2.2.6.2 ***WETLANDS***

The Corps and the EPA have defined wetlands as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (Federal Register 1982; 1980). Utilizing the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) Cowardin classification system, wetlands adjacent to Deadmans Run within the study area were determined. A small, approximately 0.15-acre, emergent wetland is located approximately 2,800 feet southwest of the N 48th Street and Leighton Avenue intersection on the left bank line of Deadmans Run (Figure 11).
It is likely this wetland's hydrology source stems from the "No Name" tributary that inlets to Deadmans Run at this location.

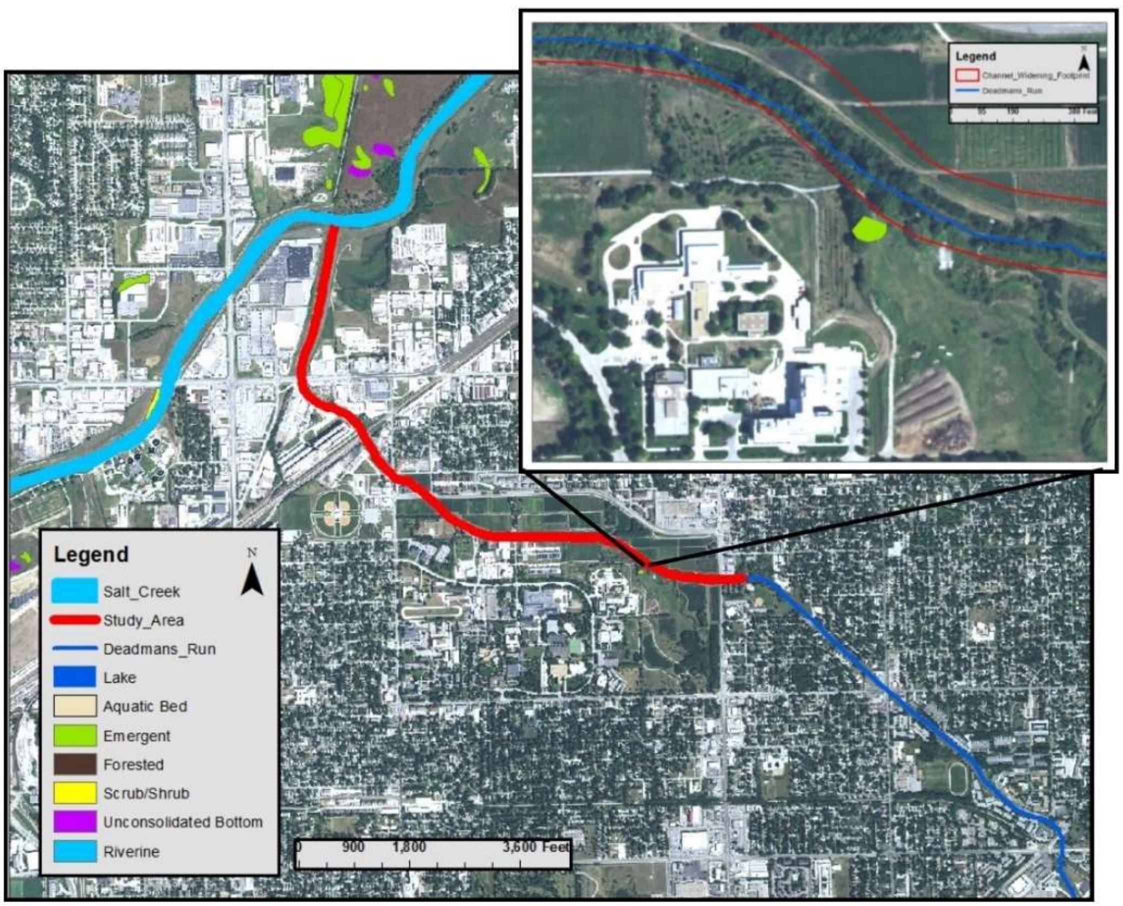

Figure 11. Emergent Wetland near Project Location

2.2.6.3 ***Water Quality***

The Clean Water Act (CWA) authorizes States to adopt water quality standards to protect "waters of the United States" within their jurisdiction. By legislative design, water quality standards include; designated beneficial uses assigned to each waterbody; both general water quality criteria which are broad prohibitions against poor water quality and specific water quality criteria for individual pollutants or conditions; and an antidegradation policy which, in general, would maintain water quality which is better than minimally required to protect designated uses. Water quality criteria are developed to protect specific beneficial uses assigned to individual waterbodies.

Under Section 401 of the CWA, an applicant for a federal license or permit (i.e. Section 404 permit) must obtain a certification that the discharge and activity is consistent with State or Tribal effluent limitations (Section 301 of the CWA), water quality related effluent limitations (Section 302 of the CWA), water quality standards and implementation plans (Section 303 of the CWA), national standards of performance (Section 306 of the CWA), toxic and pretreatment effluent standards (Section 307 of the CWA) and “any other appropriate requirement of State or Tribal law set forth in such certification”.

According to the 2007 Deadmans Run Watershed Master Plan (CDM, 2007), the complete urbanization of the watershed has impacted the water quality of Deadmans Run. The Nebraska Department of Environmental Quality (NDEQ) has established the following beneficial uses for Deadmans Run:

- Primary Contact Recreation- waters where there is a high potential for prolonged or intimate contact with the water, including swimming
- Aquatic Life Warmwater Class B- water where the resident biota is presently limited by water volume or flow, water quality (natural or irretrievable human-induced conditions), substrate composition, or other habitat conditions
- Agricultural Water Supply Class A- waters used for general agriculture purposes (e.g. livestock watering and irrigation) without treatment
- Aesthetics- waters that are aesthetically acceptable and free from human-induced pollution such as noxious odors, floatable materials, refuse and algal blooms

As required by CWA regulations, NDEQ periodically assess available water quality data to identify concerns. If the concerns is sufficiently high, a surface water may be classified as impaired and placed on a 303(d) list and require the development of a total maximum daily load (TMDL) which establishes the pollutant control requirements deemed necessary to resolve the impairment and bring the body of water back into compliance with water quality standards. In 2006, *Escherichia coli* caused a listing on the 303(d) list, and a TMDL was applied in September 2007. Assessments conducted in 2014 and 2016 Deadmans Run is on the 303(d) list for Organic Enrichment/Oxygen Depletion, a TMDL is still needed.

2.2.6.4 ***FISH AND WILDLIFE***

Various fish species occur in Deadmans Run, one study conducted in 1977 in the Salt Creek basin collected individuals representing 12 families and 34 species. It was determined the general low diversity was indicative of the unstable conditions that small streams provide. Species such as channel catfish (*Ictalurus punctatus*), blue catfish (*I. furcatus*), largemouth bass (*Microterus salmoides*), walleye (*Sander vitreus*), and northern pike (*Esox lucius*) are desirable sport fish. Members from the sucker, sunfish, carp, minnows and shiners, as well as topminnow families are present. Other species include the shortnose gar (*Lepisosteus platostomus*), brook stickleback (*Culaea inconstans*), black and yellow bullhead (*Ameiurus melas* and *natalis*), and freshwater drum (*Aplodinotus grunniens*) (Maret & Peters, 1980). During field observations, invasive Asian carp (*Hypophthalmichthys molitrix* and *Mylopharyngodon piceus*), shortnose gar and schools of unidentified minnow-like fish were noted. Overall diversity is very poor within the channelized portion of Deadmans Run. Deadmans Run is very shallow and lacks cover across most of its length. It is expected that a minor increase in species diversity may occur at the confluence of Salt Creek and where more natural habitat areas exit in unlined portions of Deadmans Run. These areas of potential higher diversity are likely located within the East Campus segment of the stream, and Deadmans Run downstream of the BNSF railroad bridges. In addition to these segments being un-lined with a concrete mattress, they are surrounded by a greater buffer of vegetation which contributes to woody and detritus inputs into the stream providing food, shelter and refugia as well as shading.

Mammals that may typically be found in the vicinity of waterways in eastern Nebraska, like that of Deadmans Run, include Virginia opossum (*Didelphis virginiana*), masked shrew (*Sorex cinereus*), least shrew (*Cryptotis parva*), eastern red bat (*Lasiurus borealis*), woodchuck (*Marmota monax*), white-footed mouse (*Peromysus leucopus*), northern grasshopper mouse (*Onychomys leucogaster*), southern bog lemming (*Synaptomys cooperi*), meadow vole (*Microtus pennsylvanicus*), and least weasel (*Mustela nivalis*), (Benedict et al., 2000). It is anticipated that generalist species prone to urbanized areas such as raccoon (*Procyon lotor*), Virginia opossum, skunk (*Mephitis mephitis*), gray squirrel (*Sciurus carolinensis*), white-footed mouse and red fox (*Vulpes vulpes*) would likely be present throughout the study area.

Although Deadmans Run does not provide high quality riparian habitat, it is anticipated that common breeding birds in eastern Nebraska may be found along Deadmans Run. This would include the Cooper's hawk (*Accipiter cooperii*), great horned owl (*Bubo virginianus*), northern flicker (*Colaptes auratus*), red-headed woodpecker (*Melanerpes erythrocephalus*), great crested flycatcher (*Myiarchus crinitus*), blue jay (*Cyanocitta cristata*), black-capped chickadee (*Poecile atricapilla*), house wren (*Troglodytes aedon*), eastern bluebird (*Sialia sialis*), American robin (*Turdus migratorius*), red-eyed vireo (*Vireo olivaceus*), yellow warbler (*Dendroica dominica*), Baltimore oriole (*Icterus galbula*), and northern cardinal (*Cardinalis cardinalis*) (Sharpe et al., 2001).

Presently, 13 species of amphibians and 47 species of reptiles are known to exist in the entire State of Nebraska. In Eastern Nebraska, the tiger salamander (*Ambystoma* *trigrinum*), cricket frog (*Acris crepitans*), woodhouse toad (*Bufo woodhousii*), western gray tree frog (*Hyla chrysoscelis*), plains leopard frog (*Rana blairi*), northern leopard frog (*Rana pipiens*) and western striped chorus frog (*Pseudacris triseriata*), snapping turtle (*Chelydra serpentina*), painted turtle (*Chrysemys picta*) are all amphibians that have a high probability of being found in and around the project area.

Some reptiles expected to be found around Deadmans Run would be the blue racer (*Coluber constrictor*), prairie kingsnake (*Lampropeltis calligaster*), milk snake (*Lampropeltis triangulum*), common watersnake (*Nerodia sipedon*), bull snake (*Pituophis catenifer*), varying species of gartersnakes (*Thamnophis* spp.) and the prairie skink (*Eumeces septentrionalis*) (Lynch, 1985).

2.2.6.5 ***THREATENED AND ENDANGERED SPECIES***

In accordance with Section 7 of the Endangered Species Act (ESA) of 1973 (16 U.S.C. 1531 et seq.), a letter dated May 20th, 2015 was submitted to the USFWS Region 6 Ecological Services Field Office requesting information on anticipated impacts that may be associated with proposed alternatives and a list of federally-listed threatened and endangered species that may be found in the study area. In response, the USFWS provided the Corps with a planning aid letter (PAL) dated January 15th, 2016. In this letter, the USFWS identified three federally threatened species; the western prairie-fringed orchid (*Platanthera praeclara*), piping plover (*Charadrius melodus*) and northern long-eared bat (*Myotis septentrionalis*) and four endangered species; the salt creek tiger beetle (*Cicindela nevadica lincolniana*), pallid sturgeon (*Scaphirhynchus albus*), whooping crane (*Grus americana*) and interior least tern (*Sterna antillarum athalassos*). These species were fully considered during alternative formulation and in the impact analysis of this integrated EA (see Section 5.1.8) as well as in the Biological Assessment (BA) prepared for submission to the USFWS (see Appendix A- Section I).

Furthermore, it was noted in the January 2016 PAL that since 1978 the USFWS has concluded in all of its Section 7 consultations on water projects in the Platte River basin, that the Platte River ecosystem is in a state of jeopardy and any federal action resulting in instream flow depletion to the Platte River ecosystem will further or continue to deteriorate the already stressed habitat conditions. Due to the cumulative effect of many water depletion projects in the Platte River basin, the USFWS considers any depletion (direct or indirect) significant. As such, the USFWS has adopted a jeopardy standard for all Section 7 consultations on federal actions which result in water depletions to the Platte River system.

The USFWS had concluded that water-related activities in the Platte River basin resulting in less than 0.1 acre-foot per year of depletions in flow to the nearest surface water tributary to the Platte River system do not affect the Platte River target species (pallid sturgeon, interior least tern and piping plover) and thus do not require consultation with the USFWS for potential effects on those species. Similarly, detention basins designed to detain runoff for less than 72 hours and return all water to the same drainage basin within 30 days' time are considered to have no effect and do not require consultation.

2.2.7 SOCIOECONOMIC SETTING

The City of Lincoln, Nebraska has experienced continued population growth since its establishment. This population growth has led to increases in the number of housing units, although household size has remained relatively constant since 2000. Table 7 contains the U.S. Census Bureau data for 2000, 2010, and 2014 illustrating the growth of Lincoln since 2000.

Table 7. Population, Housing Units, and Average Household Size Lincoln, NE 2000-2014

	2000	2010	2014	% Increase (2000-2010)	% Increase (2010-2014)	% Increase (2000-2014)
Population	225,442	258,379	273,002	14.6	5.7	21.1
Housing Units	95,188	110,546	114,052	16.1	3.2	19.8
Avg. Household Size	2.36	2.36	2.39	0.0	1.3	1.3

In 2014, persons of Hispanic or Latino origin (who may be of any race) comprised 7.1 percent of the total population of Lincoln, compared to 10.1 percent of the Nebraska population and 17.3 percent of the U.S. population. In 2014, Lincoln's racial composition consisted of the following: Caucasian, 86.3 percent; African-American, 4.5 percent; American Indian and Alaska Native, 0.3 percent; Asian, 4.7 percent; some other race, 1.4 percent; and two or more races, 2.8 percent (U.S. Census Bureau, 2014).

Educational attainment is relatively high, with 92.4 percent of the population age 25 years, or older, having graduated high school and 36.3 percent having obtained a bachelor's degree or higher in 2014. In 2014, the major industries employing Lincoln residents were: educational services, and health care and social assistance, 26.1 percent; retail trade, 10.9 percent; arts, entertainment, and recreation, and accommodation and food services, 10.1 percent; professional, scientific, and management, and administrative and waste management services, 9.8 percent; manufacturing, 9.3 percent; and finance and insurance, and real estate and rental and leasing, 8.5 percent. Lincoln had an estimated 2014 median household income of $50,241, and in this same time period the percentage of the population living below the poverty level was 15.6 percent. By comparison, median household income and poverty level in the State of Nebraska are $52,686 and 12.4 percent, while the U.S. has figures of $53,675 and 15.5 percent for the same time period (U.S. Census Bureau, 2014).

2.2.8 ECONOMIC SETTING

The economic analysis was performed using the HEC-FDA Version 1.4 Model. The study analysis includes the stretch of Deadmans Run from just upstream of 48th Street to the confluence with Salt Creek, as well as the West Tributary to its confluence with Deadmans Run below the BNSF Railway Line. The majority of the analysis focuses on the high damage area between 48th Street and the BNSF Railway Line on Deadmans Run, as this area contains the vast majority of expected damages. These areas are identified in Figure 12. This high damage area is the most likely area to produce a viable project. The economic analysis factored in the 0.2 percent ACE event floodplain, with data collection and modeling going slightly beyond this area to account for uncertainty and flood events that are theoretically greater than the 0.2 percent ACE event. The entire area is located within city limits and includes residential neighborhoods, developed commercial areas, and the UNL's East Campus. Annualized estimates of damages in this analysis assume the fiscal year (FY) 2017 federal interest rate of 2.875 percent and a period of analysis of 50 years based on official guidance for evaluation of federal projects. All estimates are expressed in FY 2017 price levels. Additional detail about the economic analysis and economic model may be found in Appendix D.

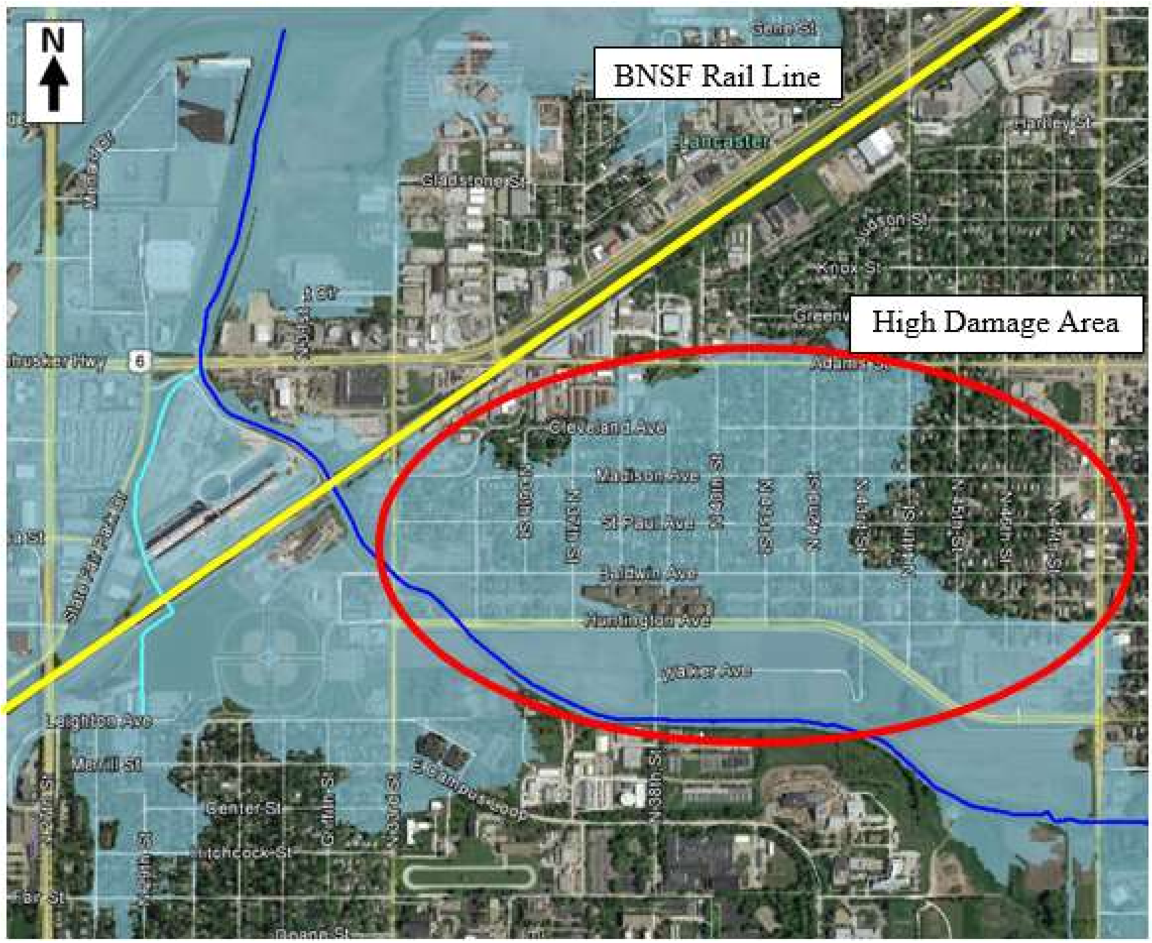

Figure 12. High Damage Area and BNSF Rail Line within Study Area

2.2.8.1 ***ECONOMIC MODEL***

Economic damages and potential benefits for the Deadmans Run Feasibility Study were computed using the HEC-FDA version 1.4 tool. Using the most likely values for the input parameters, HEC-FDA uses specified levels of uncertainty for input values over tens of thousands or even hundreds of thousands of model iterations to incorporate the uncertainty in the values used in the program. Throughout these iterations, the HEC-FDA program determines whether a flood event resulted in damage and how much damage would have occurred. The result is a computed EAD with incorporated risk and uncertainty. Uncertainty parameters used in the HEC-FDA study for this analysis include:

- first floor elevations;
- structure values;
- content to structure ratios;
- appurtenant uses to structure ratios;
- percent depth-damage functions;
- discharge-exceedance functions; and
- stage-discharge functions

As mentioned above, a period of analysis of 50 years was used based on official guidance for Corps economic evaluation. The expected annual damage for each year in the analysis period is computed, discounted back to present value at the beginning of the base year, and annualized to obtain equivalent annual value over the 50-year period of analysis. Due to the assumption that the future most likely year will not differ greatly from the base year, an equivalent annual damage analysis was not completed for this study.

Reaches for Deadmans Run were delineated based on two primary variables. Input from hydraulic engineering was taken into account when it was determined that certain physical features affected the stream hydraulics. Changes in flood characteristics often occur at bridge crossings and culverts. This accounts for most of the boundaries for reaches. In addition to this variable, the potential for with-project alternatives, in particular reaches, led to delineations that would allow for comparison of different alternatives to the existing condition in the future.

In addition to Deadmans Run, hydraulic and economic modeling was done for the West Tributary, which begins at Leighton Avenue near Fleming Fields, downstream of the BNSF rail line, and flows in a northerly direction until the confluence with Deadmans Run approximately a half-mile downstream. The same variables for considering reaches and their boundaries were analyzed for this tributary.

2.3 FORECASTED FUTURE CONDITIONS

The future forecasted conditions, also commonly referred to as the future without-project conditions, are an estimate of what the community will be like, up to 50 years in the future, if no project is implemented by the Corps. Current trends and the potential for change, as expressed by other development plans on the books, are a basis for estimating this future condition.

2.3.1 FUTURE HYDROLOGIC AND HYDRAULIC CONDITIONS

There is no appreciable change expected in the rainfall and runoff patterns of the Deadmans Run watershed during the 50-year period under consideration. The current forecasted future conditions include the 33rd, 38th and 48th Street bridges being replaced and widened by the City of Lincoln and LPSNRD. When supplemented with an improved flood control channel, these bridge modifications would increase the overall capacity of the Deadmans Run flood control project proposed in this report. When not supplemented by an improved flood control channel, the modification of these bridges will only have a localized impact on reducing stages upstream of the bridges. The 33rd Street Bridge is currently a 34-foot wide by 17-foot high box culvert and is a considerable chokepoint on the existing channel. The replacement of this culvert with a bridge that spans the width of the proposed flood channel will drop the upstream water surface considerably during large events. Overall, this would not reduce the extent of flooding in the study area.

The 38th and 48th Street bridges do not reduce the channel capacity as much as the 33rd Street Bridge, and therefore do not have as considerable an impact when widened without any corresponding channel improvements. There will be a localized reduction in stage and increase in velocity at each bridge location during a 100-year event (or 1% ACE) with no impact to the extent of flooding in the Deadmans Run basin. The City of Lincoln and LPSNRD will also transition an existing soccer field into a detention basin. For flows that exceed a 50-year event (or 2% ACE) there will be a reduction in stage on the West Tributary. As such, the City and LPSNRD are constructing a 7.7-acre detention basin within the existing Fleming Field Complex to capture these flows.

It is expected that due to the close proximity of infrastructure, dwellings, and commercial property to the channel that prompt maintenance action will be employed to address any bank erosion or down cutting of the stream bed.

2.3.2 FUTURE ECOLOGICAL CONDITIONS

2.3.2.1 ***ECOSYSTEM***

In the absence of a project, it is not likely that the biological setting of the heavily urbanized portions of Deadmans Run would change. In the limited areas where environmental conditions allow a potential natural setting, it is likely these areas would continue to develop through natural succession. Early successional species, typically ruderal in nature, would colonize newly disturbed areas and slowly be replaced by mid- to late-succession species. In the absence of any disturbance, the plant communities will continue to be dominated by late successional species. Continued pressure from invasive species, such as reed canary grass (*Phalaris arundinacea*) and Japanese brome (*Bromus japonicus*) is expected along Deadmans Run.

A habitat analysis was conducted as part of this feasibility study. Further detail of these analyses can be found in Appendix A. This analysis showed a future continued trend further degrading the ecological system to a homogenized, biologically monotypic site with reduced floodplain connectivity, continued bank erosion and increased sedimentation. This degradation would continue to impact the terrestrial and aquatic communities that currently exist through declining quantity and quality of diversity and sustainability. To solve problems in the study area, they may be viewed as opportunities.

2.3.3 FUTURE COMMUNITY CONDITIONS

The future without-project condition economic analysis was determined to be the same as the "no action alternative analysis" for this feasibility study. The resources consulted in establishing the current and future without-project conditions included maps, aerial photos, topographic and hydrographic surveys, soils data, previous studies, data and consultation with other agencies. It is assumed that minimal channel encroachments, from urbanization and commercialization, will continue. Periodic flooding will continue to impact portions of the floodplain, and will continue to damage property in the floodplain. This will continue to create economic and social hardships to the properties affected, as well as to others not directly impacted by flooding. The basin is fully developed, so substantial changes are not expected. Economic and social revitalization along Deadmans Run will be impeded due to the floodplain development restrictions that currently exist. The projects developed out of this effort will strive to greatly improve the economic and social conditions in the Deadmans Run study area of Lincoln, Nebraska.

2.3.4 CLIMATE

The Corps' Engineering and Construction Bulletin No. 2016-25 (ECB, USACE 2016) requires a qualitative analysis of the impacts of climate change on the climate variables that may affect the hydrology of a project. The climate change analysis does not affect the numerical results of the calculations made for the other, non-climate aspects of the required hydrologic analysis but is used to inform the decision process related to future without-project conditions, formulation and evaluation of the performance of alternative plans, and other decisions related to project planning, engineering, operation, and maintenance. Some examples of how a quantitative assessment of climate trends may affect a project design include considering whether the project could be modified in the future or if another strategy to address the study objective should be considered to accommodate the project future increases in discharge.

The climate change analysis performed in compliance with ECB No. 2016-25 indicated largely negligible changes in annual peak stream flow and precipitation. Stream gauge annual peak flows on Salt Creek show a downward trend in annual peak flows, but the trend was not statistically significant in the majority of cases. The stream gauge records near the site were not homogeneous because ten dams designed for flood control were closed in the 1960s on tributaries to Salt Creek, so a downward trend in the first-order trend analysis of the data was almost certainly not due to climate change. Review of regional climate model data indicates that precipitation and runoff are forecasted to likely increase at a negligible rate given the expected 50-year project life. The frequency of flood events will likely increase over time but their peak flow magnitudes do not show a significant increase. Therefore, project alternatives would benefit from including resiliency for future increases in flood events. Additional information on the climate change analysis can be found in Appendix E.

3 PLAN FORMULATION

3.1 PLANNING STRATEGY

3.1.1 CORPS SECTION 205 POLICY

CAP Section 205 projects are relatively small-scale flood risk management projects. The solutions investigated can include either structural measures (levees, channels, etc.), nonstructural measures (floodproofing, relocations, etc.), or a combination of both. Flood risks and damages must stem from overland flooding by a stream or a major drainage way. To qualify for assistance under the Section 205 authority, watersheds contributing to flood problems must have a drainage area of at least one square mile and a peak flow of at least 800 cfs for a 10 percent ACE event. This project qualifies for the Section 205 Program, as the Deadmans Run watershed has a drainage area of 9.6 square miles, and the 10 percent ACE event discharges are approximately 5,000 cfs at the mouth of the channel.

3.1.2 CONSIDERATION OF THE FOUR PLANNING CRITERIA

In the conduct of all Corps feasibility studies, alternative plans are formulated within the context of considering four fundamental planning criteria*: completeness, effectiveness, efficiency* and *acceptability*.

1. *Completeness* is the extent to which a given alternative plan provides and accounts for all necessary investments or other actions to ensure the realization of the planned effects. This may require relating the plan to other types of public or private plans if the other plans are crucial to realization of the contributions to the objective.
2. *Effectiveness* is the extent to which an alternative plan alleviates the specified problems and achieves the specified opportunities.
3. *Efficiency* is the extent to which an alternative plan is the most cost-effective means of alleviating the specified problems and realizing the specified opportunities, consistent with protecting the Nation's environment.
4. *Acceptability* is the extent to which the alternative plans are acceptable in terms of applicable laws, regulations and public policies.

3.1.3 QUALITY MANAGEMENT

To ensure quality and technical accuracy of the analyses and report, both District Quality Control (DQC) and Agency Technical Review (ATR) are conducted and certified prior to finalizing the report for public review. Legal certification is accomplished concurrent with the ATR process to ensure that the study meets and fulfills all legal requirements, and complies with all applicable federal, state, and local laws and regulations. This final report incorporates all comments received during the agency and public review process and any necessary revisions needed to address those comments, and the same quality management procedures are applied prior to submitting the report for approval.

3.2 SUMMARY OF MANAGEMENT MEASURES

In accordance with ER 1105-2-100, both nonstructural and structural measures were considered under this study. This section provides an overview of the measures identified for consideration.

3.2.1 NONSTRUCTURAL MEASURES

Nonstructural flood risk adaptive measures (FRAM) were considered for reducing flood damages and flood risk in the Deadmans Run floodplain in Lincoln, Nebraska. Nonstructural FRAMs can be sub-divided into physical and non-physical measures. Physical nonstructural measures include wet and dry floodproofing of buildings, raising first floor elevations of buildings, relocation of buildings and buy-outs. These measures result in physical modifications to buildings in flood hazard areas that make them less vulnerable to flood damages or removal of the buildings from the flood hazard area entirely. Nonstructural measures can be implemented for public and private structures. Relocation or acquisition is the only acceptable nonstructural measure for structures located in the FEMA regulatory floodway. Implementation of nonstructural measures requires the permission and active participation of the property owners. Non-physical measures such as automated flood warning systems, which supplement National Weather Service flood warnings, can also reduce the threat to life and give warning to remove some property from flood prone areas ahead of a flood. Figure 13 shows an example of a flood warning device found in Lincoln, Nebraska.

Figure 13. Stage Activated Traffic Flood Warning Device near 50th and R Streets, Lincoln, NE

Non-physical nonstructural measures consist of programs, systems or activities such as flood insurance, floodplain regulations and flood preparedness planning. The adverse effects of flooding are reduced by providing flood insurance for potential flood damages incurred, alerting the population to imminent flooding, preventing unsuitable development in flood hazard areas and providing recommendations for actions by public officials and citizens before, during and after flooding. These measures do not physically modify the building to reduce the vulnerability to flood damages of existing property in flood hazard areas.

3.2.2 STRUCTURAL MEASURES

Structural solutions typically change the characteristics of flooding at the project location, usually by reducing flood stage, discharge or both. Among structural flood risk management measures typically considered on flood risk reduction projects are levees, floodwalls, diversions, detention, channelization, and bridge replacement. Improvement of channel conveyance allows flood flows to pass by at a lower stage. A community can also be protected by employing structures upstream, such as dams and flood diversion channels. Large-scale structural measures are those measures that protect multiple properties by building permanent features which modify the characteristics of flooding in order to protect property from flood overflows, or prevent overflows, rather than by modifying individual property. Typical large-scale structural measures include channel and bridge improvements, levees, floodwalls, reservoirs and detention basins and diversion channels.

Conversely, small-scale, or micro, structural measures are small changes to individual properties within the basin that, if enough micro-structural measures are constructed it could reduce flood peaks on the main channel. Micro-structural measures include rain gardens, storing rooftop rainwater in cisterns, permeable parking lots and mini-detention basins. While micro-structural measures can be employed to reduce peak discharges, they are most effective in lowering peaks of more common rainfall events, such as the 20 percent or 10 percent ACE events, and they tend to be overwhelmed by larger events, such as the 1% ACE rainfall runoff event. This problem with micro-structural measures occurs as they often have limited storage or infiltration capabilities, which are overwhelmed once rainfall rates reach several inches per hour, or are already full before the most severe portion of the storm arrives. An example of a micro-structural measure is shown in Figure 14.

Figure 14. Bio-Retention Storm Water System (Lauritzen Gardens, Omaha, NE)

3.2.3 INITIAL ARRAY OF PROJECT MEASURES

The initial array of measures of all types was developed during the June 30th facilitated workshop, and edited and appended following the meeting. The condensed list of measures included:

- Channel and bridge conveyance improvements, multiple locations
- Off channel storm water detention
- Subgrade storm water detention beneath parking garages
- Levee and roadway combination at 33rd Street
- Buyouts
- On-site local treatments (rain barrels, pervious pavement, etc.)
- Elevate and floodproof structures
- Raise Huntington Avenue to serve as a levee
- Lower Huntington Avenue to provide conveyance
- Floodwalls near channel
- Flood warning system installation or improvement
- Storm sewer diversion to Salt Creek
- Increase storage at Wedgewood Lake

3.3 ARRAY OF ALTERNATIVES

As mentioned in Section 1.2, the initial study area for this feasibility study was the entire Deadmans Run watershed within Lincoln, Nebraska. Therefore, the initial array of measures was developed for the entire watershed. Following the alternatives formulation process, the PDT decided to reduce the study area, to better match the study objectives and Section 205 program limits.

The initial array of measures were screened for viability and effectiveness. During this screening the following measures were eliminated from further analysis:

- On-Site Local Treatment Measures – had potential application within the study reach and ranked high in the qualitative assessment, but initial evaluation showed that this measure would not achieve the study objectives.
- Buyouts – were determined to be economically unviable, because in accordance with the Corps' Flood Damage Reduction Matrix, buyouts for such a large number of properties would be significantly more expensive than other nonstructural measures. Additionally, since the structures are not within the floodway, buyouts are not required, so less expensive methods were pursued.
- Raising/Lowering Huntington Avenue – raising the roadway was determined to be economically unviable, as the entire roadway would have to be reconstructed within the project reach to make it an effective water barrier. Additionally, it was decided that if the analysis performed on the levee alternatives showed positive benefits, that this measure may be revisited. However, the levee analysis, further discussed later in this report, showed that an embankment on only one bank would induce damages on the opposite bank. Therefore, further analysis on this measure was not performed. Lowering the roadway would not achieve the objectives of the study, as it would allow for more water to enter into the high damage neighborhoods.
- Flood Warning System – the location for this measure was eliminated from the study area (upstream).
- Storm Sewer Diversion to Salt Creek – would not achieve study objectives as storm sewer flows were small relative to the flows inducing damages within the community.
- Increase Storage at Wedgewood Lake – the location for this measure was eliminated from the study area (upstream).
- Detention – a standalone detention alternative was screened out as the team was unable to find enough real estate to construct an adequate sized storage area, or multiple smaller storage areas.

With this in mind, the measures listed below were carried forward for analysis under this study:

- Channel and conveyance improvement
- Bridge improvements
- Elevation and floodproofing
- Right-bank levee(s)
- Detention in combination with other measures

The structural measures were combined into integrated alternative plans for evaluation due to interdependencies between measures. For example, should a short levee be constructed on a bank of Deadmans Run, an analysis of its effect on the water surface elevation must then be conducted. If the water surface elevation rises or flows are accelerated, downstream improvements such as bridge replacement or channel widening may also be necessary to prevent induced damages. Additionally, the multiple right-bank levee alternative plans were not evaluated due to initial analysis on Alternative #2, below, showed that the right-bank levee was inducing damages on the left bank.

3.3.1 DESCRIPTION OF ALTERNATIVES[1]

3.3.1.1 ***ALTERNATIVE #1 – CHANNEL AND BRIDGE IMPROVEMENTS, CHANNEL CONVEYANCE IMPROVEMENTS***

The focus of this alternative was on increasing channel conveyance by widening the channel. Significant channel widening, bridge replacements, and a flume beneath the railroad bridges form the core of the effort to lower flood stages.

The initial version of Alternative #1 only included replacement of the box culvert at 33rd Street and the bridge at 48th Street with longer structures, placing the concrete flume under the railroad bridges, and sizing the channel to a 1% ACE flood event. However, the HEC-RAS models indicated that with the improved channel and wider structures, the peak stages produced by an event on the Deadmans Run channel occur quicker under this alternative, causing backwater effects on the West Tributary; shown in light blue in Figure 16. HEC-FDA determined that these backwater effects were significant enough to cause induced, outward, damages along the West Tributary. Further analysis determined that the backwater effects along the West Tributary were caused by coincidental hydrograph peaks. These effects do not currently exist because the West Tributary's hydrograph peaks before the peak of the current Deadmans Run hydrograph. However, by entraining more flow that would have otherwise caused overland flooding into the Deadmans Run channel, thus increasing the volume of water within the channel, the hydrographs are now peaking at almost the exact same time. This coincidental hydrograph can be seen in Figure 15 for the 0.2 percent ACE event.

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[1] During initial formulation and alternative screening, 33rd Street culvert and 48th Street Bridge were included in the structural analysis for replacement. However, in fall of 2017, the City of Lincoln identified the 48th and 38th Street bridges for replacement due to their age and condition and replacing the 33rd Street culvert with a bridge as a potential component of a future RTSD project concurrently being planned. The current undersized 33rd Street culvert and 48th and 38th Street bridges have restricted capacity resulting in attenuation floodwaters; once the larger structures are put in place, they will allow additional channel flow to propagate downstream changing timing of how the flows interact with flow coming from the West Tributary. These bridge replacements are now being performed by the non-federal sponsor, as well as the off-channel detention basin which alleviates flooding along the West Tributary by coinciding flows created by the Deadmans Run proposed project. For further details, see Section 4.4.

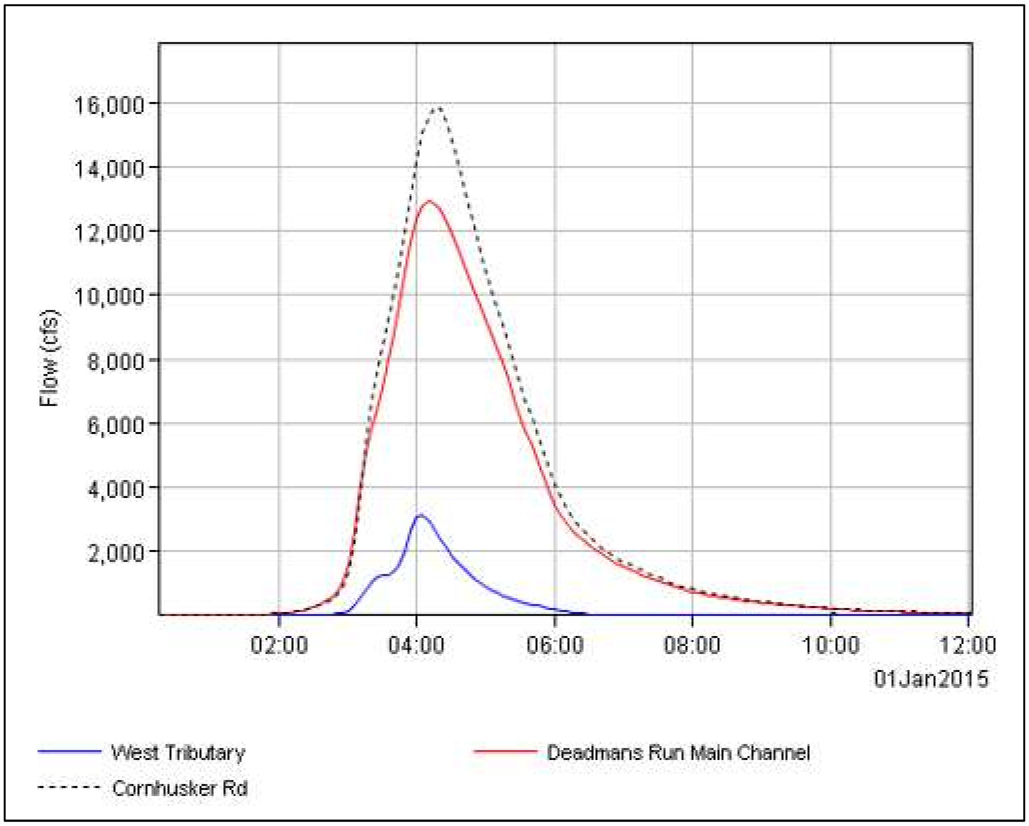

Figure 15. Improved Deadmans Run Channel & West Tributary Hydrographs (0.2% ACE event)

In order to mitigate the induced damages caused by the improved Deadmans Run channel, an off-channel detention basin was designed along the West Tributary to temporarily detain flows and lower the peak of the West Tributary hydrograph for events exceeding the four percent ACE flow. The detention basin, shown in purple in Figure 16, will be designed with a hardened overtopping section. Events equal to or more severe than the four percent ACE event, the event at which it was determined the backwater effects started, overflow the overtopping structure into the off-channel detention basin. The detention basin was sized to accommodate the necessary volume, approximately 90 acre-ft, to "shave" the West Tributary hydrograph enough to mitigate damages associated with the previously noted backwater effects created from coincident hydrographs. More information about the detention basin can be found in Section 3.3.5.3 of the Hydraulic Appendix (Appendix F).

Since the off-channel detention basin will be designed to capture flows during events more severe, less frequent, than the four percent ACE event, the majority of the time the basin will serve as a recreational facility. Currently the area where the detention basin is proposed for construction is used as a soccer and rugby complex. The intention would be for the detention basin to continue to serve this purpose, or a similar recreation purpose, except during severe high water events.

In addition to the detention basin, it was determined that the existing access road to the grain elevator and other industrial facilities along the right bank of the West Tributary needed to be relocated. The existing access road doesn't have sufficient space beneath it to accommodate an additional culvert. Additionally, the further the access road is placed upstream of the confluence with Deadmans Run, the more effective the culverts underneath the roadway will be at passing flows. The relocated access road, shown in orange in Figure 16, will not only increase the capacity underneath the roadway, but it should also provide for a safer intersection between the access road and the State Fair Park Drive. It is worth noting that a “Texas Crossing,” or low water crossing, was also considered for the access road, but due to the geometrics required for the tractor trailers accessing the grain elevator this type of crossing was determined to be infeasible. The overall extents of the fully developed Alternative #1 are depicted in Figure 16.

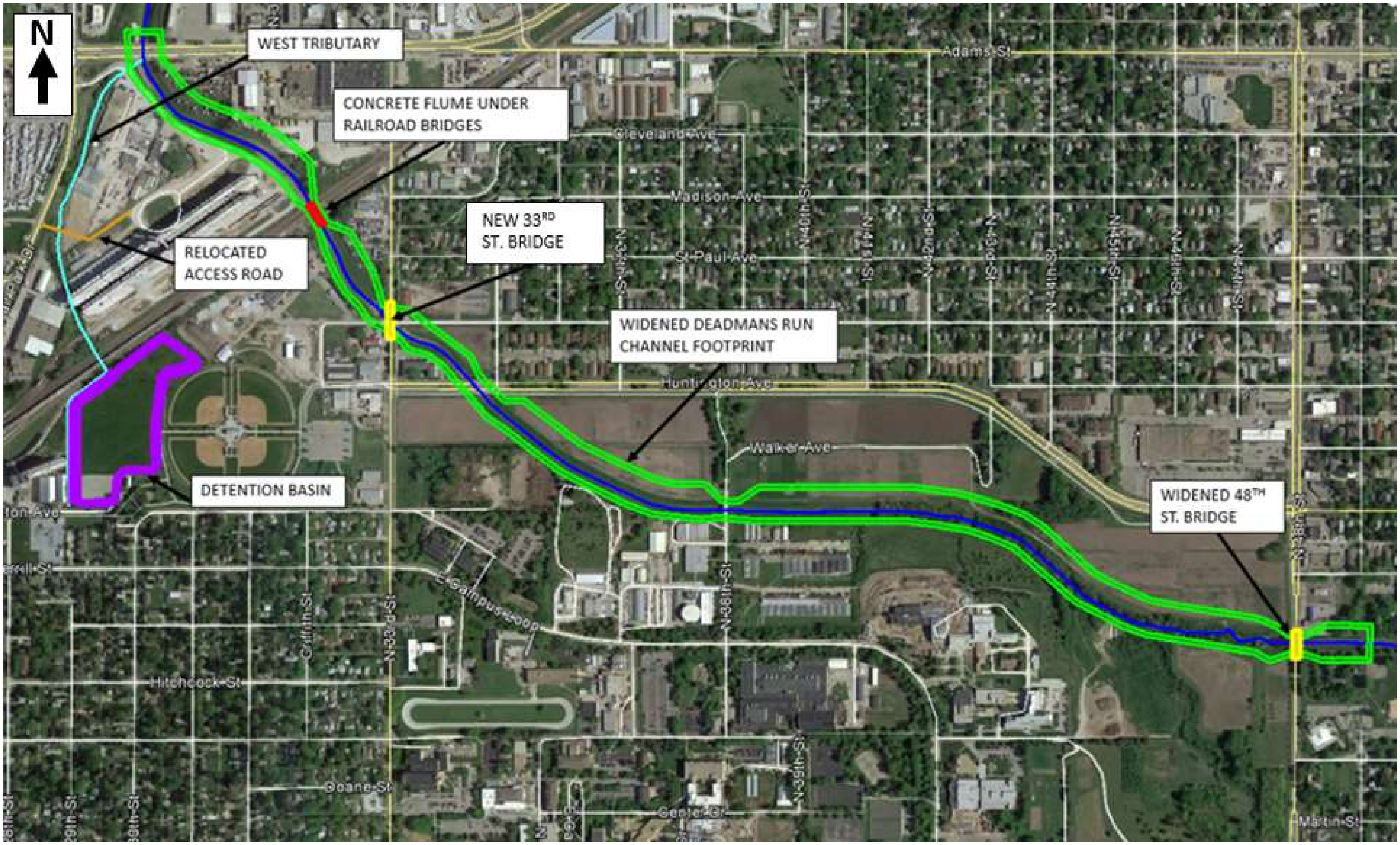

Figure 16. Alternative #1 Overview

3.3.1.2 ***ALTERNATIVE #2 – CHANNEL AND BRIDGE IMPROVEMENTS WITH A RIGHT BANK LEVEE***

The focus of this alternative is on increasing channel conveyance by widening the channel. Significant channel widening, bridge replacements, and a levee upstream of the railroad bridges to Huntington Road form the core of the effort to lower flood stages. This alternative differs from Alternative #1 primarily by substituting a right bank levee between the Railroad Bridges and Huntington Avenue in-lieu of replacing the 33rd and Baldwin culvert with a bridge, and installing the concrete flume under the railroad bridges. The overall extents of Alternative #2 are depicted in Figure 17.

Similar to Alternative #1, the initial version of Alternative #2 only included structural measures along the main Deadmans Run channel. However, the HEC-RAS models for Alternative #2 also showed that backwater effects were produced with the implementation of the structural measures due to coincident hydrographs on the main channel and the West Tributary. Therefore, the detention basin and relocated access road were incorporated as pieces of Alternative #2 as well.

Figure 17. Alternative #2 Overview

3.3.1.3 ***ALTERNATIVE #3 – STAND-ALONE NONSTRUCTURAL FLOOD RISK ADAPTIVE MEASURES***

A stand-alone nonstructural assessment was completed for the study area along Deadmans Run. The assessment focused on the 1% ACE design flood event. All of the structures within the 0.2 percent ACE floodplain were identified, and a nonstructural measure was selected for each structure incurring damages at the 1% ACE event. Nonstructural measures looked at under this study included elevating structures, removing basement areas, wet floodproofing, and dry floodproofing. Given the number of structures within the floodplain, relocation was not considered to be a cost-effective solution. The measures identified for each structure were selected based on the individual structure characteristics, the depth of flooding, and the velocities at that structure's location. The details of the methodology used in the assessment are located in Appendix G. Figure 18 shows an overview of the stand-alone nonstructural plan.

In addition to the stand-alone nonstructural plan, supplemental nonstructural plans were considered for both Alternatives #1 and #2. These plans looked at the structures that would remain within the 1% ACE floodplain within the study area, and identified an approrpriate nonstructural measure for each remaining structure. However, the only economically viable structures found within the study area under these supplemental plans were downstream of the BNSF Railroad Bridge. The concern of the structures being downstream of the BNSF Railroad Bridge is that this is the point where the Salt Creek floodplain begins to overlap the Deadmans Run floodplain. Therefore, although there may have been viable supplemental nonstructural plans for Alternatives #1 and #2 when evaluating the Deadmans Run floodplain, further analysis of the Salt Creek floodplain would be required to move forward with any nonstructural measures in that area. This additional analysis would be outside of the scope of this study. Further discussion on the supplemental nonstructural plans can be found in Appendix G.

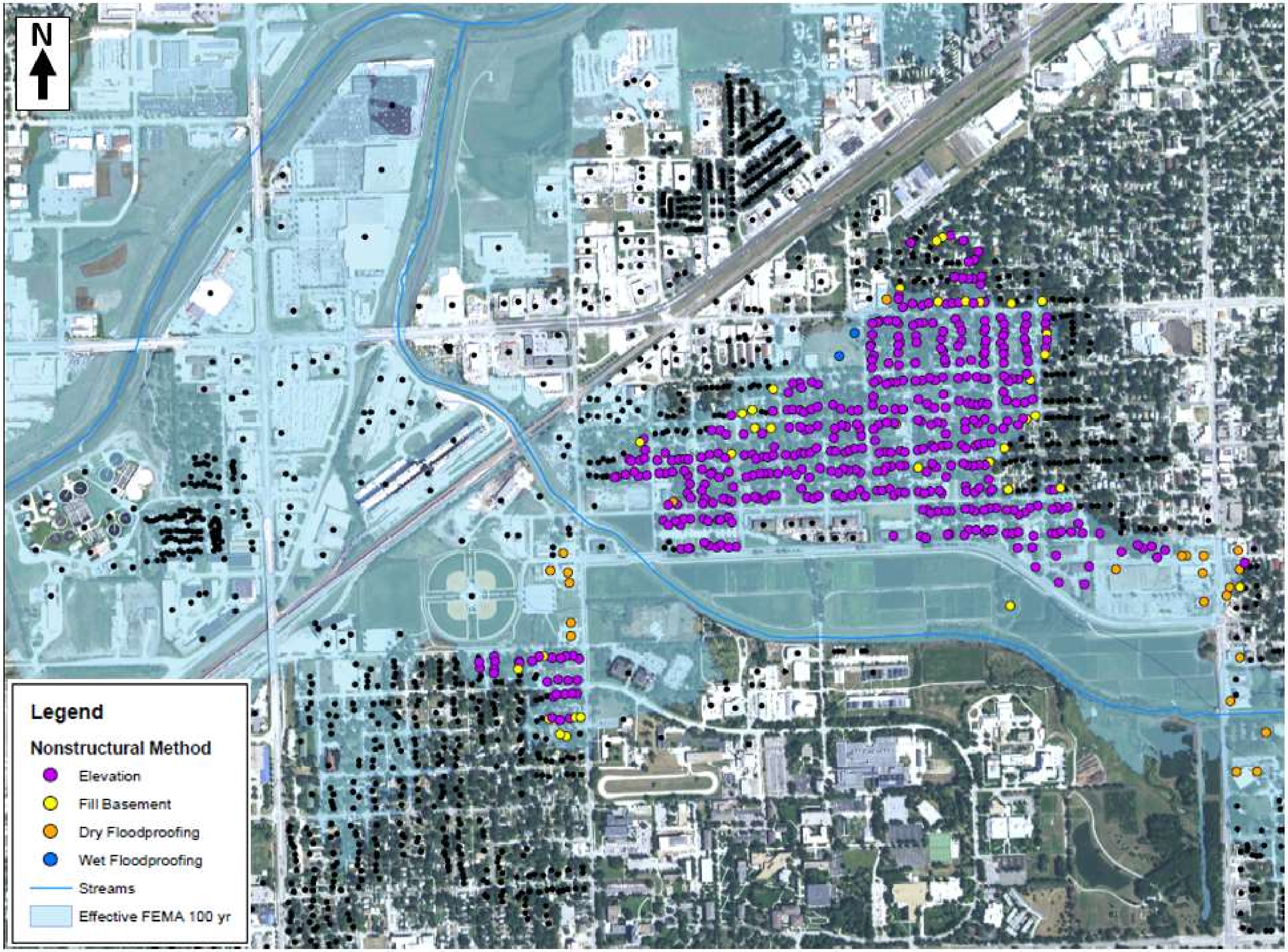

Figure 18. Alternative #3 Overview

3.3.1.4 ***ALTERNATIVE #4 – THE “NO ACTION” PLAN***

In accordance with NEPA and the Planning Principles and Guidelines, the “No Action” plan was also considered as an alternative. Under the “No Action” Plan the existing flood risk to the community persists into the future. Figure 19 shows the study area with the existing FEMA 1% ACE floodplain, which highlights the flood risk the community would continue to face.

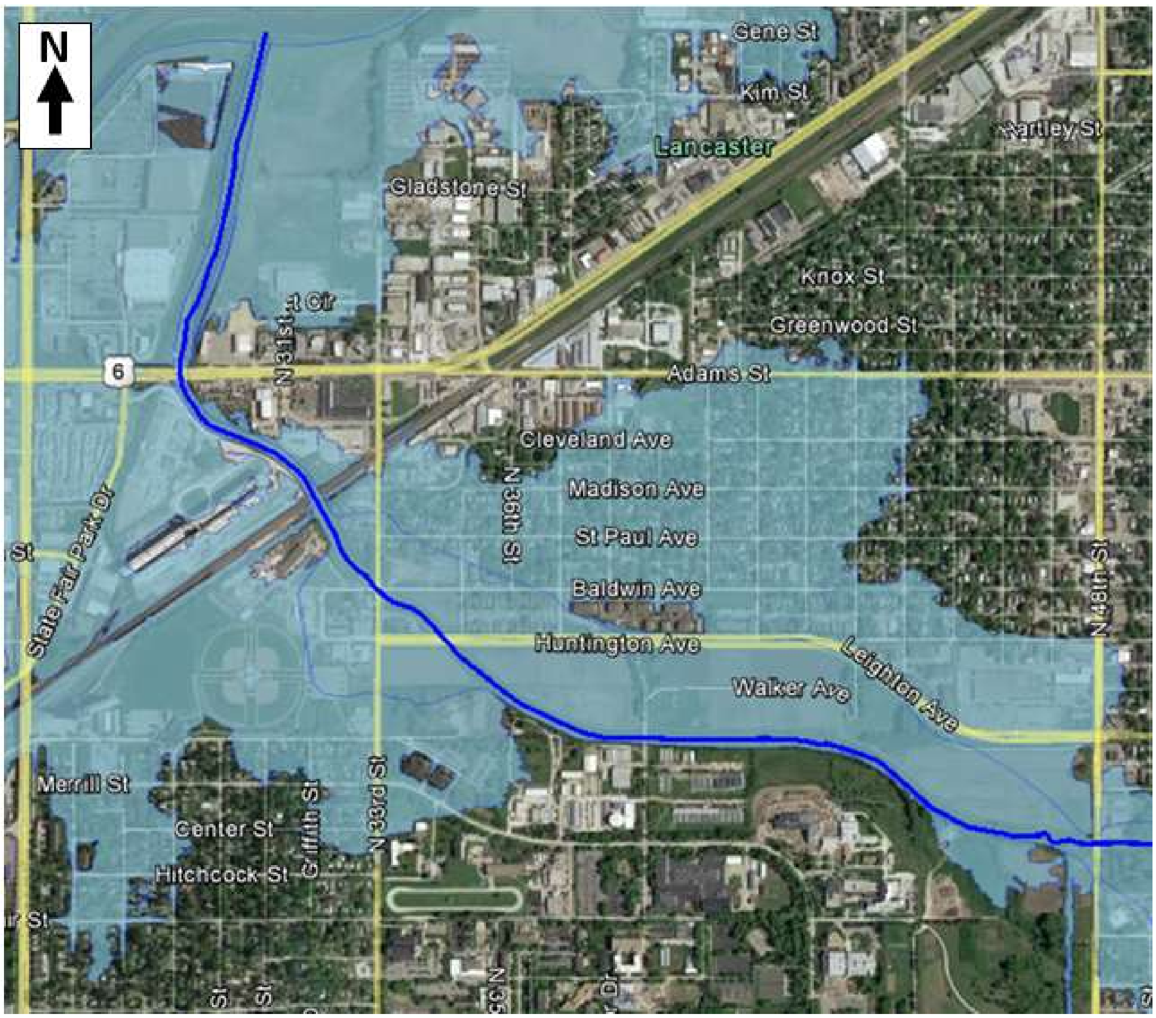

Figure 19. Alternative #4 Overview

3.3.2 EVALUATION OF ALTERNATIVES

The four alternatives were evaluated to see how each satisfied the previously defined study objectives listed in Section 1.4.1.

Furthermore, within the Corps’ planning process, four accounts have been established to facilitate the evaluation of alternative plans. These accounts are the:

- National Economic Development (NED) Account
- Environmental Quality (EQ) Account

- Regional Economic Development (RED) Account
- Other Social Effects (OSE) Account

A candidate for becoming a successful flood risk management plan is one that meets the stated objectives for reducing the flood risk, and is economically feasible with a benefit-to-cost ratio (BCR) of greater than 1.0, meaning that every dollar spent on a flood risk management project would produce at least one dollar of NED benefits. A successful plan must be affordable to the local sponsor and meet its goals for flood damage reduction. Additionally, it must not create environmental or other problems that cannot be economically mitigated. The Corps is required to define the NED Plan when evaluating and comparing alternative plans. The NED Plan is the plan with the greatest net economic benefits.

Economic costs and benefits resulting from a project are evaluated in terms of their impacts on national wealth, without regard to where in the United States the impacts may occur. NED benefits must result directly from a project and must represent net increases in the economic value of goods and services to the national economy, not simply to a locality. For example, if a flood interrupts auto production at a plant in one community, that community suffers a loss. But if the affected company replaces the interrupted production at another plant in another city, the community's loss does not represent a net loss to the national economy, and the prevention of such a loss cannot be claimed as a NED benefit.

NED costs represent the costs of diverting resources from other uses in implementing the project, as well as the costs of economic losses resulting from detrimental effects of the project. NED benefits, the BCR, and the net NED benefits are calculated during the evaluation process. Net benefits represent the amount by which the NED benefits exceed NED costs, thereby defining the plan's contribution to the Nation's economic output. The plan with the highest net benefits is typically considered to be the recommended plan, assuming technical feasibility, environmental soundness, and public acceptability. Note that the plan with highest net benefits is not necessarily the plan with the highest BCR. The BCR helps identify which plans have likely economic feasibility and can be carried forward for further analysis, but is not decisive in identifying the NED plan from among those plans that are economically feasible.

While the NED Account is primary in the plan formulation process for flood risk management studies, the EQ, RED, and OSE accounts must be taken into consideration in quantitatively and qualitatively formulating alternative plans. Projects are required to be formulated with consideration of the EQ Account to avoid, minimize or mitigate adverse impacts. Additionally, there are often opportunities for ecosystem restoration, which can be incorporated into a flood risk project, at little additional cost. RED Account factors are especially important in less populated states like Nebraska, where facilities such as hospitals and commerce may be located at great distances. OSE Account factors are important to community acceptance of a project, quality of life and community cohesion once a project is implemented.

3.3.3 COMPARISON OF ALTERNATIVES[2]

The principal unit of measure for comparing successful flood risk management plans is the comparison of NED net benefits. The comparison is performed on alternative plans that have been evaluated based upon meeting project objectives and have been found to be cost effective. Cost effective projects are those that have positive net benefits, or a BCR greater than 1.0. Such projects may be considered to be in the Federal Interest. The comparison of formulated plans always includes a "no action alternative," which defines the basis for comparison for all action alternatives.

While comparison of NED net benefits is the principal measure of alternative comparison, the qualitative climate change analysis can also inform the decision-making process in the selection of a plan. In the case of the Deadmans Run watershed, climate trends indicate the frequency of large flows are likely to increase even though the annual maximum discharge is likely to remain consistent. Therefore, alternatives that can withstand increases in the frequency of large events without increases in repairs and maintenance should be given additional weight if several alternatives are viable.

3.3.3.1 ***ALTERNATIVE #1 – CHANNEL AND BRIDGE WIDENING, CHANNEL CONVEYANCE IMPROVEMENTS***

Alternative #1 was determined to meet all of the study objectives within the study area. This alternative would both reduce the potential for life loss and damages associated with flooding along the Deadmans Run channel. It is expected that the channel improvements would reduce emergency response costs associated with future high water events. Additionally, the reduced floodplain should decrease any future costs associated with disrupted transportation networks.

As for the four accounts, Alternative #1 was found to have an annualized project cost of approximately $1 million, producing an annualized benefit of approximately $1.38M. This means Alternative #1 has a BCR of 1.38 and would produce annualized net benefits of approximately $379,5000. It stands to reason that by reducing the Deadmans Run floodplain, there would be fewer structures required to carry insurance resulting in the potential for fewer Lincoln residents required to pay flood insurance premiums, there is a positive RED benefit to Alternative #1. The EQ and OSE accounts were not a primary focus in this study, but it is believed that there will be a benefit to life safety for residents and businesses located in the affected area, and no negative effect to the EQ account will occur under Alternative #1.

3.3.3.2 ***ALTERNATIVE #2 – CHANNEL AND BRIDGE IMPROVEMENTS WITH A SHORT LEVEE***

Alternative #2 was determined to meet all of the study objectives within the study area. This alternative would both reduce the potential for life loss and damages associated with flooding along the Deadmans Run channel. Like Alternative #1, Alternative #2 should lead to reduced costs associated with emergency response and disruptions to

[2] Some components of the initial evaluation and comparison of alternatives later became components of a City-proposed project and were removed from the Section 205 federal project. See Section 4.4 for more detail.

transportation networks during future high water events. Although Alternative #2 satisfies the study objectives, this alternative doesn't produce the same level of positive benefits.

When evaluating Alternative #2 under the NED account, the alternative was found to have an annualized project cost of approximately $968,000 producing an annualized benefit of $851,350. Alternative #2 has a BCR of 0.88 and would produce annualized net benefits of -$116,600. It's expected that RED, OSE and EQ benefits and impacts would accrue similarly to Alternative 1, though at a slightly lesser magnitude as flood risks are not reduced to the degree they are under Alternative 1.

3.3.3.3 ***ALTERNATIVE #3 – STAND-ALONE NONSTRUCTURAL FLOOD RISK ADAPTIVE MEASURES***

Alternative #3 was determined to partially meet the study objectives within the study area. This alternative would reduce the potential for damages associated with flooding along the Deadmans Run channel. Even though the existing floodplain would remain unchanged, structures would be elevated above the floodplain water surface elevations and therefore reduce the life loss impacts. Without implementing a physical solution to the flood risk, which in turn would modify the floodplain, it can be expected that there will be no significant decrease to costs associated with emergency response during high water events. Additionally, disruptions to transportation infrastructure will remain similar to their current levels.

In terms of NED benefits, Alternative #3 was found to have an annualized project cost of approximately $1.7M, producing an annualized benefit of approximately $1.51M. Alternative #3 has a BCR of 0.89 and would produce annualized net benefits of -$188,710. It's expected that RED, OSE and EQ benefits and impacts would accrue similarly to Alternatives 1 and 2, though at a slightly lesser magnitude as flood risks are primarily reduced for individual structures, and residual flood risks would still exist to infrastructure, emergency response and individuals not sheltered in structures with floodproofing.

3.3.3.4 ***ALTERNATIVE #4 – THE "NO ACTION" PLAN***

Alternative #4 was determined to not meet any of the study objectives. Since this alternative involves no action, there would be no reduction to the potential for life loss and damage associated with flood events along Deadmans Run. Similarly, there would be only a small change to the existing floodplain due to the infrastructure work being undertaken by the City of Lincoln and LPSNRD, and thus there would be minimal to no changes to emergency response costs or costs associated with disruptions to transportation networks. For these reasons, Alternative 4 is not expected to have effects to the RED, OSE and EQ accounts. It would be the preferred alternative if all other alternatives showed negative net benefits under a study.

3.3.3.5 ***SUMMARY OF THE COMPARISION OF THE FOUR ALTERNATIVES***

Table 8 shows a comparison of how the four study alternatives meet the study objectives. As noted above, although multiple alternatives may meet one of the study objectives, this doesn't necessarily mean that the alternatives all produce the same level of benefits in regard to the respective study objective.

Table 8. Comparison of How the Four Alternatives Satisfy the Study Objectives

Objective	Alt. #1	Alt. #2	Alt. #3	Alt. #4
Reduce the potential for loss of life, property damage, negative transportation and commerce impacts, and degraded channel stability caused by flooding along Deadmans Run in Lincoln, Nebraska.	Y	Y	P	N
Reduce the damages associated with flooding from the Deadmans Run by providing economically feasible, environmentally sensitive, and socially acceptable flood risk reduction solutions for the City of Lincoln.	Y	Y	Y	N
Reduce emergency response and transportation network disruption expenses associated with high-water events throughout the Deadmans Run watershed.	Y	Y	Y	N

Y = Yes, P = Potentially, N = No

Table 9, below shows how the four alternatives compare in regards to the NED account. As mentioned previously, for an alternative to be considered viable, it must have a BCR greater than 1.0. If multiple alternatives have BCRs greater than 1.0, then the alternative with the highest net benefits is selected as the NED plan. Given that there is only one plan with a BCR above 1.0, a discussion of how the alternative has resiliency to climate change trends will not be discussed in detail for comparison against other alternatives. Channel improvements would benefit from a design such that an increase in the frequency of large events will not result in substantial erosion.

Table 9. Comparison of the Four Alternatives in Regards to the NED Account, FY18 Price Levels and Discount Rate (2.75%)

	Alt. #1	Alt. #2	Alt. #3	Alt. #4
Project Cost	$23,783,607	$22,658,985	$44,834,830	$0
Annualized Cost	$1,000,242	$967,990	$1,701,396	$0
Annualized Benefit	$1,379,780	$851,350	$1,512,680	$0
Annualized Net Benefits	$379,541	-$116,637	-$188,714	$0
BCR	1.38	0.88	0.89	N/A
Note: Costs were further refined during the optimization process				

3.3.4 PLAN SELECTION

Only Alternative #1 satisfies the NED account requirements for a viable Section 205 Project. Alternative #1 also meets the fundamental planning requirements of being a complete, efficient, and effective project. The scale or sizing of the selected alternative in order to maximize net benefits, regardless of the alternative chosen as the Tentatively Selected Plan (TSP), is determined during optimization. Therefore, only the fundamental planning requirement of "acceptable" remains for Alternative #1, as it does exceed the Section 205 Program project cost limit by approximately $8.4M. As such a cost exceedance waiver has been submitted to Corps HQ, and upon approval Alternative #1 would satisfy the criteria for being an "acceptable" plan.

4 RECOMMENDED PLAN[3]

Alternative #1 was chosen by the project team to be the TSP recommended to Northwestern Division (NWD) for approval. Before the plan is recommended to NWD for approval, it needs to be scaled to maximize net benefits through optimization.

4.1 PRELIMINARY PLAN COMPONENTS

Section 3.3.1.1 briefly discussed the details of the different components of the TSP, Alternative #1, but these components will be discussed in further detail in this section.

4.1.1 WIDENED CHANNEL

The primary component of the TSP is the widened channel. The existing Deadmans Run channel is sized to contain the flows of an approximately four percent ACE event in most areas. Under the TSP this channel would be widened to contain the flows produced by a 1% ACE event.

Under the TSP the existing concrete mat and gabions would be replaced with rip-rap, sized to mitigate erosion of the streambed as much as possible. Above the rip-rap, a channel bench would be installed on one bank to allow for the planting of native grass and vegetation, as well as to provide additional flow capacity within the channel cross-section. The channel banks would then be cut back to allow for a 3:1, horizontal-to-vertical, slope to be installed from the channel bench, or rip-rap depending upon the bank, to the surrounding existing grade.

Figure 20 shows the difference between a typical cross-section of the existing channel and a typical cross-section of the proposed widened channel. From the figure it can be seen that the channel would be widened from about 80 feet in width to about 150 feet in width. The estimated cost for constructing the new widened channel, including the channel stability improvements, was approximately $7.33M.

[3] Some components of the initial evaluation and comparison of alternatives later became components of a City-proposed project and were removed from the Section 205 federal project. See Section 4.4 for more detail.

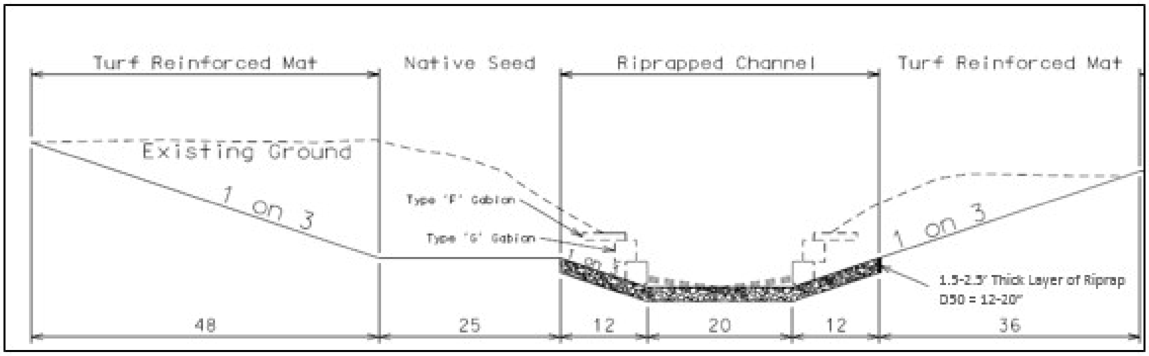

Figure 20. Comparison of the Existing vs. Proposed Channel Cross-Sections

The majority of the real estate required for the widened channel footprint is within the UNL's East Campus. Near Huntington Avenue, the acquisition of some commercial real estate would be required. The preliminary cost estimate for real estate acquisition associated with the widened channel was approximately $2.1M.

4.1.2 BRIDGE REPLACEMENTS

Within the study area there are six bridges spanning the Deadmans Run channel. These bridges from upstream to downstream are the: 1) 48th Street Bridge, 2) 38th Street Bridge, 3) Huntington Avenue Bridge, 4) OLB Railroad Bridge, 5) BNSF Railroad Bridge, and 6) Cornhusker Street/Highway 6 Bridge. The channel also currently flows through a large concrete box culvert to pass under 33rd Street.

It was determined that the structures that would need to be replaced in order to allow for the channel to contain a 1% ACE event were the 48th Street Bridge and the concrete box culvert under 33rd Street.

The existing 48th Street Bridge is approximately 60 feet long by 42 feet wide with eight-foot sidewalks on the east and west sides. At its current size the bridge would constrain the channel flow produced by a 1% ACE event enough to cause it to spill out of the channel and flow over 48th Street, inundating the nearby community to the North. To mitigate this issue a new bridge was designed to replace the existing structure. This new bridge would be 90 feet long by 71 feet wide, including sidewalks on both sides. A detailed cross-section and plan view of the proposed bridge can be found in Appendix J. This bridge was sized and raised so that the channel would pass the flows produced by a 1% ACE event.

In order to pass the 1% ACE event flows at the 48th Street Bridge, a longer structure with a raised low chord would be required, and thus the bridge approaches would have to be raised. Including the costs associated with the roadway raise on 48th Street, the estimated cost associated with removing and replacing the 48th Street Bridge was just over $2.1M. Additionally, the wider footprint of the new bridge meant that an existing restaurant on the right bank of the channel, shown in Figure 21, had to be relocated in the analysis. The estimated real estate cost associated with this relocation was $837,000.

Figure 21. Commercial Property Relocation Associated with the Widened 48th Street Bridge

The existing concrete culvert that runs beneath 33rd Street is approximately 132 feet long by 36 feet wide. This existing box culvert is not large enough to pass the flows from a 1% ACE event. In a high water event, the constraining size of the culvert would cause water to back up in the channel and inundate the surrounding community. To resolve this issue, a new bridge was designed to replace the existing culvert. This new bridge would be 180 feet long by almost 39 feet wide. A detailed cross-section and plan view of the proposed bridge can be found in Appendix J. This bridge was sized and raised so that the channel could pass the flows produced by a 1% ACE event.

The estimated cost to remove the culvert and construct the new 33rd Street Bridge, including roadway alignment work, is just under $2.2M. The estimated real estate cost associated with the new bridge is just under $245,000. Although most of this cost is associated with the construction of the turn-arounds on Baldwin Avenue, as the majority of the bridge construction effort could be performed within the existing right-of-way and the right-of-way that would have to be required to construct the widened channel at that location.

Associated with the construction of the 33rd Street Bridge would be terminating Baldwin Avenue, the road directly to the north of the channel, on both sides of 33rd Street. This would have minimal impact on the traveling public, as the road is not a major thoroughfare, and access would be maintained to all facilities. The facility that this action will have the largest impact on is a City of Lincoln maintenance yard, but they believe the remaining access will be sufficient. Turn-arounds will be constructed for emergency service vehicles.

Advanced bridge replacement benefits were not estimated as a part of this study. While it is recognized that there is a benefit for the period that the useful life of a bridge is extended by the project, the estimation of this benefit would not have changed the conclusion of the alternative screening or the Tentatively Selected Plan. Additionally, the absence of this benefit means that net benefits are likely slightly greater than currently reported, and the selected plan is all the more justified based on the net benefit analysis.

4.1.3 CONCRETE FLUME UNDER THE RAILROAD BRIDGES

The two railroad bridges that span the Deadmans Run channel were identified as constraints when modeling the 1% ACE event. However, it was determined to be cost prohibitive to remove and replace the existing structures. Rather, the TSP proposes to construct a concrete flume that would run beneath both railroad structures. This flume would increase the hydraulic efficiency, allowing the channel to pass the flows from the 1% ACE event while retaining the existing railroad structures in place. To prevent erosion around the concrete flume and gradually contract and expand flows entering and exiting the flume, the flume will be gradually widened up and downstream from the bridges until the width of the flume matches the width of the proposed channel. A detailed cross-section of the proposed flume can be found in Appendix J. Figure 22 shows an example of a similar flume designed and constructed by the USACE Omaha District in the 1990s on the Big Papillion Creek in Omaha, Nebraska.

Figure 22. Concrete Flume under Railroad Bridge (Southeast of 84th St. & I-80, Omaha, NE)

The estimated construction cost for the concrete flume is approximately $1.34M, as it requires construction around two existing structures and would likely involve phased construction. In terms of real estate, the concrete flume would stay within the confines of the real estate required for the proposed channel, and thus there is no real estate acquisition or easement cost associated with the concrete flume.

4.1.4 DETENTION BASIN & RELOCATED ACCESS ROAD

As noted in Section 3.3.1.1, the West Tributary could not release flows into the proposed Deadmans Run channel as it currently does under existing conditions. This is due to the improved Deadmans Run channel having increased peak flows that arrive sooner downstream, this leads to the higher water stages associated with a high water event to reach the downstream limits of the Deadmans Run channel sooner. In order to mitigate the backwater effect caused on the West Tributary by the improved Deadmans Run channel, an off-channel detention basin was designed to capture enough water to allow for the water levels within Deadmans Run to recede before releasing flows back into the West Tributary.

The proposed detention basin will have an area of approximately 10 acres, with a volume of just under 90 acre-feet. The off-channel detention basin has been designed to collect flows from the West Tributary via a hardened overtopping section that would be set at such an elevation so that flows would begin spilling into the basin at approximately the four percent ACE event. Flows more frequent than the four percent ACE event stay within the channel of the West Tributary. Even after implementation of the overtopping section and excavation, the area can continue to be used as a recreational space.

In addition to the detention basin, the relocation of an existing access road has been proposed under the TSP. The existing access road identified in Figure 23 currently constrains the ability for the West Tributary to outlet into Deadmans Run. The tailwater produced by Deadmans Run greatly reduces the capacity of the two, six-foot diameter culverts that outlet near the confluence of the West Tributary and Deadmans Run. Therefore, to increase the outflows of the West Tributary the installation of a new access road further upstream of the confluence and the removal of the existing roadway have been proposed under the TSP. The increased outflows from the West Tributary are necessary to allow the West Tributary to reach lower stages before the backwater effects caused by the high stages within the Deadmans Run channel begin.

An additional benefit that could be realized by relocating this access road is the improved safety of the intersection that would allow for a safer and more efficient intersection. It should be noted that the relocation of this access road would necessitate the relocation of some of the existing facilities associated with the grain elevator, shown in the bottom right portion of Figure 23, such as the weigh station, as the flow of traffic would be reversed from its existing direction.

Figure 23. Existing & Proposed Relocated Access Road along the West Tributary

The preliminary construction cost associated with the detention basin is just over $1.81M, while the estimated construction cost of relocating the access road is approximately $544,000. In addition to the construction costs associated with these two project features, the estimated real estate costs for the detention basin and relocated access road are approximately $885,000 and $24,000, respectively.

4.1.5 INTEGRATED ENVIRONMENTAL PLAN

To account for the new widened channel configuration and disturbance of existing environmental conditions, the channel benches constructed under the improved channel would be planted with a native mesic-wetland seed mixture and the reinforced turf mats would be planted with native stabilizing grasses.

To avoid and minimize impacts to riparian vegetation and mature trees throughout the East Campus area (see Figure 24), the team assessed variations of the channel alignment and footprint throughout this location. Trees were simulated in the HEC-RAS model (see Appendix I) by increasing the roughness on either or both the right and left bank. Results of the modeling indicated that despite how much the channel was expanded into the right bank, the slower flows induced by an expanding channel, and a higher roughness of leaving the trees in the channel, caused the waters to rise approximately two feet higher at the 38th Street Bridge and leaving trees on both or either bank in the upstream channel would cause overbank flooding at higher flood frequencies such as the 100-year event and potentially the 50-year event. A shifted channel alignment was deemed not hydraulically feasible without having to emplace a levee on the north bank near the 38th Street Bridge, or completely removing the 38th Street Bridge. To account for the impacts associated with the proposed removal of 4.82 acres of mature trees along Deadmans Run near East Campus of UNL, tree plantings would be replaced in the upland portions of the channel footprint throughout East Campus. No mitigation ratio was determined for replacement; however, existing ecological services were modeled with the Nebraska Stream Condition Assessment Procedure (NESCAP) to ensure no net loss habitat function as a result of the recommended plan (see Appendix A).

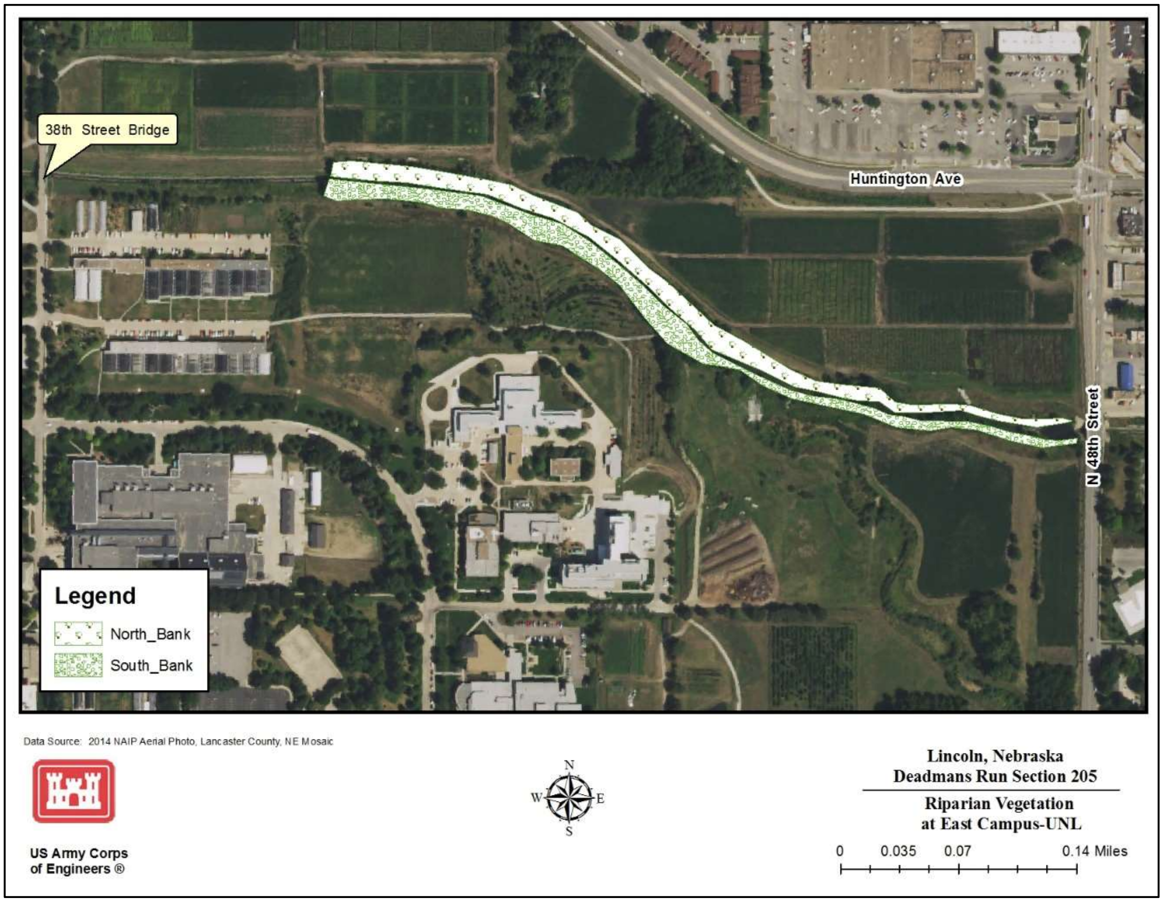

Figure 24. Upstream Habitat to be Removed and Replaced by the Widened Channel

4.2 RECOMMENDED PLAN OPTIMIZATION[4]

To ensure that the TSP maximizes the NED-benefits, multiple variations of the TSP were run to determine the optimized version of the alternative. Two major items were focused on in terms of optimization. First, the removal and replacement of the 38th Street Bridge was analyzed. It was determined during the modeling of the TSP that the 38th Street Bridge constrained the volume of water that could flow through the channel, and thus it was hypothesized that by replacing the bridge the proposed channel would produce

[4] Some components of the initial evaluation and comparison of alternatives later became components of a City-proposed project and were removed from the Section 205 federal project. See Section 4.4 for more detail.

higher net benefits while potentially being able to be reduced in size. The second major focus of the optimization process was to determine the optimal channel size. During plan formulation, all of the proposed widened channel alternatives were sized to contain the flows from the 1% ACE event. While the 1% ACE event is a typical baseline for channel sizing, it is necessary to determine if a channel that would contain a larger, or smaller, event would produce more net benefits.

4.2.1 REPLACING THE 38TH STREET BRIDGE

As mentioned above, the first step taken during the optimization process was to remove the existing 38th Street Bridge and replace it with a new structure. This structure was not considered under the initial TSP, because the existing channel could be improved to convey the flows produced by the 1% ACE event, initial design event, without replacing the structure. However, additional analysis, and discussion with project stakeholders including the University of Nebraska (structure owner), indicated that there may be additional flood risk management benefits associated with replacing the structure. Beyond increasing the proposed channel conveyance, replacing this structure would allow the channel geometry to be modified, reducing the impact of the proposed channel's footprint on UNL's existing agricultural test plots. This was a major concern for the non-federal sponsor and UNL, who is a key stakeholder in the project. Furthermore, the existing bridge structure doesn't satisfy current local design criteria, so a replacement structure would most likely also be a safety improvement for the community.

The existing 38th Street Bridge is a steel pony truss on steel piers structure that is 130 feet long by 28 feet wide. The proposed replacement structure would be very similar in size, also being 130 feet long, but the low cord, or bottom, of the structure would be at a higher elevation, which is where the hydraulic modeling indicated the flow constraint with the existing structure. A detailed cross-section and plan view of the proposed bridge can be found in Appendix J.

It was determined that by replacing the 38th Street Bridge the overall net NED-benefits of the TSP would increase from $1.38M to $1.67M. Table 10 below shows a detailed breakdown of the impacts of the replaced 38th Street Bridge on the TSP. It should be noted that the majority of the increase in cost between the two plans is associated with the addition of a sub-drain under the detention basin and an increase in the thickness of the rip-rap layer along the channel. Both of these additions were found during later reviews and were therefore not incorporated into the original TSP estimate, as the TSP with the replaced bridge was already the plan with higher net benefits.

Table 10. Economics Impacts of Replacing the 38th St. Bridge, FY18 Price Levels and Discount Rate (2.75%)

	TSP	**TSP w/ Replaced 38th St. Bridge**
Project Cost	$23,783,607	$25,769,650
Annualized Cost	$1,000,242	$1,055,400
Annualized Benefit	$1,379,780	$1,671,350
Net Benefits	$379,541	$615,950[1]
BCR	1.38	1.58

[1]Rounding errors present

4.2.2 DETERMINING THE OPTIMAL CHANNEL SIZE

All of the alternatives that involved a wider channel looked at a new channel that would contain the flows associated with a 1% ACE event. This is a typical baseline event for channel widening projects, and also accommodated the non-federal sponsor's goal to remove the community from the National Flood Insurance Program (NFIP) floodplain. ER 1105-2-100 dictates that the Corps shall find the plan that maximizes the benefits associated with the NED account. In order to meet this objective, the PDT looked at resizing the channel to contain the two percent ACE event and the 0.833 percent ACE event. Then using the three data points associated with the NED, net benefits of the three levels of flow conveyance were developed.

Although the flows associated with the two percent ACE event level of conveyance were different enough from the flows associated with the 1% ACE event to allow for the channel to be reduced in size, the hydraulic modeling showed that difference between the flows associated with the two events was not significant enough to allow for any of the structures replaced under the TSP to remain in place. Therefore, the only real cost savings associated with the two percent ACE event channel were those associated with the smaller channel footprint, as the structure replacement costs remained the same. More details on this matter can be found in Appendix F.

The upper bound for the channel size optimization curve was chosen to be the 0.833 percent ACE event. This upper bound was calculated by determining which event would produce the largest flows without requiring replacement of another bridge or existing structure. The reasoning behind this decision, was that the next structures that would have to be replaced along the Deadmans Run channel are the railroad bridges. Replacement of these bridges would likely lead to a sharp decrease in the net benefits, due to the significant replacement and coordination costs associated with the structures. Along with being a larger event, the 0.833 percent ACE channel would also require the demolition and rebuilding of a small, approximately 18,000 square feet, warehouse and three greenhouses on the UNL's East Campus. All other structures would remain the same under the 0.833 percent ACE event channel and the TSP channel.

Table 11 below shows the comparison of the channels associated with the two percent ACE, 1% ACE, and 0.833 percent ACE events.

Table 11. 2% ACE Channel vs 1% ACE Channel vs 0.833% ACE Channel, FY18 Price Levels and Discount Rate (2.75%)

	2% ACE Channel	1% ACE Channel (TSP)	0.833% ACE Channel
Project Cost	$24,462,252	$24,788,657	$28,384,746
Annualized Cost	$1,042,490	$1,055,440	$1,196,360
Annualized Benefit	$1,462,000	$1,671,350	$1,697,270
Net Benefits	$419,520	$615,950	$500,920
BCR	1.40	1.58	1.42

Note: Rounding errors present

Figure 25 is the optimization curve developed from the data points in Table 10. What can be seen in Figure 25 is that the optimized channel size resides somewhere around the 1% ACE event channel. Therefore, it was determined that the 1% ACE event channel is the optimized channel size for this project.

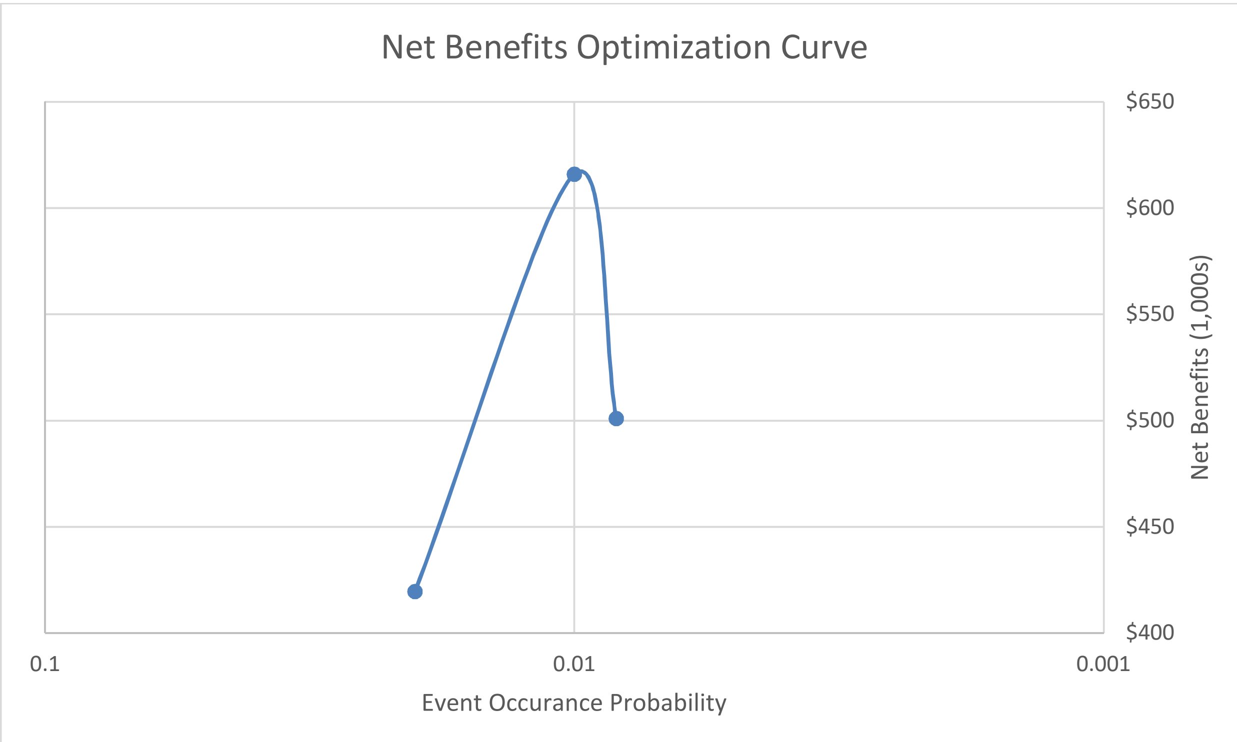

Figure 25. Net Benefits Optimization Curve

4.2.3 OPTIMIZED INTEGRATED ENVIRONMENTAL PLAN

Optimization of the recommended plan, as indicated above in Section 4.2.1, results in the removal and replacement of 38th Street Bridge with a wider span structure. A variated channel alignment was assessed throughout the East Campus area to avoid and minimize impacts to the riparian vegetation throughout this area (see Figure 23). Under optimization, with the replacement of this bridge, it was determined that a stage up to 4 feet lower than existing conditions would be possible at the current bridge location and as such, the north (right) bank of trees could remain and only the south bank (2.34 acres) would be required to be removed. Therefore, tree replacement will only occur in the upper extents of the project footprint on the south bank throughout the East Campus area.

Based on environmental modeling, found in Appendix A, the environmental impact associated with this project would be negligible, to slightly improved, due to the combination of tree plantings and native seeding implemented under this plan. For more information regarding impacts to vegetation, see Section 5.1.4 and Appendix A: Section III.

4.2.4 OPTMIZATION RESULTS

From the optimization process it was determined that the optimized plan would replace the 38th Street Bridge with a wider structure, and the channel would be sized to contain the flows produced by the 1% ACE event. Figure 26 shows the results of the optimization process on the recommended plan.

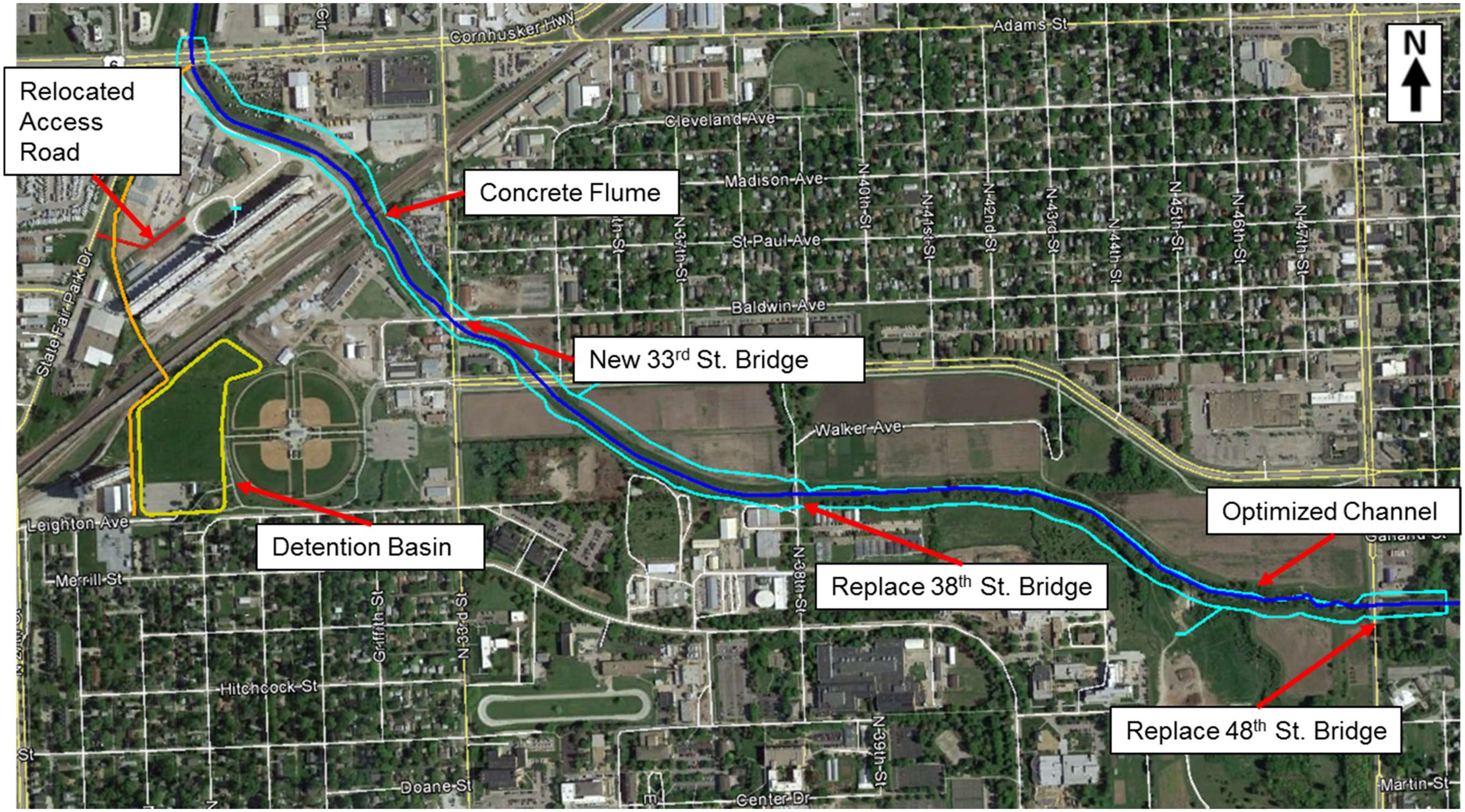

Figure 26. Optimized Recommended Plan

4.3 OPTIMIZED PLAN COST ESTIMATE

4.3.1 PROJECT COSTS

During the optimization process the cost estimate for the preferred plan was also refined for accuracy and risk. An abbreviated Cost Risk and Schedule Analysis (CRSA) was conducted by the team on January 30th, 2017. The major output of the CRSA process was the development of cost escalation factors by identifying and quantifying expected risks associated with the project.

Immediately following the optimization process, the gross appraisal was performed. The gross appraisal process takes a much more detailed look at the real estate costs associated with the proposed plan, and these costs were captured in the cost estimate shown below. More information on the gross appraisal process can be found in the Real Estate Plan, which is located in Appendix H.

Table 12 shows the updated construction cost estimate and real estate gross appraisal values, which aggregate into the total project cost estimate. This estimate was developed at Fiscal Year 2017 price levels, and may need to be updated during the Design & Implementation (D&I) phase to match the appropriate year price levels. The increase in costs is mainly associated with three items incorporated during the review process. The first item was an increase in the channel stability materials, which was determined necessary under further review and design. The second item that increased the costs was the proposed installation of a sub-drain system under the detention basin. The final item that increased the total cost for the project was an increase in the contingency factor to more adequately address the uncertainty associated with the project at this time. It should be noted that the real estate costs associated with the recommended plan did significantly decrease during the gross appraisal process. This decrease can be attributed to the substantially higher level of detail involved in the gross appraisal process as compared to the preliminary real estate estimates used for alternative comparison and evaluation. One other minor revision to the costs is the decrease in Interest During Construction (IDC) due to a more detailed schedule of construction expenditures outlined in the certified Total Project Cost Summary.

Table 12. Optimized Plan Project Costs

Project Feature	Construction Cost
Widened Channel	$8,367,368
33rd St. Bridge Installation	$2,046,413
38th St. Bridge Replacement	$1,242,267
48th St. Bridge Replacement	$2,209,957
Concrete Flume	$2,091,112
Detention Basin	$2,449,316
Relocated Access Road	$827,201
Baldwin Ave. Termination	$292,549
Subtotal	**$19,526,183**
E&D	$2,064,766
S&A	$1,171,511
Subtotal	**$22,762,460**
LERRDs	$2,829,700
Total (Oct 2016 Price Level)	**$25,592,160**

4.3.2 ECONOMIC BENEFITS

Annualized over a 50-year period of analysis at the FY17 discount rate of 2.875 percent, total annual costs for the optimal plan, including construction, real estate, engineering and design (E&D), supervision and administration (S&A), interest during construction (IDC) and operations, maintenance, repair, replacement, and rehabilitation (OMRR&R), are $1,057,992. Annual project benefits are just over $1.67M. Resulting annual net benefits for the optimal plan are $613,361, which produces a BCR of 1.58. Table 13 contains all annual without and with-project benefits and costs used for determining the annual net benefits and BCR.

In Table 13, OMRR&R costs include routine operations and maintenance assumed to be performed by the sponsor into the future. Additional, non-routine outlays including semi-periodic replacement of significant amounts of rip rap, major restoration of storage volume in the detention basin once storage has been reduced by 25 percent, and replacement of structures associated with the detention basin have been incorporated into the estimated OMRR&R costs for this project. Interest during Construction (IDC) is based on an estimated 3-year period between project approval and final construction completion.

Table 13. Optimized Plan Project NED Benefits (Costs in 1,000s)

ECONOMIC BENEFITS & COSTS	One Percent ACE Channel with Bridge Replacement	
WITHOUT PROJECT DAMAGES [EAD]		
Structure/Contents/Ext. Damages	$	2,049.60
Public Damage/Emergency Costs	$	31.14
Flood Insurance Administrative Costs	$	95.65
TOTAL ANNUAL w/o PROJECT DAMAGES [EAD]	**$**	**2,176.39**
WITH PROJECT RESIDUAL DAMAGES [EAD]		
Structure/Contents/Ext. Damages	$	480.59
Public Damage/Emergency Costs	$	12.87
Flood Insurance Administrative Costs	$	11.58
TOTAL ANNUAL w/ PROJECT RESIDUAL DAMAGES [EAD]	**$**	**505.04**
PROJECT BENEFITS:		
Structure/Contents/Ext. Damage Reduction	$	1,569.01
Public Damage/Emergency Cost Reduction	$	18.27
Flood Insurance Administrative Cost Reduction	$	84.07
TOTAL ANNUAL w/ PROJECT ECONOMIC BENEFITS	**$**	**1,671.35**
INVESTMENT COSTS:		
Construction	$	19,525.18
LERRD	$	2,829.70
Planning, Engineering, and Design	$	2,064.77
Construction Management	$	1,171.51
Subtotal, Construction Cost	$	25,592.16
Subtotal, IDC	$	245.66
TOTAL PRESENT VALUE, INVESTMENT COST	**$**	**25,837.82**
Annualized Investment Cost (50 yrs, 2.875%)		$980.50
Annualized OMRR&R Cost	$	77.50
TOTAL ANNUAL PROJECT COSTS	**$**	**1,057.992**
NET ANNUAL BENEFITS	**$**	**613.361**
BENEFIT/COST RATIO		**1.58**

4.4 UPDATED RECOMMENDED PLAN

Although the optimized selected plan was economically justified, the project costs exceeded the CAP Section 205 per project cost limit of approximately \$15.3 million. Meetings between the (LPSNRD), City of Lincoln, NWD, HQUSACE, and the Omaha District PDT led to the development of a revised selected plan. The revised plan involves removing the three vehicle bridges from the Federal project, as well as the detention basin on the West Tributary. The City of Lincoln has identified the 48th and 38th Street bridges for replacement due to their age and condition, and replacing the 33rd Street culvert with a bridge may be a component of a future RTSD project currently being planned. The 48th Street Bridge has exceeded it design life and is experiencing significant decay, so has become a high priority for replacement by the City. Additionally, the 38th Street Bridge is weight restricted and has become a safety concern for the City and University where the structure is located.

Additionally, the detention basin accompanies the bridge replacements as a mitigation feature to address induced flooding, and therefore will be completed by the City of Lincoln and LPSNRD at the same time. The current undersized culvert and bridges have restricted capacity resulting in attenuation floodwaters, but once the larger structures are put in place, they will allow additional channel flow to propagate downstream changing timing of how the flows interact with flow coming from the West Tributary. This combination of additional flow on Deadmans Run with coincident flows on the West Tributary causes increased flooding in the area near the confluence. The detention basin on the West Tributary will regulate the flow contribution from the tributary offsetting the impacts of the additional conveyance associated with the larger bridges. The 48th and 38th Street Bridge modifications, 33rd Street Bridge installation, and the detention basin will be initiated prior to the federal Section 205 Project by the non-federal Sponsor and will be constructed prior to or during construction of the federal Section 205 Project. These efforts will be performed by the City and LPSNRD with or without the Section 205 Project, as the aging infrastructure is in need of replacement.

The remaining project components remained unchanged and Figure 27 shows the updated selected plan, with the components that the City of Lincoln and LPSNRD now plan to implement outside of the Federal Project.

By performing the analysis on an integrated plan that initially contained both the Federal and Non-Federal project components, the study team was able to optimize the integrated plan, as discussed in Section 4.2. This ensured that while two separate efforts are going to be implemented, the projects will integrate to maximize benefits to the local community and to the nation.

Figure 27. Updated Recommended Plan

4.4.1 UPDATED FUTURE WITHOUT PROJECT CONDITIONS

The City of Lincoln and LPSNRD have initiated the process for constructing the new 33rd, 38th, and 48th Street bridges as well as the detention basin West Tributary Fleming fields. It is believed that this infrastructure will likely be in construction or complete before the updated recommended plan is implemented. This is due to the City of Lincoln and the LPSNRD having provided assurances to the Corps' team that the infrastructure improvement efforts will be completed in the near future.

As such, these infrastructure improvements are being considered in the Future Without Project (FWOP) conditions. Incorporating these improvements as the FWOP ensures that the benefits associated with the Deadmans Run Project can be accurately represented, and not overstated by inaccurately capturing benefits from the bridges and detention basin as well. The updated FWOP condition (including the new 33rd, 38th, and 48th Street bridges and the detention basin) resulted in reducing the without-project EAD from $2.18 to $1.95M (approximately 11%).

Analysis was only conducted on the originally selected alternative (Alternative 1), which was optimized based on the revised future without-project conditions. The exclusion of Alternative 2 from further analysis was based on the fact that preliminary alternative evaluation and comparison determined that the levee feature of this alternative would induce higher stages and thus damages in downstream reaches, and the revised future without-project conditions would not have changed this result. Additionally, Alternative 2 did not result in positive net benefits under the original analysis, and nothing in the revised future without-project conditions would likely lead to Alternative 2 showing sufficiently greater net benefits than Alternative 1 (Alternative 1 had over 50 percent greater benefits than Alternative 2 in the original alternatives analysis shown in Table 9). Alternative 1 also gained costs savings by removing the replacement of the 33rd Street Bridge from the plan (now City future without-project feature) which is not a feature of Alternative 2.

Alternative 3, which consisted of nonstructural measures, is also not likely to result in a great enough increase in benefits as a result of the revised future without-project condition to change the selected alternative. Any decrease in costs associated with the revised future without-project conditions would not have as great of an impact on the nonstructural plan net benefits because the costs of bridge replacement and the detention basin weren't included in the nonstructural alternative's costs. The costs would only be reduced by the reduction in flood proofing costs associated with those structures that are no longer impacted under the updated future without-project condition. With approximately a 10 percent decrease in damages for the updated future without-project conditions, costs for the nonstructural alternative would very likely not decrease enough to result in a feasible project, and would not result in net benefits greater than Alternative 1. The total project costs would also still likely exceed the CAP limit.

The optimization process was not revisited because it was qualitatively determined that there shouldn't be a significant change in the optimization curve. This was due to the fact that the infrastructure costs now associated with the local infrastructure project would have equally reduced the cost of all three plans, so the net benefits would have been increased equally for all three plans. Additionally the larger channel design would have still required additional infrastructure improvements at the Huntington Bridge and BNSF Railway Bridge, so it would have remained substantially more costly than the chosen plan.

4.4.2 UPDATED PROJECT COSTS

Table 14 shows the updated construction cost estimate and real estate LERRD values, which aggregate into the total project cost estimate. This estimate was developed at mid-point of construction price levels, and may need to be updated during the D&I phase to match the appropriate year price levels. The decrease in costs is mainly associated with the removal of the three bridges and the detention basin from the original recommended plan. It should be noted that the real estate costs associated with the updated recommended plan did significantly decrease during the update process. This decrease can be attributed to the substantial reduction in the project footprint by removing the necessary easements for the bridge and detention basin construction efforts.

Table 14. Updated Optimized Plan Project Costs

Project Feature	Construction Cost
Widened Channel	$7,796,000
Concrete Flume	$2,182,000
Relocated Access Road	$747,000
Subtotal	**$10,725,000**
E&D	$1,104,000
S&A	$680,000
Subtotal	**$12,509,000**
LERRDs	$1,726,000
Total (Fully Funded Price Level)	**$14,235,000**

4.4.3 UPDATED ECONOMIC BENEFITS

Annualized over a 50-year period of analysis at the FY18 discount rate of 2.75 percent, total annual costs for the optimal plan, including construction, real estate, engineering and design (E&D), supervision and administration (S&A), interest during construction (IDC) and operations, maintenance, repair, replacement, and rehabilitation (OMRR&R), are $523,543. Annual project benefits are just over $1.42M. Resulting annual net benefits for the optimal plan are $902,443, which produces a BCR of 2.72. Table 15 contains all annual without and with-project benefits and costs used for determining the annual net benefits and BCR.

OMRR&R costs still include routine operations and maintenance assumed to be performed by the sponsor into the future. Additional, non-routine outlays including semi-periodic replacement of significant amounts of rip rap and establishment and maintenance of the channel vegetation have been incorporated into the estimated OMRR&R costs for this project. Interest during Construction (IDC) is based on an estimated 3-year period between project approval and final construction completion.

Table 15. Updated Optimized Plan Project NED Benefits (Costs in 1,000s)

ECONOMIC BENEFITS & COSTS	One Percent ACE Channel
WITHOUT PROJECT DAMAGES [EAD]	
Structure/Contents/Ext. Damages	$ 1,833.38
Public Damage/Emergency Costs	$ 27.86
Flood Insurance Administrative Costs	$ 85.56
TOTAL ANNUAL w/o PROJECT DAMAGES [EAD]	**$ 1,946.80**
WITH PROJECT RESIDUAL DAMAGES [EAD]	
Structure/Contents/Ext. Damages	$ 495.60
Public Damage/Emergency Costs	$ 13.27
Flood Insurance Administrative Costs	$ 11.94
TOTAL ANNUAL w/ PROJECT RESIDUAL DAMAGES [EAD]	**$ 520.81**
PROJECT BENEFITS:	
Structure/Contents/Ext. Damage Reduction	$ 1,337.78
Public Damage/Emergency Cost Reduction	$ 14.59
Flood Insurance Administrative Cost Reduction	$ 73.62
TOTAL ANNUAL w/ PROJECT ECONOMIC BENEFITS	**$ 1,425.99**
INVESTMENT COSTS:	
Construction	$ 10,157.88
LERRD	$ 1,650.00
Planning, Engineering, and Design	$ 867.00
Construction Management	$ 609.47
Subtotal, Construction Cost	$ 13,284.36
Subtotal, IDC	$ 174.52
TOTAL PRESENT VALUE, INVESTMENT COST	**$ 13,458.88**
Annualized Investment Cost (50 yrs, 2.75%)	$498.53
Annualized OMRR&R Cost	$ 25.01
TOTAL ANNUAL PROJECT COSTS	**$ 523.543**
NET ANNUAL BENEFITS	**$ 902.443**
BENEFIT/COST RATIO	**2.72**

4.5 COST SHARE

The non-federal sponsor is responsible for a minimum of 35 percent of total project costs to a maximum of 50 percent of total project costs during the design and implementation phase. In accordance with the terms of the PPA, the non-federal sponsor must pay a minimum of five percent of total project costs in cash, provide all LERRDs required for the project, participate in the Project Coordination Team, perform necessary non-federal audits, and perform investigations necessary to identify the existence and extent of any hazardous substances on lands required for the project. The value of the LERRD (including the value of any project lands already owned by the sponsor) and the value of in-kind participation in the other activities described are added to the five percent cash as part of the 35 percent non-federal cost share. If the total value of the LERRD, the five percent cash, and the other activities is less than 35 percent of total project costs, the non-federal sponsor must contribute additional cash so that its total share is equal to 35 percent of total project costs. Once construction is complete, the project will be turned over to the non-federal sponsor for all OMRR&R.

4.6 DESIGN & IMPLEMENTATION

The D&I phase includes all activities to take the selected plan through to construction. This phase begins once the NWD Commander approves the Integrated Feasibility Report and recommends proceeding into the design and implementation phase. The first action of the design and implementation phase is the negotiation and execution of a PPA which is the cost-share agreement that outlines the responsibilities of both the Corps and the non-federal sponsor required to implement the project.

Along with the PPA, a new Project Management Plan (PMP) will be developed that outlines the scope and schedule for completing design and construction activities. Typical design processes would include collection of field data (surveys and soil borings) as necessary to finalize the design, preparation of final design plans and specifications, preparation of a project real estate footprint outlining all necessary LERRD elements that the sponsor would be responsible for obtaining, advertising and awarding of the construction contract, construction management and supervision during the construction period, preparation of the OMRR&R Manual for the project sponsor to use in operating and maintaining the project, final financial and cost-sharing balancing, close-out, and project transfer to the non-federal sponsor. A preliminary schedule for the design and implementation of this project can be found in Table 16. It should be noted that this schedule will be subject to the Non-Federal Sponsor implementing the non-Federal components that were removed from the recommended plan and treated as future without-project conditions.

Table 16. Preliminary Design & Implementation Schedule

Milestone	Schedule
Public Review of Feasibility Report	March 2018
Feasibility Report Approval	June 2018
Sign Project Partnership Agreement with sponsor	August 2018
Initiate Plans and Specifications	September 2018
Design Complete	October 2019
Sponsor Complete LERRD Acquisitions - Phase I	August 2020
Construction Contract Award – Phase I	September 2020
Phase I Complete	August 2021
Sponsor Complete LERRD Acquisitions – Phase II	August 2021
Construction Contract Option Exercised – Phase II	September 2021
Complete Project	December 2022

4.7 OPERATION & MAINTENANCE REQUIREMENTS

Upon physical completion of the project, the District Commander will notify the non-federal sponsor in writing that construction of the project is complete, and will provide the non-federal sponsor with an OMRR&R Manual. Upon receipt of the notice of completion of construction of the project, the non-federal sponsor will operate, maintain, repair, rehabilitate, and replace the project in accordance with the OMRR&R Manual.

4.8 RISK & UNCERTAINTY

A risk and uncertainty analysis was performed. A risk and uncertainty analysis integrates the uncertainty from the hydrology, hydraulics, economics and other aspects of the project into the plan formulation process. Feasibility study team members select their best estimates for hydrologic, hydraulic and economic parameters used in the analysis and determine their related uncertainty. Using a Monte Carlo, or computer based random sampling procedure, the best estimates and uncertainties are integrated into the results.

The analysis for future with and without-project conditions for the feasibility study was performed using the HEC-FDA Version 1.2.4 risk analysis model. The basic assumption underlying use of a risk analysis program is that the field data in flood risk management studies are based on imperfect knowledge and those key variables for which median or most likely values are specified could, in reality, take on a range of values above and below the specified values. The economic structure inventory is input into HEC-FDA and integrated with hydraulic and hydrologic data characterizing flood potential. All engineering and economic data are entered into the program in terms of median or most likely values and accompanied by appropriate uncertainty parameters encompassing the range of possible values for each variable. The subsequent analysis simulates tens of thousands of theoretical flood events, synthetically extending the period of record to thousands of years and thereby producing results that embody uncertainties in assumptions and the dynamic interaction of variables over time. For each event, the program samples the range of possible values for each variable and determines (a) whether the flood event results in damage, and (b) how much damage occurs. Under the risk-based analysis condition, the model uses the expected probability function along with the stage-discharge and damage-stage functions with uncertainty to compute EAD.

In this analysis, the economic database for the existing condition year was the same for the base condition year and future condition year. These conditions are often defined separately in order to allow the addition of planned development. However, the basin is fully developed, and according to City of Lincoln staff, it is unlikely that there will be major changes to the land use within the city's flood plain area over the next 25 years. Rather, community development will primarily concentrate on the fringe and outlying areas outside the flood plain. Redevelopment efforts that improve upon the existing land uses in the older, established areas of the city are encouraged, but the city did not note any specific structures that are currently proposed for redevelopment. Local officials stated that no future development or re-development plans within the study area are definite at this point.

Ultimately, while there could be potential projects on the horizon as this study is completed, none had a high likelihood of implementation, a firm identification of a location, or availability of information on industrial classification and estimated investment. Thus, for purposes of this analysis it was assumed that existing level of development will remain throughout the 50-year period of analysis.

Engineering data used in the risk-based analysis for hydrologic, hydraulic, structural, and geotechnical conditions were also identical under existing and future-without project conditions. Refer to these appendices separately for details and a discussion of future with and without-project conditions.

Appropriate contingencies were applied in the development of project costs. There is negligible risk of any additional costs not specifically captured in the project total estimate.

5 ENVIRONMENTAL IMPACTS, REVIEWS AND COMPLIANCE FOR THE UPDATED OPTIMIZED RECOMMMENDED PLAN

5.1 ENVIRONMENTAL CONSEQUENCES

The selected plan would enlarge the Deadmans Run channel to contain the 1% annual chance exceedance flood event. This alternative includes the installation of a concrete hydraulic flume under the BNSF Rail Spur Bridge and widening the channel top-width from an existing 120 feet to 177 feet from Cornhusker Highway upstream to just east of 48th Street. The following sections describe the effects on the physical environment and biological and natural resources that are likely to occur as a result of implementing the selected plan or the No Action Alternative. The No Action Alternative assumes the non-federal sponsor project which includes replacing the 33rd Street culvert, and the 38th and 48th Street bridges with wider-spanned bridges to accommodate traffic patterns. These bridge replacements are assumed to have an approximate 0.5-acre construction footprint each (total 1.5-acre impact area) within the channel of Deadmans Run. The non-federal sponsor project also includes construction of a 7.7-acre detention basin at Flemings Field Complex, where it will continue to function as a recreational field.

Appropriate mitigation of any negative effects of the federal project is also described. To review the current environmental conditions of the project area, see Section 2.2.6. The selected plan is in compliance with all environmental laws and regulations as documented in Section 5.2.2.

5.1.1 PHYSICAL GEOGRAPHY/TOPOGRAPHY AND SOILS

The selected plan would result in permanent construction-related impacts to soils as a result of the proposed project. Approximately 171,000 cubic yards (cy) of material would be removed and hauled off to an approved upland location as a result of the widening and re-shaping the channel. This location will either be the local landfill or a stockpile site designated by the Non-Federal Sponsor, so the material may be used as beneficial fill. Typical earth-moving equipment would be used to dig, grade, trench and shape the soils during construction activities. Erosion and control Best Management Practices (BMPs) during construction such as silt fencing and erosion control blankets would be utilized. Immediately following construction activities, disturbed areas would be seeded with a native seed mixture and mulched to control erosion. Ground disturbing activities would be kept to a minimum. No adverse impacts are anticipated to occur to physical geography/topography and soils.

The No Action Alternative would have minor impacts to soils and area topography. The non-federal sponsor's planned project would replace the 33rd Street culvert and 38th and 48th Street bridges as well as construct a 7.7-acre detention basin on the West Tributary. It is estimated that the bridge replacements and widening will modify approximately 0.5-acre area/bridge. These modifications would have localized impacts on approximately 1.5 acres of the Deadmans Run channel within the Corps' study area at these bridge locations. The detention basin would also likely require the removal of native materials, decreasing the localized elevation of the construction footprint near the West Tributary.

5.1.2 AIR QUALITY

There would be no long-term impacts to air quality as a result of this project. Short-term impacts would include an increase in fossil fuel pollutants by construction equipment during construction activities and an increase in particulate matter in the form of dust. BMPs such as powering off equipment when not in use would be implemented to reduce impacts to air quality. Upon completion of construction activities, it is anticipated the air quality in the localized area would return to ambient, existing conditions.

Similar impacts to air quality may occur as a result of the No Action Alternative as the non-federal sponsor is planning to modify and replace three bridges and construct a detention basin on the West Tributary. If equipment is left idling or appropriate dust and particulate control measures are not implemented, minor and temporary impacts to the localized area could occur.

5.1.3 NOISE

The preferred alternative would result in minor short-term, construction-related noise impacts. These impacts would result from the operation of heavy machinery during project construction. These noise levels would be in addition to those produced in this urban setting. However, BMPs such as avoiding idling engines when equipment is not in use would be implemented to reduce noise impacts. Construction activities that would take place along the East Campus area would be coordinated with UNL and scheduled appropriately in accordance with any noise policy maintained by the University. All other construction activities would be conducted during normal business hours and, therefore, impacts would not be considered significant.

Similar impacts to noise may occur as a result of the No Action Alternative as the non-federal sponsor is planning to modify and replace three bridges and construct a 7.7-acre detention basin on the West Tributary. If equipment is left idling or construction activities take place without the prior coordination with noise-sensitive areas, minor and temporary impacts to the localized area could occur.

5.1.4 VEGETATION AND TERRESTRIAL HABITAT

The selected plan would impact approximately 28.5 acres of vegetation in the floodplain of Deadmans Run, acreage was calculated using the preliminary design project cross section as shown in Figure 28. The 28.5-acre estimate does not include the area currently occupied by the normal flow of Deadmans Run which was estimated to be approximately 20 feet wide through the project area. It also does not include approximately 1.5 acres of turf grasses within the three replaced bridges' construction footprint that are a part of the No Action Alternative. Most of the acres affected consist of highly disturbed urban areas and upland weeds and turf grasses. Following construction, the disturbed areas would be seeded with a native grass mixture on reinforced turf mats. This would result in approximately 17.5 acres of native species with higher floristic quality that would contribute to the environmental setting of the riparian corridor. Within the 25-foot buffer adjacent to the channel, a wetland-mesic prairie seed mix would be planted to result in an additional 5 acres of wet-mesic habitat (see Appendix A: Section III for seed mixes).

Included in the 28.5-acre impacted vegetation is approximately 2.34 acres of mature trees classified as an Eastern Riparian Forest community on the south, right descending bank of Deadmans Run near the East Campus area. As shown in the typical cross section for East Campus (Figure 29), tree plantings would be replaced in the upland right-of-way of the channel footprint throughout East Campus on the south bank. Replacing trees along this area would result in approximately 1 acre of tree plantings, which was calculated by taking the length of the stream impacted, approximately 2,600 feet, and multiplying by the 16-foot width of the proposed tree plantings. These trees would be placed in the upland zone of the new channel footprint and hydraulic modeling indicated that these tree plantings would not negatively impact conveyance.

Several channel alignment variations were discussed by the team to avoid, minimize and mitigate impacts to this Eastern Riparian Forest community; however, the recommended plan has been designed to improve flow conveyance and alleviate flooding, while avoiding impacts to the north bank of trees. Based on the hydraulic analysis, it is not possible to replace trees below the flood-prone zone without inducing overbank flooding during higher frequency events. Due to this constraint, in-kind, on-site mitigation can still be achieved, however, species composition would vary based on replacing trees in the upland areas verses immediately adjacent to the stream. As noted in Section 4.1.5, no mitigation ratio was utilized; however, existing ecological services were assessed and modeled with NESCAP to ensure no net loss habitat function as a result of the recommended plan. See Appendix A: Section III for further discussion.

NESCAP is a hydrogeomorphic approach that measures six thematic variables for the major physical, ecological and anthropogenic factors that can strongly influence stream and adjacent riparian systems. A finalized stream condition index (SCI) averages these six variables together to assign a habitat quality index to the assessment area. This SCI ranges from a scale of 0 to 1, with 1 being the optimal reference standard condition. Based on environmental modeling, found in Appendix A, the environmental impact associated with this project would be negligible, to slightly improved, due to the combination of tree plantings and native seeding implemented under this plan. As Table 17 below shows, implementation of the recommended optimized plan, the overall total SCI remains the same as existing conditions. Multiplying the total SCI by area gained as a result of channel widening accounts for the spatial unit (quantity). As noted, the structural alternative impacts and optimized recommended plan both result in net gains of quantitative indexed area but only the optimized recommended plan results in no net impact to the total SCI. Coordination with USFWS and Nebraska Game and Parks Commission (NGPC) occurred throughout this feasibility study (see correspondence in Appendix A, Section IV) and concurrence that the optimized integrated environmental plan would result in no net impact to habitat function was received.

Table 17. Comparison table of alternative impacts to existing conditions. Note that the stream condition index area increases with action as a result of widening the stream.

	Existing Conditions	Structural Alternative Impacts	Optimized Reccommended Plan
Total Stream Condition Index Rating	0.26	0.24	0.26
Stream Condition Index Area (sqft)	761.14	1,158.86	1,268.57

Under the No Action Alternative, minor and long-term impacts to approximately 1.5 acres of primarily turf grasses and non-native species are likely to occur within the construction footprints of the three replaced bridges. Furthermore, approximately 7.7 acres of Flemings Fields would be converted into a dry detention basin. These turf grasses would be replanted and the detention basin would still function as a recreational facility/soccer field.

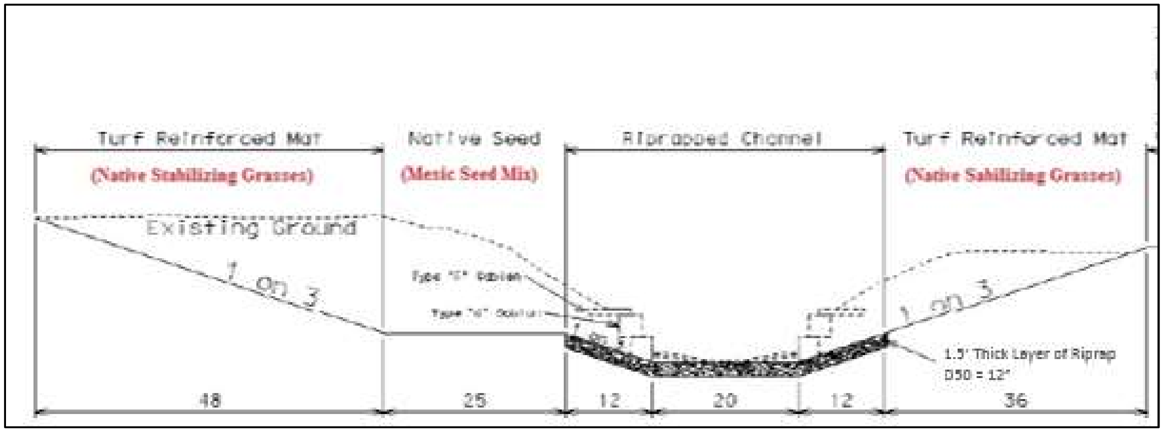

Figure 28. Typical Cross Section of Mitigating Actions along the Impacted Channel Footprint of Deadmans Run

Note: The native stabilizing grasses placed on the reinforced turf mat and the mesic seed mix immediately adjacent to the channel.

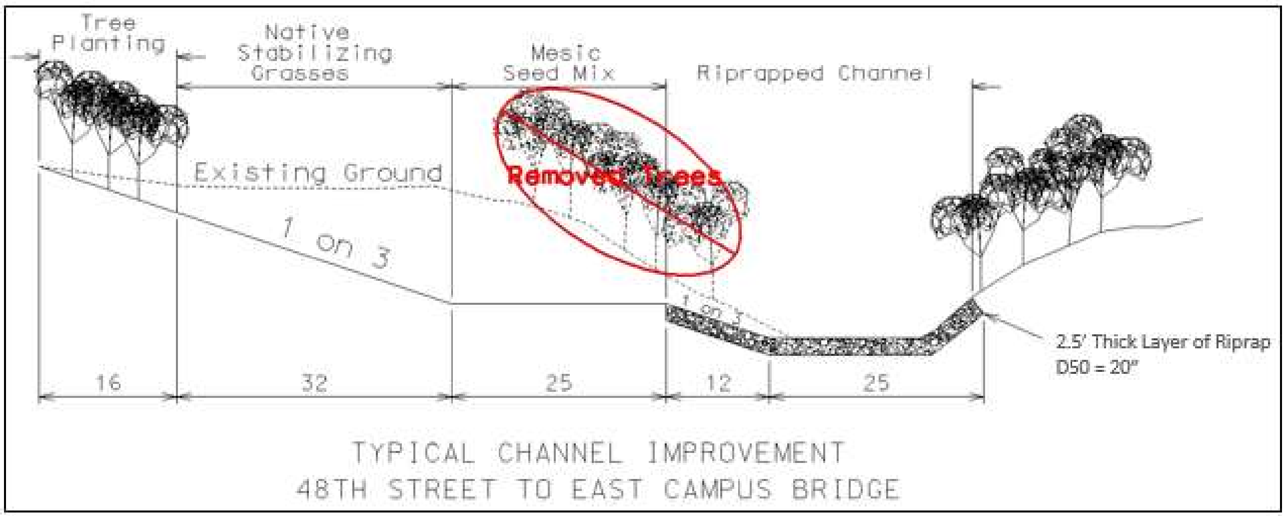

Figure 29. Typical Cross Section through East Campus

Note: The tree plantings on the upper banks of the channel footprint on the south bank, native stabilizing grasses placed on the reinforced turf mat, the mesic seed mix immediately adjacent to the channel and the undisturbed trees on the north bank.

5.1.5 WATER QUALITY

Riparian vegetation slows water runoff, traps sediment, and intercepts pesticides, pathogens, and heavy metals from entering waterways. Clearing riparian vegetation would cause the temporary loss of the stream's vegetative buffer which could cause increased water temperatures, increased sediment load and turbidity, and increased fertilizer and pesticide runoff from surrounding agricultural fields. All of these effects would be minor and short term. The fish species found in Deadmans Run are tolerant of low water quality conditions and all of the effects previously mentioned would last only until bare soils can be stabilized and vegetation is re-established.

Runoff from the construction site into waterways is a potential effect that would be minor and short term. The Clean Water Act (CWA) requires preparation and submission of a general stormwater permit and preparation of a Stormwater Pollution Prevention Plan (SWPPP) prepared by the construction contractor before construction activities can begin. The SWPPP would be based on best management practices such as seeding and mulching bare slopes as soon as practicable and measures to contain spillage of any contaminants into waterways. In the long term there would essentially be no change to the water quality in these creeks from implementation of any of the build alternatives and none of the beneficial uses assigned to Deadmans Run would be degraded.

A Nebraska Department of Environmental Quality (NDEQ) 401 Water Quality Certification would be obtained prior to any construction activities. Any mitigation contained within this permit would become part of the proposed action. The selected plan would have minor, temporary construction-related adverse impacts to water quality resulting from site runoff and increased turbidity. A 404(b)(1) analysis has been completed to account for impacts to waters of the U.S. and may be found in Appendix A: Section II. These temporary impacts would be minimized to the greatest extent possible through the use of Best Management Practices (BMPs) that would be required as a provision under the National Pollutant Discharge Elimination System (NPDES) permit, acquired through the construction contractor, and through permitting requirements from other local and state authorities.

BMPs would minimize any incidental fallback of material into the creek during construction and would minimize the introduction of fuel, petroleum products, or other deleterious material from entering into the waterway. Such practices and measures could include, but are not limited to: the use of erosion control fences; storing equipment, solid waste and petroleum products above the ordinary high water mark and away from areas prone to runoff and requiring that all equipment is clean and free of leaks. To prevent fill from reaching water sources by wind or runoff, fill would be covered, stabilized or mulched and silt fences used as required. With an expectation that BMPs would be required as a part of the NPDES permit and implemented during construction activities, no significant impacts to water quality are anticipated.

Under the No Action Alternative, the non-federal sponsor would still be replacing three bridges within the study area and constructing a detention basin on the West Tributary. It will still be necessary for the non-federal sponsors to seek a 401 certification, NPDES permit and utilize BMPs as a result of their intended plan. Impacts to water quality under the No Action Alternative are likely to be minor and temporary but would be coordinated appropriately with the NDEQ.

5.1.6 WETLANDS AND WATERS OF THE UNITED STATES

No impacts to wetlands would occur as a result of the proposed project, as no wetlands exist within the project footprint. As noted, a small emergent wetland, approximately 0.15 acres, exists on the south bank off West Tributary (see Section 2.2.6.2); however, this wetland falls outside of the construction area. A 404(b)(1) analysis has been completed and may be found in Appendix A: Section II. Because the existing channel is armored and lined, narrow, incised, and has steep banks, the amount of land area suitable for wetlands development is very limited. Moderate and temporary impacts would occur to Waters of the United States during construction activities as a result of placing a barrier bisecting the channel to create a dry workspace. Construction would start at the downstream end of the channel, a barrier would be placed upstream and downstream of the work area, and water would be pumped to the upstream side of the most upstream barrier. As the construction activities continue, the barriers would be moved farther upstream to accommodate a workspace for channel improvement. It is anticipated that this work would span over two construction seasons. Details of water care and diversion would be further refined in Design and Implementation and provided to NDEQ when seeking a 401 certification. Best management practices would be utilized to minimize impacts to Waters of the United States such as installing these temporary barriers during low-flow season and during warmer weather after the potential of winter or early spring peaks have passed. Barriers with earthen fill would be used (such as sandbags, plywood barriers or water-filled bags/tubes).

Material associated with the project would include clean, earthen silt loam or silty clay loam material mechanically excavated from the banks of Deadmans Run from Cornhusker Highway upstream to just east of 48th Street, removal of the concrete mattress along the same reach and replacement with clean rock riprap obtained from commercial sources. An estimated 171,000 cy would be excavated from the banks and hauled offsite to an approved, upland location. Approximately 44,672 tons of rock riprap would be placed along this approximately 1.4-mile construction footprint (7,196 linear feet) reach. An additional 18,677 tons of riprap would be utilized for filter spalls for the concrete flume under the BNSF rail spur bridge for a net total 63,349 tons of riprap placed in the channel.

The excavated material would be hauled off site by the contractor to an approved upland disposal location. No material would be disposed of in wetland areas or Waters of the United States. Maximum material anticipated to be excavated from the construction of the recommended plan would total no more than 171,000 cy. A 404(b)(1) Evaluation was completed and is available in Appendix A: Section II.

The No Action Alternative is assumed to have negligible impacts to wetlands and Waters of the United States. It is likely that beneath the replaced bridges, riprap would be placed to stabilize the bankline. As such, the non-federal sponsor would be required to coordinate with Corps' Regulatory to obtain a 404 permit as a result of any bridge modifications.

5.1.7 FISH AND WILDLIFE

The project area has been highly disturbed with industrial and commercial activities. The preferred alternative would result in minor, temporary, construction-related adverse impacts to fish and wildlife resources. The impacts to fishery resources would primarily be related to site runoff and increased turbidity, which could make feeding, breeding and sheltering difficult for species not accustomed to these conditions. The concrete flume was modeled with a flat slope to give conservative estimates of flow capacity. The flume width, length, roughness, slope, transitions, and backwater conditions are all subject to change during the final design process. A physical model and/or CFD modeling of the flume will likely be required to ensure it operates as predicted by the 1D HEC-RAS modeling. The concrete flume would not create an impediment to fish passage, though it is anticipated that during rare higher flow events, the water would move through this portion of Deadmans Run at a swifter rate as it facilitates flow downstream. Many factors such as species, body length, form, physiological condition, condition to currents, motivation and behavior, water temperature, water quality and dissolved oxygen can impact the swimming performance of fish (as cited in USACE, 2012). Salt Creek would rise in stage after a rapid, "flashy" event on Deadmans Run, producing a calm backwater through the flume. Impacts to swimming behavior may occur; however, these impacts to this microhabitat would be localized, minor and short-term for the duration of the event. The impacts to wildlife resources would be related to noise and visual disturbance during the construction activity. Following construction, conditions though slightly improved as a result of the integrated environmental plan, would revert back to pre-construction conditions, thus impacts to wildlife resources are not considered significant.

Moderate and temporary impacts would occur to the aquatic environment during construction activities as a result of placing a barrier bisecting the channel to create a dry workspace. Construction would start at the downstream end of the channel, a barrier would be placed upstream and downstream of the work area, and water would be pumped to the upstream side of the most upstream barrier. As the construction activities continue, the barriers would be moved farther upstream to accommodate a workspace for channel improvement. It is anticipated that this work would span over two construction seasons. Details of water care and diversion would be further refined in Design and Implementation. Best management practices would be utilized to minimize impacts to Waters of the United States such as installing these temporary barriers during low-flow season and during warmer weather after the potential of winter or early spring peaks have passed. Barriers with earthen fill would be used (such as sandbags, plywood barriers or water-filled bags/tubes). Minimal impacts are anticipated to occur to the benthic aquatic environment as a result of water diversion, as the majority of the project footprint is lined with a concrete mattress and currently provides negligible habitat to benthic aquatic life. However, it is assumed that as the barriers are being installed into the channel, most aquatic life would flee the area as a result of vibration, auditory and visual disturbances from human activity.

Without construction of the flood damage reduction project, no low flow channel or high quality wetlands would occur within the channel; thus, no increased habitats for wildlife to feed, breed, or shelter would result. Under the No Action Alternative the non-federal sponsor would also be replacing the 33rd Street culvert and the 38th and 48th Street Bridges as well as adding a 7.7-acre detention basin within the Flemings Fields complex. It is not expected that these actions would have significant or long-term negative effects on fish and wildlife. Impacts under the No Action Alternative would include construction-related disturbances such as noise, vibrations from earth-moving equipment and increased presence of humans. It is assumed that most fish and wildlife would disperse during these construction activities and return upon the completion of the non-federal sponsor project.

5.1.8 THREATENED AND ENDANGERED SPECIES

On June 14, 2016, an informal memorandum of record (MOR) was submitted (via e-mail) to the USFWS, as well as NGPC to update both agencies on project formulation status and provide opportunity for comment. Both agencies sent a confirmation that the MOR was received but provided no further comment. On November 1, 2016, a follow-on informal MOR was submitted (via e-mail) to the USFWS and NGPC to inform both agencies the tentatively selected alternative that would be briefed to the non-federal sponsor on December 1, 2016. Subsequently, a webinar was presented to USFWS and NGPC on December 5, 2016, outlining the details of the selected alternative.

After evaluating effects of the proposed action, the Corps concluded that the proposed project would have *"no effect"* on the Salt Creek tiger beetle, whooping crane, pallid sturgeon, and western fringed prairie orchid based on the premise that suitable habitat is not present within the project footprint and no related project activities would impact potential or suitable habitat. Furthermore a "*no effect*" determination was made in regards to the recommended plan contributing to Platte River depletions. The project has been designed so it falls within the *de minimus* threshold established by the USFWS and thus does not require formal consultation. A "*may affect, but not likely to adversely affect*" determination was made for the northern long-eared bat, interior least tern and piping plover. Table 18 summarizes these determinations.

Table 18. Determination of Effect Summary

SPECIES	DETERMINATION	RATIONALE
Salt Creek Tiger Beetle	No Effect	Lack of highly specialized habitat needs within the project area, critical habitat nearly 2 miles north of project location. No saline wetland or impacts to saline wetlands as a result of the recommended alternative.
Whooping Crane	No Effect	Lack of habitat in the immediate project area within urbanized Lincoln, Nebraska.
Interior Least Tern	Not Likely to Adversely Affect	Lack of habitat in the immediate area, construction activities limited to a highly urbanized tributary of Salt Creek (which in turn is a contributing watershed to the Platte River). Construction activities and resulting project will not contribute to channel bed degradation of the Platte River nor the channel-forming velocity of the Platte River and sandbar formation of the Platte River.
Piping Plover	Not Likely to Adversely Affect	Lack of habitat in the immediate area, construction activities limited to a highly urbanized tributary of Salt Creek (which in turn is a contributing watershed to the Platte River). Construction activities and resulting project will not contribute to channel bed degradation of the Platte River nor the channel-forming velocity of the Platte River and sandbar formation of the Platte River.
Pallid Sturgeon	No Effect	Lack of habitat in the immediate area, construction activities limited to a highly urbanized tributary of Salt Creek (which in turn is a contributing watershed to the Platte River). Construction activities and resulting project will not contribute to channel bed degradation of the Platte River nor the channel-forming velocity of the Platte River and sandbar formation of the Platte River.
Northern Long-eared Bat	Not Likely to Adversely Affect	No tree clearing would occur June 1 through July 31, in order to avoid potential maternity colonies within the area. Furthermore, take would not purposefully occur, known hibernacula does not occur within a 0.25-mile radius of the project area.
Western Prairie Fringed Orchid	No Effect	Lack of habitat in the immediate area, no high quality prairies or wet meadows within urbanized Lincoln, Nebraska.

5.1.8.1 ***SALT CREEK TIGER BEETLE***

The federally endangered Salt Creek tiger beetle is confined to eastern Nebraska saline wetlands which are associated with Salt Creek and adjacent tributaries. Historical specimens indicate a once flourishing population; however loss of habitat has caused a precipitous decline. The Salt Creek tiger beetle was listed as federally endangered on October 6, 2005. On May 5, 2014, USFWS announced a final revision to designated critical habitat with only a few hundred beetles remaining in three distinct populations on less than 35 acres (USFWS, 2014). The final rule expanded designated critical habitat to 1,110 acres in Lancaster and Saunders Counties, which included saline wetlands and streams associated with Little Salt Creek and encompassed the three distinct populations (FR 79:87). The three remaining populations reside at Upper Little Salt Creek-North, Arbor Lake and Little Salt-Creek-Roper, along a stream reach of approximately 7 miles.

5.1.8.2 ***EFFECT DETERMINATION ON THE SALT CREEK TIGER BEETLE***

No saline wetlands are present within the proposed project construction footprint. According to the NWI-classified saline wetlands map (see Figure 30), the nearest saline wetland which would have the potential to provide suitable habitat for this species, is approximately 1 mile north of the channel widening footprint. As noted in Figure 31, designated critical habitat is approximately two miles north and 3.8 miles west of the confluence of Deadmans Run and Salt Creek. These locations would serve as the closest potential suitable habitat for the Salt Creek tiger beetle. No project activities are expected to occur within the vicinity of suitable habitat.

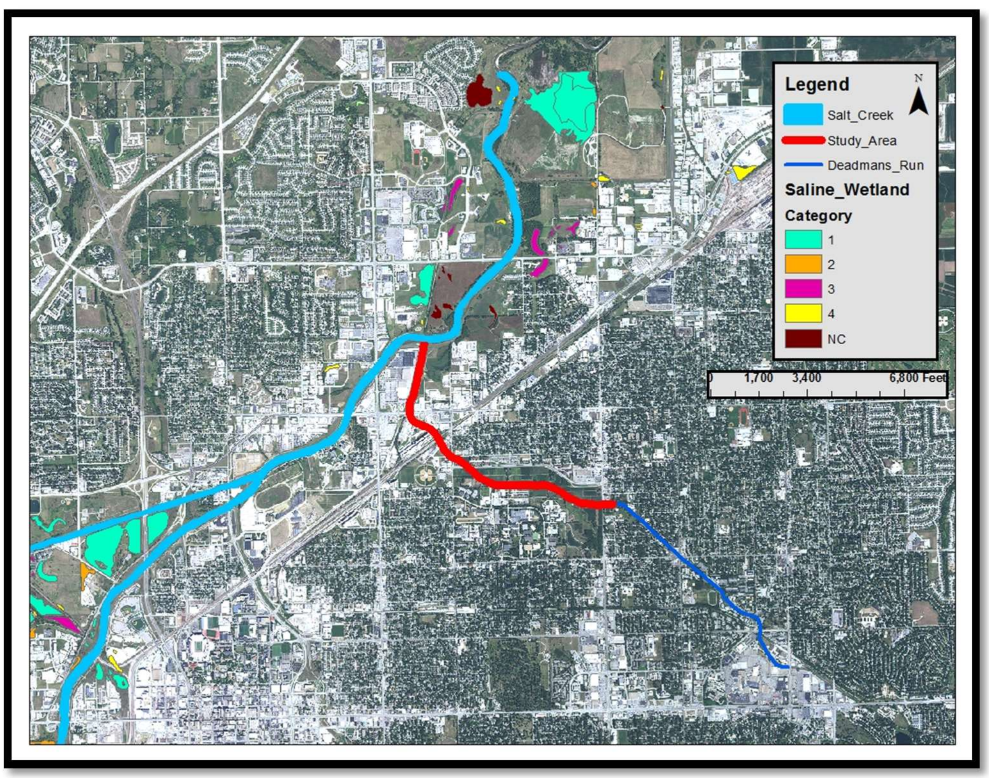

Figure 30. Saline wetlands near the Study Area of Deadmans Run

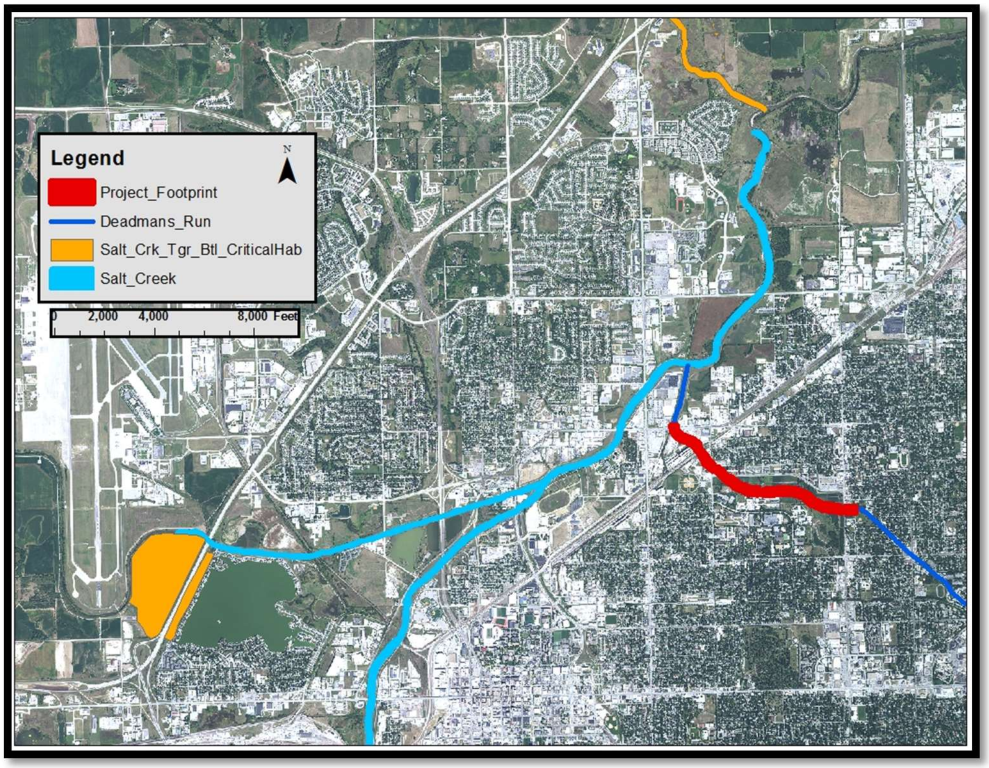

Figure 31. Designated Critical Habitat (orange) of the Salt Creek Tiger Beetle in Relation to the Project Footprint of Deadmans Run

After evaluating the potential effects of the proposed action, the Corps concludes that the proposed project would have "*no effect*" on the Salt Creek tiger beetle based on the premise that the project area is not located within or readily near suitable habitat for this species. This species has a highly specified habitat requirement and is dependent upon saline environments that do not exist within the action area.

5.1.8.3 ***WHOOPING CRANE***

The whooping crane was designated as federally endangered on March 11, 1967, prior to the enactment of the ESA. Their populations declined to an estimated 16 individuals in 1941 due to overhunting and habitat disturbance. Today, there is a small, self-sustaining wild population that nests in the Wood Buffalo National Park in Saskatchewan, Canada and overwinters on the Texas Gulf Coast at the Aransas National Wildlife Refuge. There are also a few captive populations that have been in an experimental reintroduction program scattered across a handful of zoos and research parks (USFWS, 2010). Current population approximates 600 wild and captive individuals.

5.1.8.4 ***EFFECT DETERMINATION ON THE WHOOPING CRANE***

Whooping crane migration periods occur between March and May and September to November, and birds would likely only be found in this region during those migration periods. Migrating birds will feed in croplands and roost in shallow, freshwater wetlands. It is not anticipated that the whooping crane would be negatively impacted by the proposed project as it is not likely they would be found in the action area. Due to the heavily urbanized setting of Deadmans Run, lack of freshwater wetlands and adjacent suitable foraging habitat, no direct effects are anticipated.

After evaluating the potential effects of the proposed action, the Corps concludes that the proposed project would have "*no effect*" on the whooping crane based on the premise that the project area is not located within or readily near suitable habitat for this species. Due to the highly urbanized setting of Deadmans Run, it is not anticipated the whooping crane would be located with or near the action area, nor would the proposed action have any indirect, cumulative, interrelated or interdependent impacts on this species.

5.1.8.5 ***INTERIOR LEAST TERN AND PIPING PLOVER***

The interior least tern was listed as federally endangered on May 28, 1985 (50 FR 21784), shortly after the American Ornithologist Union recognized it as a subspecies to *A. athalassos* in 1983. This species is migratory and primarily overwinters along coastal areas adjacent to the Pacific and Atlantic Oceans. Migration takes place between March and May, where they will migrate to breeding grounds. The interior population of least terns breed primarily on the lower Mississippi River, Red River, Arkansas River and the Missouri River as well as their major tributaries.

Once adults arrive to breeding grounds, typically in late April, courtship and mate selection occur. A breeding pair constructs a nest bowl, or scrape, on sparsely vegetated areas near water, on sandy or gravelly substrates. Chicks hatch after 19 to 25 days of incubation. Chicks fledge around 18 to 22 days after hatching. Fledglings congregate with adults and other fledglings, practicing foraging techniques. Parents continue to feed the juveniles until they are fully fledged, and may continue to do so during migration to the wintering grounds.

The piping plover was listed as federally threatened under the ESA on January 10, 1986. Critical habitat for the Northern Great Plains breeding grounds was designated on September 11, 2002. In the Great Plains region, piping plover nest in habitat similar to least tern nesting habitat. They construct their nests on sparsely vegetated sand/gravel beaches, to alkali lakes and wetlands, on beaches of reservoirs and lakes and on sandbars or rivers. Following nest construction, a nest scrape, eggs are laid about every other day, with a clutch size typically consisting of three to four eggs. When the final egg has been laid, incubation begins. After 28 to 31 days of incubation, chicks hatch and begin feeding. Chicks forage near parents, mimicking the "peck and run" method. The female may abandon the chicks upon hatching, though the male will continue to tend to the brood until they fledge (approximately 21 to 28 days after hatching), and in some cases, longer (USACE, 2011).

Both the interior least tern and piping plover populations have declined due to the alteration of natural river dynamics of these large rivers and their tributaries which nearly eradicated primary nesting habitat which has altered reproductive success.

5.1.8.6 ***EFFECT DETERMINATION ON THE INTERIOR LEAST TERN AND PIPING PLOVER***

As noted above, the interior least tern and piping plover would be generally present within this region during their nesting period between late April to early August, as both bird species nest on gravely/sandy substrate on large rivers. The project area is approximately 50 miles south of the Platte River where interior least terns and piping plovers would have potential suitable habitat for nesting. No nesting interior least terns or piping plovers are anticipated to occur within the action area.

The USFWS indicated that the proposed project could have tributary and watershed-level effects that could influence sediment and hydrological cycles that drive the creation and maintenance of habitats used by the interior least tern and piping plover on the Platte River. While Salt Creek [and in turn Deadmans Run] does not provide significant contributions to the Platte River sand bedload (Alexander & Schaepe, 2015), an email dated December 7, 2016 from USFWS expressed concern on how accelerated flows from Deadmans Run into Salt Creek by implementing the recommended alternative may exacerbate channel degradation in the Platte River as there would be little to no corresponding bedload with these flows.

To address this concern, an analysis was performed comparing the recommended alternative and existing conditions hydrographs. Deadmans Run, as noted, is an urbanized stream with extensive stabilization and little flow volume/sediment contribution in comparison to the Lower Platte River. It was shown in this analysis that the hydrographs are nearly identical after traveling about six miles down Salt Creek from the Deadmans Run confluence. Therefore, the effects of the Deadmans Run project appear to diminish about six miles into a 30-mile journey to the Platte River. Due to the existing extensive stabilization, urban stream characteristics, and insignificant sediment contribution from Deadmans Run, the proposed project will not significantly alter existing conditions within the Lower Platte River and therefore are anticipated to have no indirect or cumulative impact on channel degradation, and thus no indirect or cumulative effect to interior least tern and piping plover habitat.

Due to the extra capacity of the widened channel of Deadmans Run, flood waters that would have otherwise spilled into the overbanks and caused widespread flooding, will now be retained in the flood control channel. The overall volume of water that is released into Salt Creek, and eventually the Platte River, will increase slightly due to less overbank flooding. However, this increase in water volume will occur at less frequent events like the two percent ACE event and 1% ACE event flows and not at the more frequent events like the 10 percent ACE event and 50 percent ACE event. The behavior of the frequent events should remain similar to the existing conditions because channel modifications were focused on the higher elevations of the channel to increase flood conveyance. The Deadmans Run watershed is a small area in comparison with the Salt Creek and Platte River watersheds. Deadmans Run drains less than 10 square miles while the area of the Salt Creek watershed at the USGS Salt Creek at Lincoln stream gage (No. 06803500), about one mile upstream of the confluence with Deadmans Run, drains 685 square miles. Therefore, if the project on Deadmans Run did create depletions, its overall impact to the Platte River would be minimal and fall within the threshold of the USFWS *de minimus* rule. As the project is designed now, all water drains back to Salt Creek within 24 hours and as such, depletions are not considered a direct, indirect or cumulative effect as a result of the recommended plan.

There is potential for the least tern and piping plover bird species to generally pass through the area during their migration periods, however; it is anticipated that both species would not be further impacted by construction activities due to the general urbanization and anthropomorphic activities already existing within the project area.

After evaluating the potential effects of the proposed action, the Corps concludes that the proposed project would have a "*may effect, not likely to adversely affect*" determination on the interior least tern and piping plover based on the premise that the project area is not located within or readily near suitable nesting habitat for these species. Based on analysis of current channel conditions and "with project" conditions, it was determined that it is unlikely the recommended alternative would have an impact on the channel-forming velocity of the Platte River or contribute to channel bed degradation of the Platte River. Furthermore, the project has been designed in such a way that it falls under the USFWS *de minimus* threshold.

There is potential for these species to be passing through the region during the nesting season. If the interior least tern or piping plover do pass through during construction, the impact would be temporary and negligible as the birds would likely be deterred by surrounding urbanization and anthropomorphic activities already occurring. Temporary construction activities would only further deter the birds from utilizing the immediate project area.

5.1.8.7 ***PALLID STURGEON***

The pallid sturgeon was listed as federally endangered on September 6, 1990 (USFWS, 1998). This big river fish species was historically found in the lower Mississippi, Missouri, and Yellowstone River Basins (Bramblett & White, 2001). A conceptual life-history model was provided for the pallid sturgeon from a combined study conducted by the U.S Department of the Interior (DOI) and the U.S. Geological Survey (USGS). It has been determined that pallid sturgeon spawn between spring and summer upstream, after which the adults migrate downstream and overwinter. The larvae incubate upstream and drift downstream. It is thought that the timing of spawning has seasonally evolved through environmental cues such as hydrological flows. Since these flows have been altered through anthropogenic means, recruitment has suffered (Wildhaber et al., 2007).

Under the Corps' Missouri River Recovery Program (MRRP), an Effects Analysis was initiated in 2013 to incorporate new knowledge to review species recovery progress and to provide quantitative models relating to pallid sturgeon responses to management actions on the Missouri River. Currently, there are several hypotheses in the Effects Analysis regarding factors that may limit recruitment of pallid sturgeon larvae to age-1. Many of these hypotheses focus on a lack of habitat to support food production, feeding and the interception of drifting free embryos from the thalweg into channel margin habitats (Jacobson et al., 2016).

5.1.8.8 ***EFFECT DETERMINATION ON THE PALLID STURGEON***

While pallid sturgeon occur in large rivers and their tributaries, no pallid sturgeon are anticipated to occur in Deadmans Run or Salt Creek, similar to the interior least tern and piping plover. In the PAL from January 2016 it was noted that Platte River depletions could be considered significant and would thus require formal consultation if they exceed the *de minimus* threshold of 0.1 acre-foot per year as a result of the proposed project at Deadmans Run. The recommended alternative is designed to safely pass the flows from the 1% ACE event through a widened channel.

In addition, the Deadmans Run watershed is a small area in comparison with the Salt Creek and Platte River watersheds. Deadmans Run drains less than 10 square miles while the area of the Salt Creek watershed at the USGS Salt Creek at Lincoln stream gage (No. 06803500), about one mile upstream of the confluence with Deadmans Run, drains 685 square miles. Therefore, if the project on Deadmans Run did create depletions, its overall impact to the Platte River would be minimal and fall within the threshold of the USFWS *de minimus* rule. As the project is designed now, all water drains back to Salt Creek within 24 hours and as such, depletions are not considered a direct, indirect or cumulative effect as a result of the recommended plan.

After evaluating the potential effects of the proposed action, the Corps concludes that the proposed project would have a "*no effect*" influence on the pallid sturgeon based on the premise that the project area is not located within or readily near suitable habitat for this species. Furthermore, no indirect or cumulative effect to the pallid sturgeon would occur as no depletions of flows would occur in the Lower Platte River where pallid sturgeon occur. In fact, due to the extra capacity of the widened channel on Deadmans Run, flood waters that would have otherwise spilled into the overbanks causing widespread flooding, will now be retained in the flood control channel. The overall volume of water that is released into Salt Creek, and eventually the Platte River, will increase slightly due to less overbank flooding. However, this increase in water volume will occur at less frequent events like the flows from the two percent ACE event and the 1% ACE event and not at the more frequent events like the 10 percent ACE event and the 50 percent ACE event. The channel improvement project is designed to remain within the *de minimus* threshold.

5.1.8.9 ***NORTHERN LONG-EARED BAT***

The northern long-eared bat was listed as federally threatened on May 2, 2015 and may be found within the project area. The northern long-eared bat is distributed along the eastern half of the United States, with a range that extends into and throughout the majority of the state of Nebraska, to include Lancaster County. It is thought that habitat fragmentation, human disturbance and the emergence of white-nose syndrome (*Pseudogymnoascus destructans*) has decimated populations. In November 2015, white nose syndrome was confirmed in an abandoned mine in Cass County, Nebraska which is directly adjacent to Lancaster County. Lancaster County is included in the white nose buffer zone.

During summer, northern long-eared bats roost singly or in colonies underneath bark, in cavities, or in crevices of both live and dead trees. Males and non-reproductive females may also roost in cooler places, like caves and mines. This bat seems opportunistic in selecting roosts, using tree species based on suitability to retain bark or provide cavities or crevices. It has also been found, rarely, roosting in structures like barns and sheds. Northern long-eared bats spend winter hibernating in caves and mines, called hibernacula. They typically use large caves or mines with large passages and entrances; constant temperatures; and high humidity with no air currents. Specific areas where they hibernate have very high humidity (USFWS, 2015).

In Nebraska, breeding begins in late summer or early fall when males begin swarming near hibernacula. Fall swarming is the final stage before hibernation. Swarming starts in mid-August and lasts through the end of October. After copulation, northern long-eared bats hibernate in caves in southeastern Nebraska from October 15th to March 15th before beginning migration to summer-use areas. After hibernation, pregnant females migrate to summer areas where they roost in small colonies and give birth to a single pup in June or early July (USFWS, 2015). Maternity colonies disperse toward hibernacula shortly after young are able to fly.

5.1.8.10 EFFECT DETERMINATION ON THE NORTHERN LONG-EARED BAT

Direct effects to the northern long-eared bat are considered minor and temporary, and occur in the form of removing approximately five acres of Eastern Riparian Forest. There is minor potential that this area may be utilized by northern long-eared bats as roosting sites or for maternity colonies. As noted in Section 5.1.8.5, the project area falls within the white nose buffer zone. As such, the *Key to the Northern Long-eared Bat 4(d) Rule for Federal Actions that May Affect Northern Long-eared Bats* (USFWS, 2016) was consulted. No tree clearing would occur June 1st through July 31st in order to avoid potential maternity colonies within the area. Furthermore, take would not purposefully occur as known hibernacula does not occur within a 0.25-mile radius of the project area. The recommended alternative would not affect caves or mines where northern long-eared bats are known to hibernate, nor would it alter the entrance or the environment of hibernaculum.

After evaluating the potential effects of the proposed action, the Corps concludes that the proposed project would have a "*may affect, but not likely to adversely affect*" determination for the northern long-eared bat. This is based on the premise that the project area occurs wholly within the white nose buffer zone, and approximately 5 acres of trees will be removed. However, no adverse impacts are anticipated as tree clearing would be conducted outside the nesting period, June 1st through July 31st, and the project area is not within a 0.25-mile radius of known hibernacula.

5.1.8.11 WESTERN PRAIRIE FRINGED ORCHID

The western prairie fringed orchid (*Platanthera praeclara*) is an herbaceous perennial that was listed as federally threatened on September 28, 1989. This member of the orchid family is native to the Midwest prairies, typically found in wet-mesic sedge meadows (Sharma et al., 2003). Loss of habitat through agrarian and urban encroachment have caused population declines. Data depicting known historical presence show a 75-percent decline where these populations are now extirpated (USFWS, 1996).

The western prairie fringed orchid is reportedly long lived, provided adequate environmental factors. This plant is entirely propagated by seed and perpetuates through a perennating bud which forms on fusiform tubers. The initial shoot will emerge between April and May. A single bud is produced on the rhizome but will remain dormant over the winter after the plant senesces in September. In the following spring, the bud will develop into vegetative shoots. Inflorescence typically occurs in July. Pollination is required, and is typically performed by various species of hawkmoths (USFWS, 1996). Mature seeds are released in the early fall and new progeny will form.

It is thought that a drought lasting longer than a year will severely increase mortality and reduce seed viability of remaining individuals. It is also sensitive to extensive periods of inundation. Habitat management practices such as grazing, mowing and burning may also affect survivorship.

5.1.8.12 ***EFFECT DETERMINATION ON THE WESTERN PRAIRIE FRINGED ORCHID***

The disturbance caused by associated factors with urbanization has likely sequestered this species' ability to thrive within the study area. It is not expected that the western prairie fringed orchid will be found within the project area, therefore it is not expected there will be direct effects as a result of the recommended alternative.

Confirmed through desktop analysis and site visits, no high quality prairie or wet meadows exist within the project area. Therefore the Corps concludes that the proposed project would have *"no effect"* on the western prairie fringed orchid based on the lack of suitable habitat within the project area.

5.1.9 MIGRATORY BIRDS

Under the recommended alternative, impacts to migratory songbirds and raptors are anticipated to be minor and short-term. Although the provisions of the Migratory Bird Treaty Act (MBTA) are applicable year-round, most migratory neo-tropical bird nesting activity in the proposed project location occurs from April 1st to July 15th, most raptor nesting in this region occurs from February 1st to July 15th. The best time to avoid all nesting birds is between September 15th and January 31st. Under the MBTA, construction activities in rivers, wetlands, streams, riparian forests, woodlands and grassland habitats that would potentially result in the taking of migratory birds, eggs, young, and/or active nests should be avoided completely outside of the primary nesting season. Clearing and grubbing would be scheduled to occur outside of the primary nesting periods. Should any clearing and grubbing occur within the nesting season, a qualified biologist would conduct a field survey not more than 10 days prior to any proposed clearing and grubbing activities to determine the presence or absence of any nesting migratory birds. If any nesting species are found in the project area, the USFWS would be contacted immediately for further guidance and assistance.

Proposed construction activities involved with this project could have the potential to result in temporarily disturbing migratory birds in the form of displacement and determent of utilization of the area during construction. However, in order to minimize impacts to migratory species, all clearing and grubbing activities would occur outside of the migratory bird nesting season. Approximately 2.5 acres of mature trees classified as an Eastern Riparian Forest community on the south, right, bank of Deadmans Run near the East Campus area would be removed and no longer be available for nesting species. However, this impact would be minimized as tree plantings would occur in the upper extent of the right-of-way and result in the replacement of approximately 1 acre of trees of higher floristic quality (see Appendix A: Section III for recommended species).

5.1.9.1 ***BALD EAGLE***
Because the construction activities are confined to urban areas within the City of Lincoln, impacts to nesting bald eagles likely would not occur. If an eagle nest is discovered during construction, all activities would cease and the USFWS would be contacted for guidance on how to proceed.

5.1.10 CULTURAL RESOURCES
Surveys and investigation indicated that although there were numerous historical sites and properties within the local area, none of these sites or properties are located within Area of Potential Effect (APE); therefore, under the proposed alternative, no impacts to historical properties are anticipated to occur. Should a discovery be made during construction, all activities would be halted around the discovery site and a Corps archeologist would inform the Nebraska State Historic Preservation Office (SHPO). Construction would resume at the discovery site only if and after the area has been cleared. Letters were sent to the following Indian Tribes to inform them of the proposed project: Otoe-Missouria, Pawnee, Iowa Tribe of Kansas and Nebraska and Omaha. For more information regarding cultural resources, refer to Appendix K.

5.1.11 SOCIOECONOMICS
The proposed project would provide a significant reduction in flood risk for the neighborhoods surrounding the downstream portion of Deadmans Run, removing hundreds of structures from the 1% ACE event floodplain and benefitting structures beyond that floodplain. Although the project area contains environmental justice (EJ) populations such as minority and low-income groups, they would not be disproportionately impacted in a negative way; rather these groups would equally benefit from the proposed project and the corresponding social, economic and flood risk management benefits it would produce.

Without construction of the federal flood damage reduction project, substantial impacts to the socioeconomics of the community could result if urban structures were flooded and individuals were forced to relocate or rebuild. Under the No Action Alternative, the non-federal sponsor would be replacing three bridges and creating a dry detention basin; however, these actions alone do not address the flood risk of the Deadmans Run channel and its impact on adjacent communities.

5.1.12 LAND USE
Land use along the channel is completely urbanized and would not significantly change. The proposed use is in accordance with the comprehensive plan and with current local zoning regulations. The commercial and industrial areas are likely to continue to operate

in the same manner as they are currently operating. No significant impacts to land use are anticipated as a result of implementing the preferred alternative.

The State of Nebraska has enacted "Minimum Standards for Floodplain Management Programs" (Nebraska Administrative Code, Title 455, Chapter 1). Nebraska floodplain regulations are stricter than the minimum floodplain regulations required by the NFIP, such as requiring new construction within the 1 percent annual chance floodplain to be elevated or floodproofed one foot above the 1 percent annual chance flood elevation. Nebraska does not allow new residential construction in the regulatory floodway even if such construction would not impact base flood elevations. The floodplain regulations enacted by the City of Lincoln must meet the minimum standards of the NFIP and the State's stricter regulations, as outlined in Lincoln Municipal Code Section 27.52 and 27.53. The local and state floodplain regulations encourage responsible floodplain management activities and reduce development subject to flood risk.

Under the No Action Alternative, the sponsor would be replacing three existing bridges with wider-spanned bridges as well as creating a 7.7-acre detention basin at Flemings Field Complex. Overall, it is not expected that the No Action Alternative would have an impact on existing landuse. The bridges planned for replacement will continue to function as transient over the Deadmans Run channel, but allow for increased traffic patterns. The detention basin will also continue to be utilized as a recreational facility/soccer field the majority of the time. The only time the detention basin would not be utilized as a recreational facility/soccer field would be during high water events on the West Tributary which would cause the detention basin to fill up with peak flows and precipitation. However, flows would be transported downstream to Salt Creek with 72 hours of activation, thereby only causing temporary land use impacts.

5.2 CUMULATIVE IMPACTS

The combined incremental effects of human activity are referred to as cumulative impacts (40CFR 1508.7). While these incremental effects may be insignificant on their own, accumulated over time and from various sources, they can result in serious degradation to the environment. The cumulative impact analysis must consider past, present and reasonably foreseeable actions in the study area. The analysis also must include consideration of actions outside of the Corps, to include other state and federal agencies. As required by NEPA, the Corps has prepared the following assessment of cumulative impacts related to the alternatives being considered in this EA.

Historically, the City of Lincoln was initially settled on the banks of Salt Creek due to the abundance of salt. The principal economic activities in Lincoln have stemmed from the founding of the University of Nebraska (established 1869) and the railroad industry (established 1870). By 1892, Lincoln had become a major rail center hub. Services to support the railroad industry developed, including: blacksmiths, banks, hotels, lumber yards and saw mills. The city's growth over the years led to development throughout the Salt Creek River basin, impacting unique saline wetlands, freshwater wetlands, native grasslands, forests, floodplain values, water quality and aquatic life. Today's prominent industries include government, academia and education, manufacturing, railroads, pharmaceutical, medical, truck transport and agriculture on the fringes of the urban areas.

Of the reasonably foreseeable projects and associated impacts that would be expected to occur, further urbanization of the area would probably have the greatest impact on the previously mentioned resources. Continued agricultural and rangeland/pasture use within the area would also likely continue. The possibility of wetland conversion and the clearing of riparian habitat are ever present, and these activities tend to further impact valuable resources.

The channel widening will only affect a small segment of Deadmans Run. The habitat within the footprint is primarily disturbed and comprised of invasive species and managed turf vegetation, with the exception of a small patch of an eastern riparian forest-designated community near East Campus. Plant and animal species that utilize this portion of the creek will endure minor and short-term impacts. It is anticipated that following construction and seeding with native grass and wetland mixtures as well as a replacement of a portion of the trees that are removed, the quality of habitat will improve and increase in diversity.

In addition to the channel improvement project undertaken as part of this Section 205 study, an adjacent tributary, Antelope Creek was studied under Section 101(b)(19) of the Water Resources Development Act of 2000 (PL 99-662, as amended) in October 2000. The Antelope Creek Flood Protection project consists of an improved flood conveyance channel reaching from the J Street Bridge to the confluence of Antelope Creek and Salt Creek. The channel is approximately 2 miles long, with a depth of 12 to 30 feet and a constructed top width ranging from 80 to 300 feet and side slopes of 3H:1V. Like the recommended plan at Deadmans Run, the project at Antelope Creek provides flood damage reduction up to the 100-year event, includes vegetated banks and rock riprap protection. It also includes an underground conduit, concrete retaining walls near bridges and a labyrinth weir. It is not anticipated that significant adverse effects would cumulatively occur to the Deadmans Run basin or the overall Salt Creek watershed as a result of past and potential future projects on the tributary system of Salt Creek. Both tributaries have been channelized and are concrete-lined, therefore, current conditions of both streams offer minimal aquatic habitat.

The USFWS has noted concerns in their letter dated January 15, 2016 and an email dated December 7, 2016 (see Biology Appendix A- Section IV: Agency Correspondence) regarding the potential of flow depletions to the Lower Platte River from the proposed project at Deadmans Run as well as the contribution of previous work conducted within the Salt Creek watershed. To address this concern, an analysis was performed comparing the recommended alternative and existing conditions hydrographs. Deadmans Run, as noted, is an urbanized stream with extensive stabilization and little flow volume/sediment contribution in comparison to the Lower Platte River. It was shown in this analysis that the hydrographs are nearly identical after traveling about six miles down Salt Creek from the Deadmans Run confluence. Therefore, the effects of the Deadmans Run project appear to diminish about six miles into a 30-mile journey to the Platte River. Due to the existing extensive stabilization, urban stream characteristics, and insignificant sediment contribution from Deadmans Run, the proposed project will not significantly alter existing conditions within the Lower Platte River and therefore are anticipated to have no indirect or cumulative impact on channel degradation or threatened and endangered species, nor contribute to Platte River depletions.

The adverse effects associated with the proposed project are short term/minor associated with project construction. These minor adverse effects would be greatly offset by providing the citizens of Lincoln an increased measure of flood risk management.

5.2.1 IRREVERSIBLE OR IRRETRIEVABLE COMMITMENT OF RESOURCES

Irreversible effects are those caused by the proposed project that cannot be reversed. Irretrievable effects are gains and losses of outputs of the lands' use, both in the short term and long term. Irreversible effects would include the hardening of the channel throughout the East Campus area of UNL, where not previously hardened and the construction of the concrete flume beneath the BNSF railroad bridges. These components of the project would become a permanent fixture of the landscape. Irretrievable effects would include the short-term and long-term impacts to natural resources such as wetlands, wildlife, fish and riparian areas in exchange for long-term flood risk management solutions along Deadmans Run.

5.3 ENVIRONMENTAL COMPLIANCE

The following sections summarize the major statutory and regulatory environmental compliance requirements and discuss the major federal and state permits and clearances that would be required for approval and implementation of the project.

5.3.1 ENDANGERED SPECIES ACT

Federal agencies are required to determine the effects of their actions on federally listed endangered or threatened species and their critical habitats under ESA (16 U.S.C. § 1531 et seq.). Steps must be taken by the federal agency to conserve and protect these species and their habitat, and to avoid or mitigate any potentially adverse impacts resulting from the implementation of the proposed project. Informal ESA consultation is ongoing with the USFWS. A BA has been prepared in conjunction with this project. The preparation of a BA is required under ESA to evaluate if a major construction activity is likely to adversely affect a listed species or its habitat. The assessment is used to determine if formal consultation with the federal agency and the USFWS would be required. Formal consultation would not likely be required for the proposed project, as adverse impacts to listed species or their habitats are not anticipated. See Appendix A: Section I for the BA.

5.3.2 FISH AND WILDLIFE COORDINATION ACT

The Fish and Wildlife Coordination Act (16 U.S.C. § 661 et seq.) provides the basic authority for USFWS involvement in evaluating impacts to fish and wildlife from proposed water resource development projects. It requires that fish and wildlife resources receive equal consideration to other project features. It also requires that federal agencies that construct, license or permit water resource development projects must first consult with USFWS and state fish and wildlife agencies regarding impacts on fish and wildlife resources and measures to mitigate these impacts. Full consideration is to be given to USFWS recommendations. Coordination has been ongoing with the USFWS and NGPC and is summarized in the BA in Appendix A: Section I.

5.3.3 CLEAN WATER ACT

Federal limits on the amounts of specific pollutants that could be discharged to surface water in order to restore and maintain the chemical, physical and biological integrity of the water are governed by the CWA (33 U.S.C. § 1251 et seq., as amended) NPDES. Discharge of storm water resulting from construction activities that would disturb more than one acre of surface area requires a NPDES permit under Section 402 of the CWA. A SWPPP would be prepared prior to commencement of construction activities. The plan would address practices and measures required to control and reduce the amount of pollutants in storm water runoff.

Regulatory requirements for a permit system governing the placement of dredged or fill material in Waters of the United States are also mandated by the CWA, under Section 404. The Corps authorizes this permit under the Regulatory Program. A 404(b)(1) Guidelines Evaluation has been prepared in conjunction with this project to evaluate the recommended alternative to demonstrate that the proposed project would not have unacceptable adverse impacts either individually or in combination with known or probable impacts of other activities affecting the aquatic resources in the project area. See Appendix A: Section II for the 404(b)(1) Evaluation.

5.3.4 MIGRATORY BIRD TREATY ACT

Under the MBTA, construction activities in grassland, wetland, stream and woodland habitats, and those that occur on bridges that would result in the taking of migratory birds, eggs, young and/or active nests should be avoided. Clearing of vegetation will be scheduled outside of primary nesting season, April 1st through July 15th in Nebraska, to minimize the take of migratory birds. A migratory bird survey would be conducted prior to the commencement of construction activities.

5.3.5 PRIME FARMLANDS

The Farmland Protection Act (7 CFR 658) minimizes the extent to which federal actions contribute to the unnecessary conversion of prime farmlands to nonagricultural use. The NRCS takes steps to ensure that prime farmlands lost to development are documented and provided to Congress in a yearly report. No prime farmland exists within the project area.

5.3.6 NATIONAL ENVIRONMENTAL POLICY ACT

Federal agencies use NEPA (42 U.S.C. § 4321 et seq.) to evaluate the environmental impacts of a proposed project. Through the NEPA process, public officials and citizens are given the opportunity to be involved in the environmental review and receive information about environmental impacts before any decisions are made on federal actions regarding the proposed projects. This feasibility report is integrated with an EA to serve as documentation necessary to incorporate the NEPA process into the feasibility planning process. If no significant impacts are determined that would warrant the preparation of an Environmental Impact Statement (EIS), a Finding of No Significant Impact (FONSI) would be prepared and NEPA compliance would be fulfilled.

5.3.7 CULTURAL RESOURCES

In accordance with the National Historic Preservation Act (16 U.S.C. 470) (NHPA) and its implementing regulations, the SHPO, Tribes and other interested parties have been consulted to determine if there are any concerns regarding any proposed actions. The SHPO concurred with Corps' determination of No Historic Properties Affected for the proposed project.

5.3.8 EXECUTIVE ORDER 13751 INVASIVE SPECEIS

This project would be conducted in accordance with Executive Order (EO) 13112. This EO seeks to prevent the introduction of invasive species and authorizes control of said species to minimize economic, ecological and human health impacts. This EO directs all federal agencies to address invasive species concerns and refrain from actions likely to increase invasive species problems. EO 13751 amends 13112 to direct continuation of coordination for federal prevention and control efforts. This order also maintains and expands the National Invasive Species Council and further incorporates considerations of human and environmental health, climate change, technological innovation and other emerging priorities into federal efforts to address invasive species in a cost-efficient manner. EO 11987 directs agencies to restrict the introduction of exotic species into the natural ecosystems on lands and waters which they own, lease or hold for purpose of administration and encourage state and local governments as well as private citizens to prevent the introduction of exotic species in natural ecosystems of the United States.

All seed mixes would require lab testing to ensure no state listed noxious weeds or undesirable seeds are contained within any specific lot. Best management practices to prevent invasive species from colonizing such as a weed control barrier shall be installed around all plantings to prevent competition with other plants and weeds. An approximately 3 foot square piece of weed control barrier shall be cut and secured with landscape staples around each planted tree and shrub. Targeted herbicide use should be utilized to control undesirable weeds. Herbicide use must comply with the Lancaster County Weed Extension Office and in accordance with the Nebraska Noxious Weed Control Act.

5.3.9 EXECUTIVE ORDER 11988 FLOODPLAIN MANAGEMENT

EO 11988 was issued by President Carter on May 24, 1977. In issuing the Executive Order the President stated "in order to avoid to the extent possible the long and short term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative, it is hereby ordered that each agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains in carrying out its responsibilities…".

Executive Order 11988 is applicable to all planning, design, and construction of civil works projects (ER 1165-2-26). The purpose of the proposed flood risk reduction project is to reduce the risk of flooding for the community and increase the protection of life safety while recognizing state and local floodplain regulations. The study area includes just upstream of the 48th Street Bridge (upstream) to the channel's confluence with Salt Creek (downstream). Corps of Engineers ER 1165-2-26, Implementation of Executive Order 11988 provides guidance on compliance with EO11988. The following comments are provided in reference to ER 1165-2-26 Section 8 General Procedures.

The project is located in Lancaster County within Lincoln, Nebraska. The proposed project is located in or adjacent to the NFIP floodway and/or the regulatory floodplain (Panel 31109C0310F effective February 18, 2011) and is identified as within the 100 year floodplain in project analysis. As a flood risk reduction project, the proposed project's construction purpose is to reduce the flood risk and increase the protection of life safety, as such the project is functionally dependent on its location. The proposed project will increase conveyance within the study area, creating beneficial impacts on the hydraulic condition. The project will result in updated NFIP mapping, reducing the extent of the Special Flood Hazard Area. This will promote development in the areas with reduced risk. The project is being developed in accordance with local permitting criteria and communicated to the public through standard procedures.

5.3.9.1 ***CONDITIONAL LETTER OF MAP REVISION***

A Conditional Letter of Map Revision (CLOMR) approved by FEMA indicates that a proposed project complies with FEMA regulations and if constructed, FEMA will make the changes to the regulatory floodplain and/or floodway described in the CLOMR application on the official floodplain maps. The CLOMR application would be done when a feasible, locally-preferred alternative is identified.

5.3.9.2 ***FLOODPLAIN MANAGEMENT PLAN***

Section 202 of the Water Resources Development Act of 1996 (WRDA 1996) requires the development of a Floodplain Management Plan (FPMP) for federally constructed flood damage reduction projects. This plan is to be developed and in place within one year after signing the PPA. The FPMP is a document developed by the non-federal sponsor, with input and guidance from the federal agency. The FPMP assures that the integrity of the federal project will not be diminished during the life of the project and that impacts of future flood events in the project area have been reduced. The FPMP will address potential measures, practices and policies to reduce loss of life, injuries, damages to property and facilities, public expenditures and other adverse impacts associated with flooding and to preserve and enhance natural floodplain values. The FPMP is required for either a structural or nonstructural project. A FPMP for a feasible, selected alternative would be developed when a flood risk reduction project is approved.

5.4 PUBLIC INVOLVEMENT

A series of meetings have been held during the plan formulation phase of the project. The meetings helped define the objectives of a successful flood risk reduction project and the measures to be considered for the Deadmans Run flood risks.

5.4.1 PUBLIC MEETINGS

June 2015 Public Involvement Meeting: A public meeting was held the evening of June 30, 2015 at the 4th Presbyterian Church in Lincoln. The church, which is located near the left bank of Deadmans Run, drew a sizeable crowd of nearly 80. A major issue voiced was the devastating impact of the increased flood insurance premiums. The public indicated their support for structural measures that would not only take them out of the floodplain for flood insurance purposes, but also protect other property, such as cars, in the event that the flashy Deadmans Run spills over its banks. Nonstructural alternatives, such as raising structures, were not favorably received as measures in the residential neighborhoods. In the discussions following the presentations, planned projects by the University of Nebraska on the East Campus were a topic. This discussion lead to a later stakeholder meeting with UNL in August 2015.

March 2016 Public Involvement Meeting: A public meeting, hosted by the Railroad Transportation Safety District, was held on the evening of March 15, 2016 at the Nebraska Educational Telecommunications (NET) Innovation Campus at the University of Nebraska- Lincoln. The RTSD discussed a concurrent planning and environmental linkages study and presented a number of alternatives to address transportation needs within the City of Lincoln. The Corps was invited to provide an update on the study which included information on two structural alternatives tentatively formulated to address the flood risk along Deadmans Run. Comments regarding how the Salt Creek overbank flows contribute to the floodplain of Deadmans Run were expressed, as well as comments about the overall levee system along Salt Creek in need of improvement. Support was received for the channel widening alternative along Deadmans Run by some members of the public, specifically in favor to a levee alternative, which was not popular.

January 2017 Public Involvement Meeting: A public meeting was held the evening of January 17, 2017 at the NET Facility in Lincoln. This facility, which is located on UNL's East Campus, is just outside of the study area. There were approximately 80 members of the local community in attendance at the meeting. The purpose of the meeting was to provide the community with an update on the status of the study and the determination of a preliminary preferred alternative. There was a high-level of support from the public towards the preliminary preferred alternative and a high-level of interest in the on-going status of the study. Just prior to this public meeting there was a stakeholders meeting to discuss the status of the study with those entities that have been identified as key stakeholders by the non-federal sponsor.

A final public meeting on the Draft Feasibility Report and integrated EA will be held during the 30-day public comment period. Following the public meeting and comment period, if the decision maker determines the recommended plan does not constitute a major federal action that would significantly affect the human environment, a Finding of No Significant Impact would be signed by the District Engineer.

5.4.2 AGENCY COORDINATION

May 20, 2015: Initial scoping agency coordination letters were provided to the EPA, NDEQ, NGPC, NRCS and USFWS to inform the agencies of the Section 205 Flood Risk

Management Project and solicit comments relevant to agency responsibilities. Comments were received from the EPA and NDEQ (see Appendix A, Agency Coordination).

In a response letter dated June 8, 2015 the EPA urged the Corps to give full consideration to nonstructural alternatives as they are more sustainable and cost-effective. The EPA also urged the Corps to evaluate individual watershed sub-units as well as the entire Deadmans Run watershed. Additionally, the EPA suggested the Corps amend the geographic scope of the project, which was initially identified from Wedgewood Lake to the confluence of Deadmans Run and Salt Creek, to include the entire watershed of Deadmans Run, possibly as far south as Van Dorn Street and as far east as South 84th Street.

NDEQ responded to the scoping effort on June 9, 2015 stating at that time, the agency had no comments that would fall under the jurisdiction of NDEQ programs. However, it was stated the proposed project may need 404 and NPDES permits.

<u>June 30, 2015</u>: A Plan Formulation and concurrent Agency Team Meeting occurred on-site prior to the June 30, 2015 public involvement meeting. The sponsor, LPSNRD, and staff members of Nebraska Department of Roads (NDOR)- Lincoln/Lancaster County Railroad Transportation Safety District (RTSD), BNSF, Felsburg, Holt and Ullevig (FHU), and NGPC were present. Problems, opportunities and initial formulation of alternatives took place amongst disciplines in addition to a site visit conducted with Biologists of the Corps' Environmental Section and NGPC.

<u>August 2015</u>: Coordination between the Corps and USFWS, Region 6, Nebraska Ecological Services Field Office occurred to discuss a Scope of Work (SOW) for coordination activities under the Fish and Wildlife Coordination Act (FWCA). No final approval of a SOW was submitted by the USFWS, however, coordination on the proposed project continued.

<u>January 15, 2016:</u> A planning aid letter (PAL) was received from the USFWS. In accordance with the Endangered Species Act, a list of threatened and endangered species with the potential to be impacted as a result of the project was identified. In addition, concerns were expressed regarding the proposed project's impact on Platte River depletions. Further discussions regarding this topic were held during a webinar and a follow-on email. For more information, refer to the BA in Appendix A: Section I and agency correspondence in Appendix A: Section IV.

<u>December 2016:</u> A webinar was held with the USFWS and the NGPC to discuss the tentatively selected alternative and environmental impacts. Support for on-site, concurrent mitigation of native grass and tree plantings was received by both agencies.

<u>June 2017</u>: Coordination letters were sent to the following Indian Tribes to inform them of the proposed project: Otoe-Missouria, Pawnee, Iowa Tribe of Kansas and Nebraska and Omaha.

During the 30-day public comment period for the Draft Feasibility Report and integrated EA, the 404(b)(1) Evaluation (Appendix A, Section II) will be jointly released with NDEQ for public comment. Following the comment period, the Corps would seek a 401 certification for the proposed project.

6 RECOMMENDATIONS

I have carefully reviewed the existing flood risk problems and the proposed solutions along the Deadmans Run channel in Lincoln, Nebraska. History has shown that significant flooding on Deadmans Run does occur periodically, threatening human life safety and property. The adverse effects of these flood events can be significantly reduced with the construction of the recommended flood risk management project.

Various alternatives to manage the flood risk within the study area were examined. These alternatives were evaluated for engineering feasibility, economic viability, and environmental and public acceptability. Furthermore, these alternatives were validated against national and study planning objectives.

I find that the recommended plan would increase conveyance along the Deadmans Run channel to reduce flood risks through the study area and will best serve the intent of the CAP 205 Flood Risk Management Program and the overall public interest. The plan is optimized at the 1% ACE flood event conveyance capacity and includes the widening and improvement of just under two miles of the Deadmans Run channel, a concrete flume underneath the existing railroad bridges, and integrated environmental mitigation measures to ensure there is no adverse impact to environmental resources associated with the project.

I find that the recommended plan for the Deadmans Run Section 205 Flood Risk Management Project provides maximum net benefits and is the National Economic Development plan. The Lower Platte South Natural Resources District (non-federal sponsor) has provided a letter of intent acknowledging their commitment to fulfill the requirements outlined in Section 4.6, Design & Implementation. The recommended plan, as developed in this feasibility study and updated in Section 4.4, will reduce flood risks for 487 structures in the Deadmans Run 1% ACE floodplain by reducing expected annual damages by $1,425,990 (a 73.0% reduction from the without project condition). The recommended plan is estimated to cost $14,235,000, when fully funded, which will be cost-shared $9,253,000 federal, $4,982,000 non-federal. The non-federal cost includes projected LERRD value of $1,726,000 with the balance of $3,256,000 to be provided in cash. The recommended plan at a cost of $14,235,000 will result in net annual benefits to the nation of over $902,000 and has a benefit to cost ratio of 2.72.

The recommendations above reflect the most accurate information available at this time and current applicable policies and regulations governing formulation of individual projects. The recommendations do not necessarily reflect program and budgeting priorities inherent in formulation of a National Civil Works construction program nor the perspective of higher review levels. Based on the significant flood risk management benefits along Deadmans Run in Lincoln, Nebraska, the enthusiastic interest of the sponsor and their willingness to contribute a disproportionately larger cost share towards completion of the project, and other considerations, I endorse and recommend this Integrated Feasibility Report and Environmental Assessment and the selected plan for approval by the Commander, Northwestern Division, U.S. Army Corps of Engineers.

John L. Hudson, P.E.
Colonel, Corps of Engineers
Omaha District Engineer

7 LITERATURE CITED

Benedict, R. A., H.H. Genoways and P.W. Freeman. 2000. Shifting distributional patterns of mammals in Nebraska. Transactions of the Nebraska Academy of Sciences. 26:55-84.

Burchett, R.R. 1983. Surface to subsurface correlation of Pennsylvanian and lower Permian rocks across southern Nebraska. Nebraska Geological Survey. Report of Investigations No. 8. http://www.nogcc.ne.gov/ResearchDocuments/Number8.pdf. Accessed January 6, 2015.

Burchett, R.R. 1971. Guidebook to the geology along portions of the lower Platte River Valley and Weeping Water Valley of eastern Nebraska. The University of Nebraska Conservation and Survey Division, Lincoln, Nebraska.

CALMIT (Center for Advanced Land Management Information Technologies). 2007. Delineation of 2005 land use patterns for the State of Nebraska.

CDM Smith Inc. 2015. Final Report: Phase 1 Environmental Condition of Property Determination. Deadmans Run Study Area, Lincoln, Nebraska. Prepared for the Lower Platte South Natural Resources District.

Carter, M.R. 1989. The biology and ecology of tiger beetles (Coleoptera: Cicindelidae) of Nebraska. Transactions of the Nebraska Academy of Sciences and Affiliated Societies. Paper 164.

City of Lincoln. 2007. Dead Man's Run Watershed Masterplan.

EPA (Environmental Protection Agency). 2014. 2014 Waterbody report for Salt Creek. http://ofmpub.epa.gov/waters10/attains_waterbody.control?p_list_id=NE-LP2-20000&p_cycle=2014. Accessed December 9, 2014.

Gilbert, M.C. and R. Stutheit. 1994. Resource categorization of Nebraska's eastern saline wetlands. http://lincoln.ne.gov/city/parks/parksfacilities/wetlands/links/rcategor.pdf. Accessed December 12, 2014.

Johnsgard, P.A. and R. Redfield. 1977. Sixty-five years of whooping cranes records in Nebraska. Paul Johnsgard Collection. Papers in Biological Sciences. Paper 9. http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1009&context=johnsgard. Accessed January 12, 2015.

Johnsgard, P.A. 2007. A guide to the tallgrass prairies of Eastern Nebraska and adjacent states. Papers in Ornithology. Paper 39. http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1038&context=biosciornithology. Accessed December 15, 2014.

LaGrange, T., T. Genrich, G. Johnson, D. Schulz and B. Lathrop. 2003. Implementation plan for the conservation of Nebraska's eastern saline wetlands. Nebraska Game and Parks Commission Publications. Paper 24.

LaGrange, T. 2005. Guide to Nebraska's wetlands and their conservation needs: Second edition. http://outdoornebraska.ne.gov/wildlife/programs/wetlands/pdf/wetlandsguide.pdf. Accessed December 15, 2014.

Lynch, J.D. 1985. Annotated checklist of the amphibians and reptiles of Nebraska. Transactions of the Nebraska Academy of Sciences and Affiliated Societies. Paper 225. http://digitalcommons.unl.edu/tnas/225/?utm_source=digitalcommons.unl.edu%2Ftnas%2F225&utm_medium=PDF&utm_campaign=PDFCoverPages. Accessed December 15, 2014.

Maret, T.R. and E.J. Peters. 1980. The fishes of Salt Creek basin, Nebraska. Transactions of the Nebraska Academy of Sciences and Affiliated Societies. Paper 280. http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1279&context=tnas. Accessed December 8, 2014.

MDNR (Minnesota Department of Natural Resources). 2014. *Platanthera praeclara*. http://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=PMORC1Y0S0. Accessed December 8, 2014.

NDEQ (Nebraska Department of Environmental Quality). 2013. Nebraska Air Quality: Annual Report. Air Quality Division. 25 pg.

NETSTATE. 2014. The geography of Nebraska. http://www.netstate.com/states/geography/ne_geography.htm. Accessed December 10, 2014.

NGPC (Nebraska Game and Parks Commission). 2013. Saltwort: *Salicornia rubra*. http://rarespecies.nebraska.gov/portfolio/saltwort/. Accessed December 8, 2014.

NOAA (National Oceanic and Atmospheric Administration). 2014. NOAA Atlas 14 Point Precipitation Frequency Estimates. Hydrometeorological Design Studies Center Precipitation Frequency Data Server (PFDS). http://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=ne. Accessed October 2014.

NRCS (Natural Resource Conservation Service- U.S. Department of Agriculture). 1980. Soil survey of Lancaster County, Nebraska. http://www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/nebraska/NE109/0/lancaster.pdf. Accessed January 6, 2015.

Rothenberger, S.J. 1989. Extent of woody vegetation on the prairie in Eastern Nebraska, 1855-1857. Proceedings of the Eleventh North American Prairie Conference. http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1020&context=napcproceedings. Accessed December 15, 2014.

USACE (U.S. Army Corps of Engineers). 2016. Engineering and Construction Bulletin No. 2016-25: Guidance for Incorporating Climate Change Impacts to Inland Hydrology in Civil Works Studies, Designs, and Projects. U.S. Army Corps of Engineers Omaha District.

USACE (U.S. Army Corps of Engineers). 2017. Climate Preparedness and Resilience COP Applications Portal. https://maps.crrel.usace.army.mil/projects/rcc/portal.html. Accessed February 2017.

USGS (U.S. Geological Survey). 1984. Techniques of Water-Resources Investigations of the United States Geological Survey. General Field and Office Procedures for Indirect Discharge Measurements. Chapter A1.

US Army Corps
of Engineers ®
Omaha District

DEADMANS RUN
LINCOLN, NEBRASKA

SECTION 205 – FLOOD RISK MANAGEMENT

FEASIBILITY REPORT

APPENDICES VOLUME I:
APPENDIX A

AUGUST 2018

US Army Corps of Engineers ®
Omaha District

DEADMANS RUN
LINCOLN, NEBRASKA

SECTION 205 – FLOOD RISK MANAGEMENT

FEASIBILITY REPORT

APPENDIX A
BIOLOGY APPENDIX

AUGUST 2018

APPENDIX A

BIOLOGY APPENDIX

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II. Section 404(b)(1) Evaluation
III. NESCAP Technical Analysis
IV. Agency Correspondence
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BIOLOGICAL ASSESSMENT

DEADMANS RUN
SECTION 205 FLOOD RISK REDUCTION STUDY
LINCOLN, NEBRASKA
August 2018

Deadmans Run, upstream of North 56th Street, looking southeast. Photo taken July 2015.

Prepared by:

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1. Introduction

Section 7 of the Endangered Species Act (ESA) (7 U.S.C. § 136, 16 U.S.C. § 1531 et seq.) states that all federal departments and agencies shall, in consultation with the assistance of the Secretary of the Interior, ensure that any actions authorized, funded or carried out by them do not jeopardize the continued existence of any threatened or endangered species. This Biological Assessment (BA) reviews the proposed Deadmans Run Section 205 Flood Risk Management Project in sufficient detail to determine whether the proposed action may affect threatened or endangered species in the study area.

Additionally, this BA assesses potential impacts to fish and wildlife in accordance with the Fish and Wildlife Coordination Act (FWCA) (16 U.S.C. 661-667e). The FWCA requires action agencies to consult with the U.S. Fish and Wildlife Service (USFWS) and the relevant state agency or agencies whenever any department or agency of the United States or any public or private agency under federal permit or license proposes or authorizes the waters of any stream or body of water in the U.S. to be impounded, diverted, channelized, controlled, or modified for any purpose whatever with a view to conservation of fish and wildlife resources.

Figure 1 below provides a graphical depiction of agency coordination in relation to key environmental laws such as the ESA and FWCA for a Corps Feasibility Study.

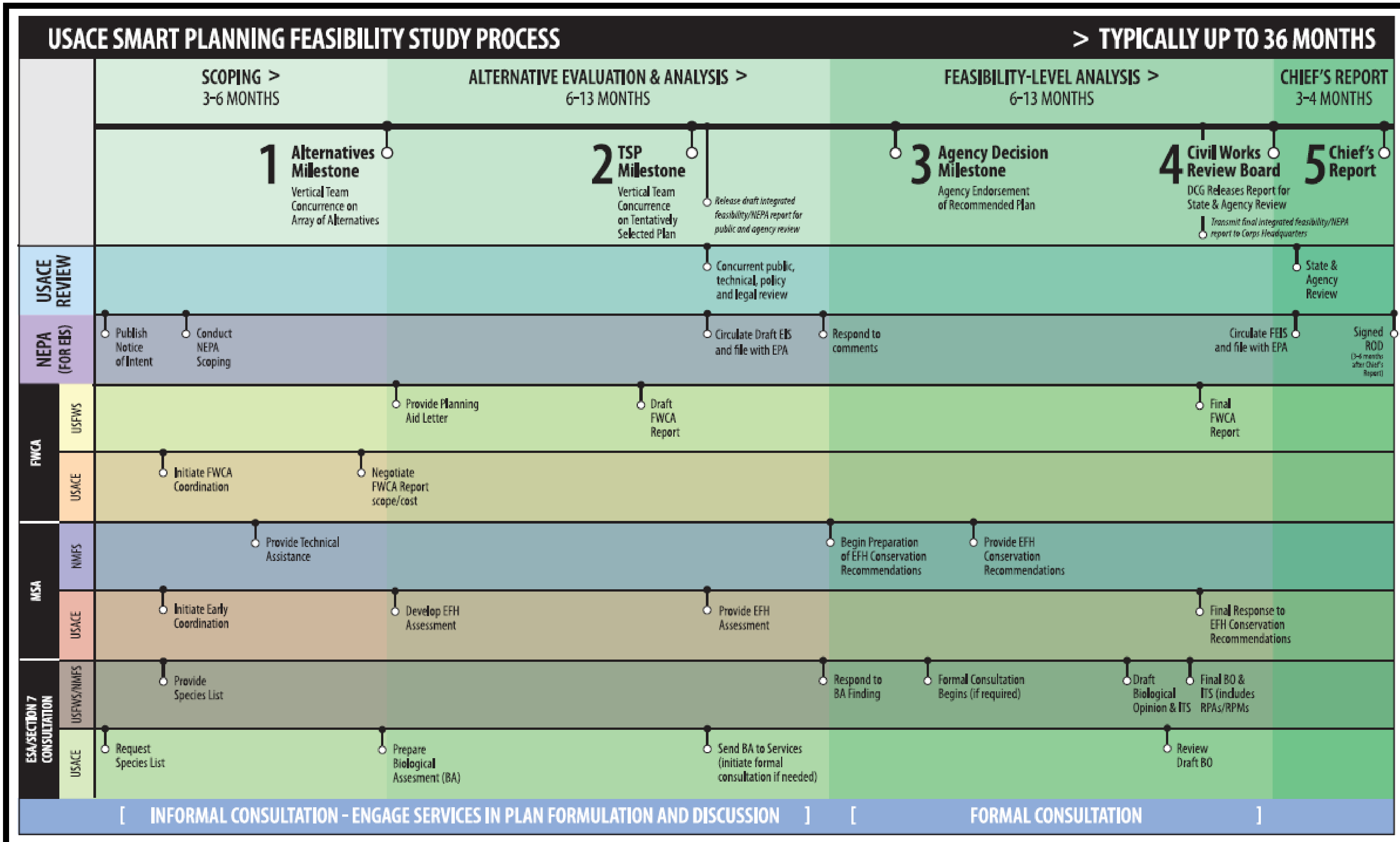

Figure 1. Planning Feasibility Study process overlaid with major environmental compliance laws and processes

1.1 Summary of Coordination

On May 20, 2015, the U.S. Army Corps of Engineers, Omaha District (Corps) sent the USFWS Region 6, Ecological Services Field Office an initial scoping letter regarding the feasibility study for the Section 205 Flood Risk Management Project at Deadmans Run. The Corps requested the USFWS to provide a list of threatened, endangered and/or candidate species that may be affected by the proposed habitat project as well as any information on possible beneficial or adverse effects of the proposed project on those species. Within the same letter, the Corps also requested information in regards to fish and wildlife and sensitive resources within the project area for the study as required under the FWCA.

On August 10, 2015, an email soliciting cooperation under the FWCA and initiating a Scope of Work (SOW) between the Corps and USFWS was sent. Through coordination, a SOW outlining necessary tasks and deliverables, responsible of both agencies, was discussed. No final approval of a SOW was submitted by the USFWS, however, coordination on the proposed project continued. In a letter dated December 11, 2015, the Corps submitted existing conditions information and the proposed model assessment tool to be utilized for this project (Nebraska Stream Condition Assessment Protocol; NESCAP) to the USFWS for review and comments.

On January 15, 2016, the USFWS provided a response regarding potential species that may occur or be affected by proposed flood risk reduction activities at Deadmans Run. The species identified include three federally threatened species; the western prairie-fringed orchid (*Platanthera praeclara*), piping plover (*Charadrius melodus*) and northern long-eared bat (*Myotis septentrionalis*) and four endangered species; the salt creek tiger beetle (*Cicindela nevadica lincolniana*), pallid sturgeon (*Scaphirhynchus albus*), whooping crane (*Grus americana*) and interior least tern (*Sterna antillarum*). These species are all considered in this BA as well as the Feasibility Study with integrated Environmental Assessment.

On June 14, 2016, an informal memorandum for record (MOR) was submitted (via e-mail) to the USFWS, as well as Nebraska Game and Parks Commission (NGPC) to update both agencies on project formulation status and provide opportunity for comment. Both agencies sent a confirmation that the MOR was received but provided no further comment.

On November 1, 2016, a follow-on informal MOR was submitted (via e-mail) to the USFWS and NGPC to inform both agencies the tentatively selected alternative that would be briefed to the non-federal sponsor on December 1, 2016. This MOR summarized potential environmental impacts to approximately 5 acres of an Eastern Riparian Forest-classified community along Deadmans Run near the East Campus area of University of Nebraska-Lincoln (UNL) and tentative plans for avoidance/mitigation. Subsequently, a webinar was presented to USFWS and NGPC on December 5, 2016. Clarification regarding comments made by USFWS was provided in an email dated December 7, 2016. Additional comments from USFWS and NGPC are summarized in letters dated January 9, 2017 and January 23, 2017, respectively.

On December 21, 2017, an update was submitted to USFWS and NGPC detailing the updated optimized selected plan. This MOR summarized measures that were removed from the Section 205 federal project as they are going to be done as part of a City project.

All coordination may be found in Section IV of the Biology Appendix (Appendix A) of the Feasibility Study.

1.2 Project Information

The purpose of the Feasibility Study is to determine if there is a feasible flood risk management project along Deadmans Run in Lincoln that will protect the community against the flood threat presented by that waterway. The study results will detail the "Federal Interest" in an economically viable project and define any impacts to the environment, which could occur, as a result of project construction. The primary purpose of a flood risk management project is to reduce the risk of flood damage, injury and death from flooding.

The study area is the floodplain of Deadmans Run, a tributary to Salt Creek in Lincoln, Nebraska. The general outline of the floodplain is shown in Figure 2.

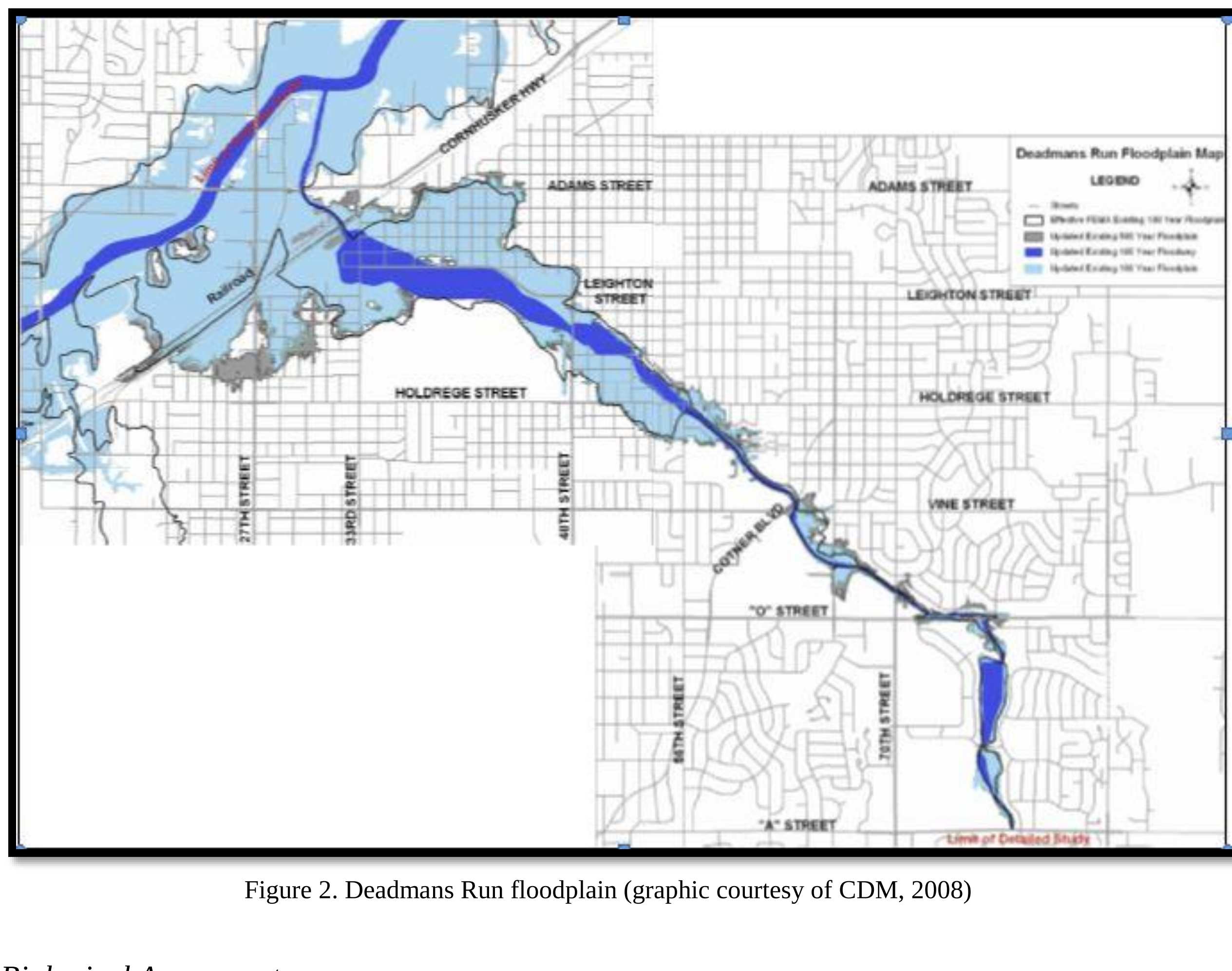

Figure 2. Deadmans Run floodplain (graphic courtesy of CDM, 2008)

1.2.1 Project Authority
This study is being conducted under the authority of Section 205 of the Flood Control Act of 1948, as amended. The purpose of the Section 205 program is to implement flood risk reduction measures (structural or nonstructural) to reduce damages caused by flooding. The program focuses on solving local flood problems that are of limited scope and complexity. Projects implemented under Section 205 authority are formulated for flood risk management in accordance with current policies and procedures governing projects of the same type that are specifically authorized by Congress. The non-federal sponsor for this study is the Lower Platte South- Natural Resources District (LPSNRD).

1.2.2 Overview of the Flood Threat
Lincoln has had a history of flooding from Salt Creek and its tributaries since it was founded after the Civil War. The Corps has worked with the City of Lincoln and more recently the LPSNRD to construct levees, dams and channel improvement projects on both Salt Creek and on many of the tributary streams. Additionally, more than 30 smaller dams have been constructed on smaller tributaries by the Natural Resources Conservation Service. The flood threat in many areas of the Salt Creek Basin has become less severe following construction of those projects. To date, flood risk reduction efforts on Deadmans Run have been limited to channel improvement efforts constructed primarily to reduce streambank erosion.

1.2.3 Existing Flood Damage Reduction Projects
The flood threat to property along Deadmans Run has been studied by the Corps and others since the late 1980s. Studies and projects by the city of Lincoln and the LPSNRD predate Corps involvement. Additionally, FEMA has used the hydrologic and hydraulic analysis of others to develop floodplain maps for the Flood Insurance Program. Recent changes in the cost of insurance within the FEMA Flood Insurance Program have placed additional financial burdens on local property owners, and that, coupled with the recent ‘near miss” floods in the watershed have led to new interest in finding lasting solutions to the threat posed by this urban waterway.

2. Description of Proposed Action
As part of the plan formulation process, many potential flood risk measures were discussed by the team. Measures consisted of structural or non-structural measures. An initial array of measures were condensed as many were discarded due to lack of practicality and high cost. The PDT then combined measures into alternatives. Refer to Chapter 5 of the Feasibility Study for detailed information on the planning process applied to Deadmans Run.

Alternatives discussed in detail in the Feasibility Study include the following:

- Alternative 1: Channel and Bridge Improvements, Channel Conveyance Improvements
- Alternative 2: Channel and Bridge Improvements with a Right Bank Levee
- Alternative 3: Stand-alone Non-structural Flood Risk Adaptive Measures
- Alternative 4: No Action

Through evaluation and comparison of the alternatives, Alternative 1 was recommended as the tentatively selected plan (TSP). The project footprint of optimized recommended plan reaches from Cornhusker Avenue upstream to just east of 48th Street. Components of this alternative include channel widening the entire length of the project footprint (approximately 1.4 miles) within the LPSNRD easement, installation of a concrete flume under the BNSF Bridge and rail spur to improve conveyance, abandonment of Baldwin Avenue west of 33rd Street and moving the intersection north, replacing the bridge at the interaction of Baldwin Avenue and 33rd Street with a longer bridge, replacing 48th Street Bridge with a wider bridge span, and creating a dry detention basin at Fleming Fields complex (see Figure 3). This detention basin is designed to hold 90 acre/feet for approximately 1.5 hours, releasing all detained water within 24 hours via a 4-foot diameter culvert back into the system following the passing of peak floodwater flows. This detention basin will prevent coincident flooding on Deadmans Run.

The 48th Street Bridge is currently 60 feet in width, according to the CDM Watershed Master Plan; it is functionally obsolete and does not adequately accommodate current traffic patterns. The 48th Street Bridge would be widened to a length of 135 feet. Refer to the main Feasibility Report for detailed information regarding alternative development, screening and features.

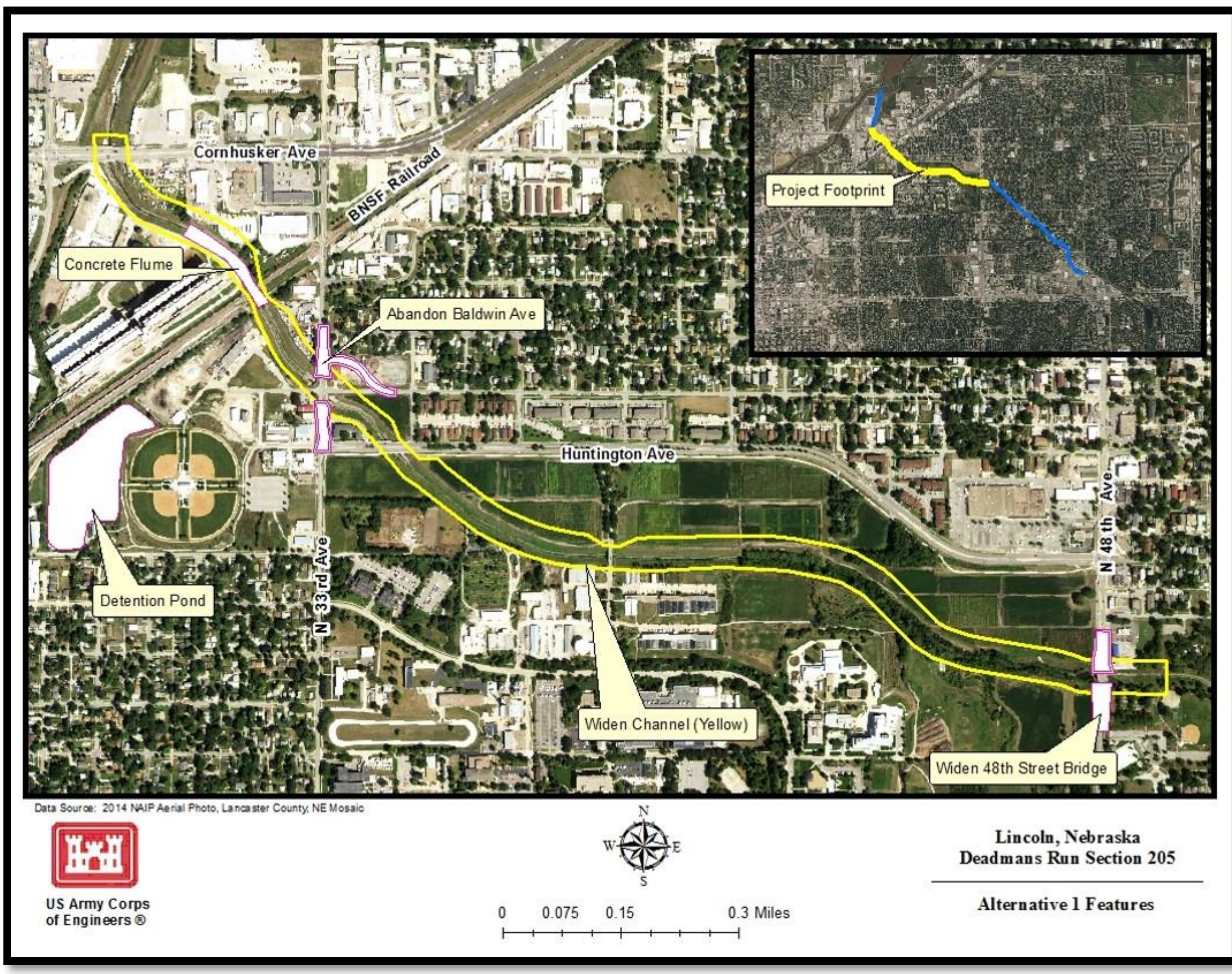

Figure 3. Components of the recommended plan.

Typical cross sections of the existing channel top-width are approximately 120 feet. Utilizing the typical cross section, channel widening would generally enlarge the width of Deadmans Run to an approximate top-width of 177 feet from Cornhusker Highway to 48th Street (see Figure 4). Within the channel widening cross section, a native seed buffer approximately 25 feet would be utilized for native vegetation plantings directly adjacent to the channel. This would equate to approximately 5 acres designated along the channel for native seeding. Additionally, areas designated with a turf reinforced mat will also host native grass species (see Section III in the Biology Appendix (Appendix A) of the Feasibility Study for proposed seed mixes).

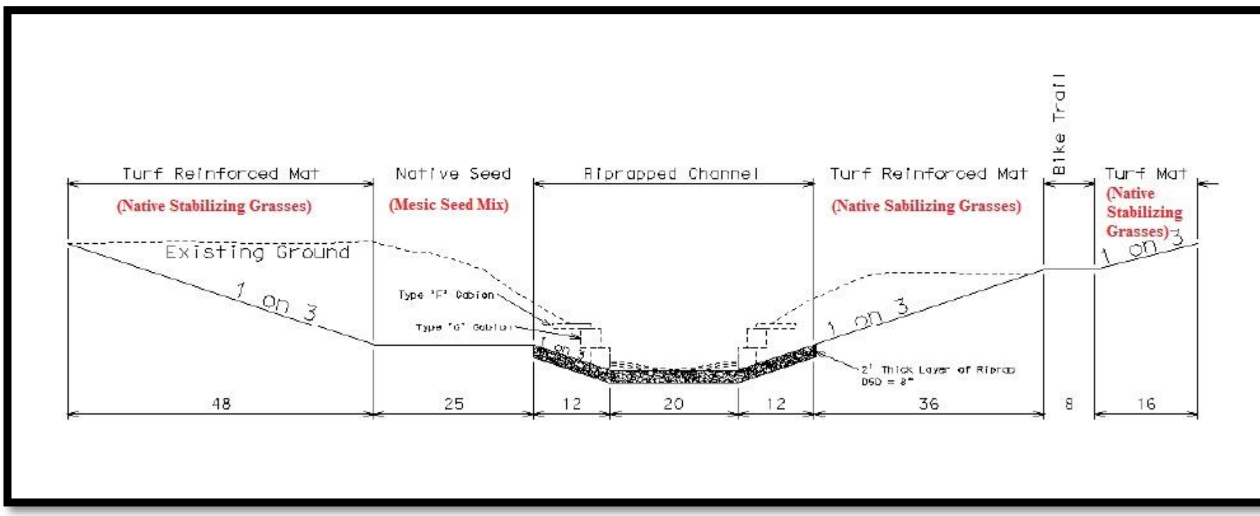

Figure 4. Typical cross-section of channel widening configuration from Cornhusker Avenue upstream to just east of 48th Street.

Under the recommended TSP, two banks of riparian vegetation, or approximately 4.82 acres (see Figure 5), were proposed for removal. In efforts to avoid and minimize impacts, variations of channel alignments were assessed. Variation I would require the removal of all trees on both the north and south bank. The Corps assessed the potential to shift the centerline of the channel north through the East Campus area to keep the south bank or north bank of trees (Variation II.a.) or replace the East Campus Bridge, also called the 38th Street Bridge, to maintain the north bank of trees (Variation II.b.).

For Variation II.a., trees were simulated in the HEC-RAS model (see Appendix I of the main Feasibility Report) by increasing the roughness on either or both the right and left bank. Results of the modeling indicated that despite how much the channel was expanded into the right bank, the slower flows induced by an expanding channel, and a higher roughness of leaving the trees in the channel, caused the waters to rise approximately two feet higher at East Campus Bridge and leaving trees on both or either bank in the upstream channel would cause overbank flooding at higher flood frequencies such as the 100-year event and potentially the 50-year event. Variation II.a was deemed not hydraulically feasible without having to emplace a levee on the north bank near the East Campus Bridge, or completely removing the East Campus Bridge.

Variation II.b. determined that if the East Campus Bridge is removed (or widened/replaced), a stage up to 4 feet lower than existing conditions would be possible at the current bridge location and as such, the north (right) bank of trees could remain and only the south bank (2.34 acres) would be required to be removed.

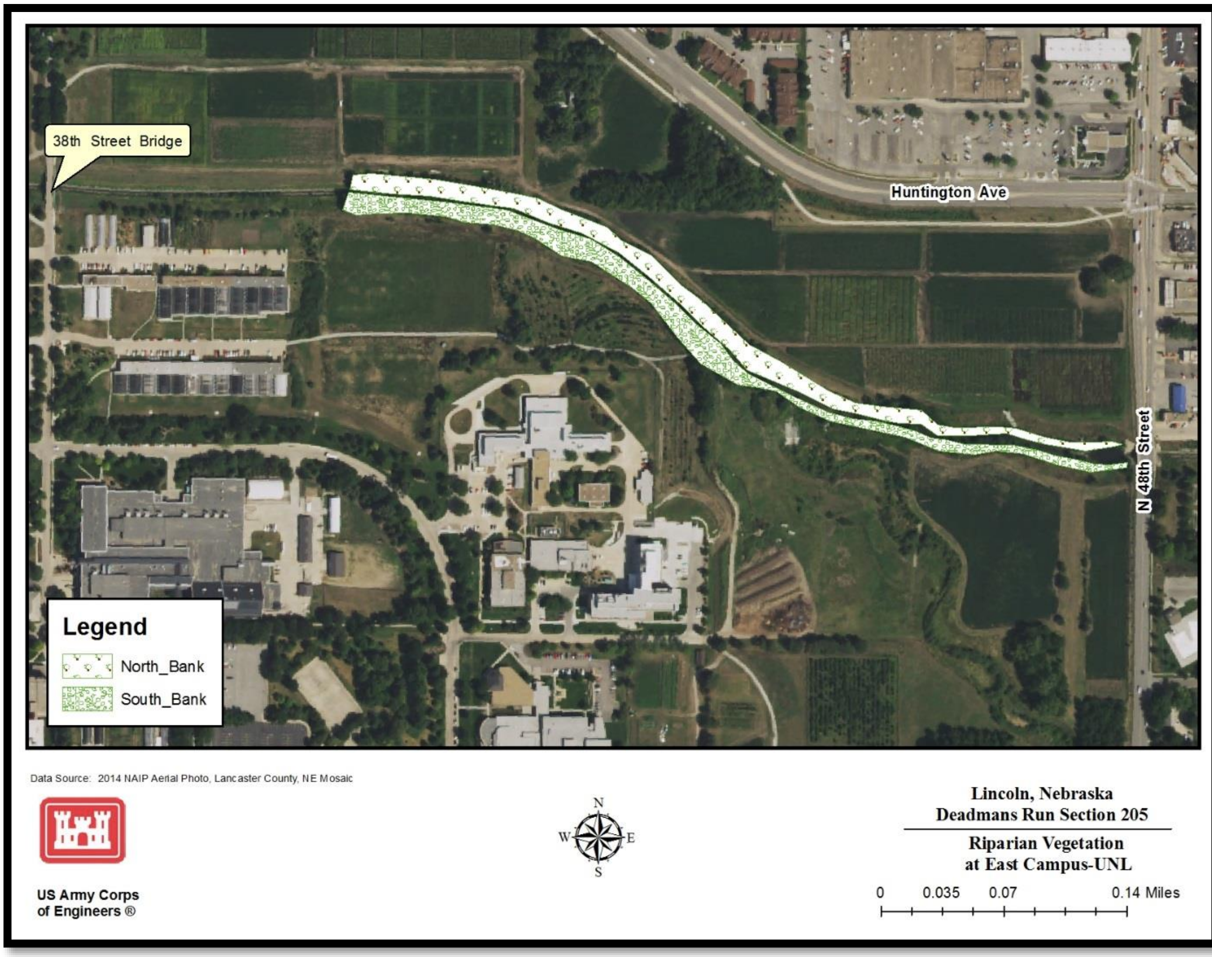

Figure 5. Eastern Riparian Forest classified community along Deadmans Run in the East Campus area. The north (right) (2.48 acres) band and south (left) bank (2.34 acres), total 4.82 acres of trees and shrubs.

2.1 Updated Selected Optimized Plan

Although the optimized selected plan was economically justified, the project costs exceeded the Continuing Authorities Program Section 205 per project cost limit of approximately $15.3 million. Meetings between the Lower Platte South Natural Resource District (LPS NRD), City of Lincoln, Northwestern Division-Corps, Headquarters-Corps, and the Omaha District PDT led to the development of a revised selected plan. The revised plan involves removing the three vehicle bridges from the federal project, as well as the detention basin. This plan was developed due to the City of Lincoln and LPS NRD already having identified the 48th and 38th Street Bridges for replacement due to their age and condition and having started discussions of replacing the 38th Street culvert with a bridge to accommodate the future Railroad Transportation Safety District

(RTSD) project. Additionally, the detention basin was removed from the Federal project because the City of Lincoln and LPS NRD are planning to begin the bridge replacement projects in the near future. When the larger structures are put in place, additional channel flow will make it further downstream in the project area, so the detention basin is needed to reduce the impacts of this additional conveyance. The 48th and 38th Street Bridge modifications and the detention basin will be initiated prior to the federal Section 205 Project by the non-federal Sponsor and will be constructed prior to or during construction of the federal Section 205 Project.
The rest of the project components remained (channel widening, removal and replacement of existing concrete mattress with 44,672 tons of rock riprap extending 7,196 linear feet and installation of a concrete flume, the concrete flume will require 18,677 tons of riprap for the spall filter, resulting in a net total 63,349 tons of riprap utilized within the channel) and Figure 6 shows the updated selected plan. While the City of Lincoln and LPSNRD plan to begin design efforts on the bridge replacement/construction and detention basin projects prior to the federal Section 205 project they do not plan to implement the project until this study is approved and the project is authorized for construction.

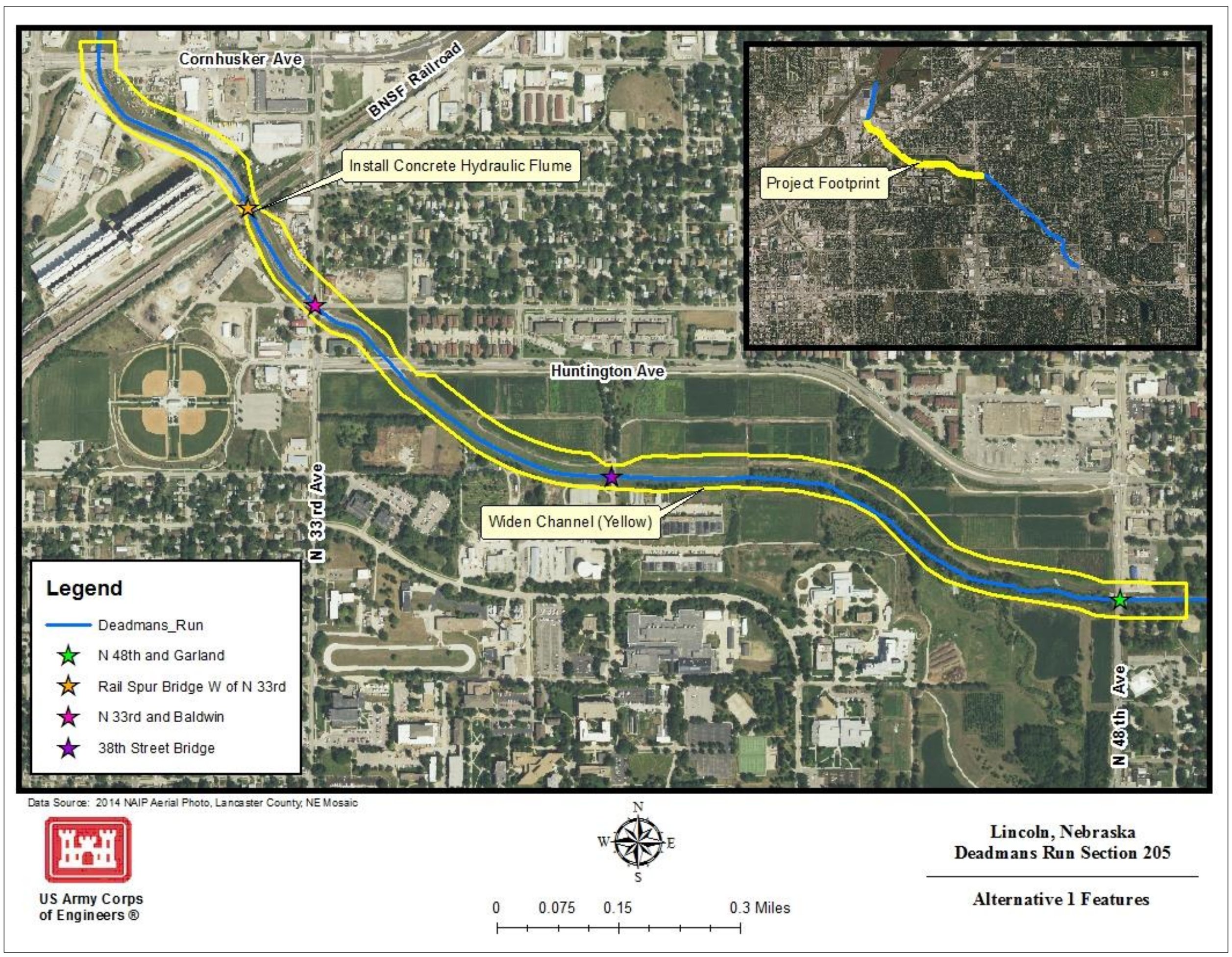

Figure 6. Updated, optimized TSP

3. Existing Environment

The Deadmans Run watershed is a mostly urbanized right bank tributary to Salt Creek, which in turn is a right bank tributary to the Platte River. Deadmans Run begins in the gently rolling hills of suburban eastern Lincoln, Nebraska, located between the Stevens Creek watershed to the east and Antelope Creek watershed to the west. The soils are generally clay or clay loam with modest infiltration rates. Deadmans Run flows northward before entering Wedgewood Lake, a private lake surrounded by homes. Wedgewood Lake has no designated flood storage and limited capacity to attenuate streamflow. From Wedgewood Lake, Deadmans run flows northwesterly under O Street and through shopping centers and its channel is lined by gabions and concrete. Below Cottner Boulevard, the channel slope becomes milder and the floodplain broader. Land use is primarily residential, with limited open space. The channel is lined with gabions with undersized bridge crossings by residential streets. At 48th Street, the channel becomes more natural, flowing through the Agricultural Campus of the University of Nebraska and the floodplain in this reach is not highly urbanized. Below 33rd Street, the floodplain transitions to primarily industrial and commercial land use, and the channel is constricted by a series of road and rail bridges. This lower reach of the watershed is also subject to flooding by Salt Creek as well as by Deadmans Run.

3.1 Salt Creek Tiger Beetle

The federally endangered Salt Creek tiger beetle is confined to eastern Nebraska saline wetlands which are associated with Salt Creek and adjacent tributaries. Historical specimens indicate a once flourishing population; however loss of habitat has caused a precipitous decline. Estimates of historical saline wetlands approximated 65,000 acres within the Salt Creek watershed (Fowler, 2012 as cited in Federal Regulation [FR] 79:87). The most recent inventory of saline wetlands in eastern Nebraska was conducted in 1992 and 1993 and identified approximately 3,244 acres remaining in Lancaster and Saunders Counties (Gilbert and Stutheit, 1994 as cited in FR 79:87). A mark-release-recapture study was conducted in 1991 and 1992 in the Salt Creek watershed for a population count of the Salt Creek tiger beetle. The attempts were not highly successful, however, because the Salt Creek tiger beetle population was low, at most sites a visual count of adults was conducted. A maximum of 229 adults were counted at all sites during peak density in 1991 and only 114 were counted during 1992 (Spomer and Higley, 1993).

The Salt Creek tiger beetle was listed as federally endangered on October 6, 2005. On May 5, 2014, USFWS announced a final revision to designated critical habitat with only a few hundred beetles remaining in three distinct populations on less than 35 acres (USFWS, 2014). The final rule expanded designated critical habitat to 1,110 acres in Lancaster and Saunders Counties, which included saline wetlands and streams associated with Little Salt Creek and encompassed the three distinct populations (FR 79:87). The three remaining populations reside at Upper Little Salt Creek-North, Arbor Lake and Little Salt-Creek-Roper, along a stream reach of approximately 7 miles.

Salt Creek tiger beetle are small, ground-dwelling, predatory insects. Adults require open, barren salt flats for construction of burrows, forage, dispersal and thermoregulation (Spomer and Higley, 1993). Larvae have been observed only on moist salt flats and salt-encrusted banklines.

The life cycle is a two-year period, adults are active for only about three to four months of this time. Peak adult populations of the Salt Creek tiger beetle occur from late May to early June, though some individuals have been collected in July (Carter, 1989). After mating, the male rides atop the female, likely to prevent her from re-mating and eggs are deposited on the salt flats at night. It is thought that females lay up to 50 eggs (Farrar, 2003 as cited in USFWS, 2009). After eggs hatch, the larvae will dig a burrow by using its head to scoop out soil. Larvae are also predaceous, latching on to the top of their burrows through abdominal hooks and rapidly extending outward to snatch prey. Larvae plug the entrance of the burrow and overwinter where it grows to an instar. Pupation takes place in May and the adult will mate and die, thus completely the life cycle (USFWS, 2007).

3.2 Whooping Crane

The whooping crane was designated as federally endangered on March 11, 1967, prior to the enactment of the ESA. Their populations declined to an estimated 16 individuals in 1941 due to overhunting and habitat disturbance. Today, there is a small, self-sustaining wild population that nests in the Wood Buffalo National Park in Saskatchewan, Canada and overwinters on the Texas Gulf Coast at the Aransas National Wildlife Refuge. There are also are few captive populations that have been in an experimental reintroduction program scattered across a handful of zoos and research parks (USFWS, 2010). Current population approximates 600 wild and captive individuals.

The whooping crane is a tall wading bird, reach up to 5 feet in height with a 7 foot wingspan, however, only weighing approximately 15 pounds. This omnivorous species feeds on invertebrates, fish, insects and herptofuana as well as grains and marsh plants.

Whooping cranes are monogamous, upon finding a mate they will exclusively breed, but will re-mate following the death of a mate. Whooping cranes typically reach sexual maturity at age-4 and breed in Wood Buffalo National Park. A nest will be constructed out of bulrush and a clutch of one to three eggs will be laid in late April to early May. The eggs will incubate in about 30 days. Nest guarding and brood rearing are a shared duty between both parents. Migration to overwintering habitat begins in mid-September and most birds arrive by late-October to mid-November (USFWS, 2014[a]).

3.3 Interior Least Tern and Piping Plover

The interior least tern was listed as federally endangered on May 28, 1985 (50 FR 21784), shortly after the American Ornithologist Union recognized it as a subspecies to *A. athalassos* in 1983. The least tern is the smallest member of the tern family in North America. Adults weight approximately 2 ounces and are around 9 inches in length with a wingspan of approximately 20 inches. Both sexes are similar in size and color, breeding plumage is characterized by a black head cap, a white triangular forehead and a black strip from the beak across the side of the head. This species is migratory and primarily overwinters along coastal areas adjacent to the Pacific and Atlantic Oceans. Migration takes place between March and May, where they will migrate to breeding grounds. The interior population of least terns breed primarily on the lower Mississippi River, Red River, Arkansas River and the Missouri River as well as their major tributaries.

Once adults arrive to breeding grounds, typically in late April, courtship and mate selection occur. A breeding pair construct a nest bowl, or scrape, on sparsely vegetated areas near water, on sandy or gravelly substrates. The interior least tern nests in a breeding colony, often 10 breeding pairs or more, and nesting is fairly social and synchronous with the colony as a whole. Least terns will lay a clutch of two to three eggs. Eggs are oval shaped, smooth and pale olive to buff colored with brown splotches that assist in camouflaging them with surround substrate. Eggs are laid at a rate of one a day, and after the last egg is laid, incubation begins. Both parents take part in nest sitting. Chicks hatch after 19 to 25 days of incubation. Chicks fledge around 18 to 22 days after hatching. Fledglings congregate with adults and other fledglings, practicing foraging techniques. Parents continue to feed the juveniles until they are fully fledged, and may continue to do so during migration to the wintering grounds. Least terns feed on small fish (typically 4 inches or smaller in length) and macroinvertebrates. Fish capture is done by hovering three to 30 feet above a shallow water area, then diving to the water to grasp the prey in open mandibles (USACE, 2011).

Decline of the interior population of least terns is due to the alteration of natural river dynamics of these large rivers and their tributaries which nearly eradicated primary nesting habitat which has altered reproductive success. Annual spring floods of watersheds are often delayed past the normal onset of breeding, and many islands and sandbars are not exposed as suitable sites in time for nesting (50 FR 21784).

The piping plover was listed as under the ESA on January 10, 1986. Critical habitat for the Northern Great Plains breeding grounds was designated on September 11, 2002. Piping plovers are small, stocky shorebirds that winter along the south Atlantic Coast from North Carolina to Florida, the Gulf Coast from Florida to Mexico and the coast of the Yucatan Peninsula in Mexico, the Bahamas and the Caribbean Islands. Migration to breeding grounds begins from March to April. Breeding grounds include the mid and north Atlantic Coast of the United States and Canada, the Great Lakes region, and large river systems and their tributaries of the Great Plains. Adults weigh approximately 2 ounces, have a length of 7 inches, with a 15-inch wingspan. Prior to migration to breeding grounds, the piping plover undergoes a molt into breeding plumage. This includes a single black band around the neck and a black band across the forehead between the eyes.

In the Great Plains region, piping plover nest in habitat similar to least tern nesting habitat. They construct their nests on sparsely vegetated sand/gravel beaches, to alkali lakes and wetlands, on beaches of reservoirs and lakes and on sandbars or rivers. Unlike least terns, the piping plovers do not colonially nest, as piping plover males are territorial of nesting and foraging areas. Diet consists of both aquatic and terrestrial macroinvetebrates, and they forage for food by a "peck and run" method. Eggs are pyriform shaped, a light buff color and evenly marked with brown spots which allows the egg to be camouflaged by surrounding substrate. Following nest construction, a nest scrape, eggs are laid about every other day, with a clutch size typically consisting of three to four eggs. When the final egg has been laid, incubation begins. After 28 to 31 days of incubation, chicks hatch and begin feeding. Chicks forage near parents, mimicking the "peck and run" method. The female may abandon the chicks upon hatching, though the male will continue to tend to the brood until they fledge (approximately 21 to 28 days after hatching), and in some cases, longer (USACE, 2011).

Like the interior least tern, changes in the quality and quantity of riverine habitat, primarily due to damming and water withdrawals are the primary threat to this species. Other threats include habitat destruction, human disturbance, predation and invasive plants which further reduce suitable habitat (USFWS, 2016).

3.4 Pallid Sturgeon

The pallid sturgeon was listed as federally endangered on September 6, 1990 (USFWS, 1998). This big river fish species was historically found in the lower Mississippi, Missouri, and Yellowstone River Basins (Bramblett and White, 2001). Among the oldest fish group, pallid sturgeon are decedents of a group of boney fishes (Paleopterygii) which first appeared during the Paleozic era. Pallid sturgeon are often mistaken for their closely related cousin, shovelnose sturgeon (*Scaphirhynchus platorynchus*) which share their range and appearance. Pallid sturgeon were not recognized as a distinct species until Forbes and Richardson (1905) evaluated nine male sturgeon caught by commercial fisherman in the confluence of the Missouri and Mississippi Rivers which showed morphological differences leading to the classification of a separate species. Because pallid sturgeon were not classified as a distinct species until 1905, little is known about their historic abundance. It is thought that this species may have never been common in their range. Reasons for decline include overharvesting sturgeon for caviar in the late 1800's and early 1900's. Additional pressure on this species includes alteration of big river systems and their tributaries within the pallid sturgeon's range. River channelization and dam construction and operation have resulted in loss of habitat to the pallid sturgeon.

A conceptual life-history model was provided for the pallid sturgeon from a combined study conducted by the U.S Department of the Interior (DOI) and the U.S. Geological Survey (USGS). It has been determined that pallid sturgeon spawn between spring and summer upstream, after which the adults migrate downstream and overwinter. The larvae incubate upstream and drift downstream. It is thought that the timing of spawning has seasonally evolved through environmental cues such as hydrological flows. Since these flows have been altered through anthropogenic means, recruitment has suffered (Wildhaber et al., 2007).

Under the Corps' Missouri River Recovery Program (MRRP) an Effects Analysis was initiated in 2013 to incorporate new knowledge to review species recovery progress and to provide quantitative models relating to pallid sturgeon responses to management actions on the Missouri River. Currently, there are several hypotheses in the Effects Analysis regarding factors that may limit recruitment of pallid sturgeon larvae to age-1. Many of these hypotheses focus on a lack of habitat to support food production, feeding and the interception of drifting free embryos from the thalweg into channel margin habitats (Jacobson et al., 2016).

3.5 Northern Long-eared Bat

The northern long-eared bat was listed as federally threatened on May 2, 2015 and may be found within the project area. The northern long-eared bat is distributed along the eastern half of the United States, with a range that extends into and throughout the majority of the state of Nebraska, to include Lancaster County. It is thought that habitat fragmentation, human disturbance and the emergence of white-nose syndrome (*Pseudogymnoascus destructans*) has decimated populations. In November 2015, white nose syndrome was confirmed in an abandoned mine in Cass County, Nebraska which is directly adjacent to Lancaster County. Lancaster County is included in the white nose buffer zone.

During summer, northern long-eared bat roost singly or in colonies underneath bark, in cavities, or in crevices of both live and dead trees. Males and non-reproductive females may also roost in cooler places, like caves and mines. This bat seems opportunistic in selecting roosts, using tree species based on suitability to retain bark or provide cavities or crevices. It has also been found, rarely, roosting in structures like barns and sheds. Northern long-eared bats spend winter hibernating in caves and mines, called hibernacula. They typically use large caves or mines with large passages and entrances; constant temperatures; and high humidity with no air currents. Specific areas where they hibernate have very high humidity (USFWS, 2015).

Northern long-eared bats emerge at dusk to fly through the understory of forested hillsides and ridges feeding on moths, flies, leafhoppers, caddisflies, and beetles, which they catch while in flight using echolocation. Northern long-eared bats also feed by gleaning motionless insects from vegetation and water surfaces.

In Nebraska, breeding begins in late summer or early fall when males begin swarming near hibernacula. Fall swarming is the final stage before hibernation. Swarming starts in mid-August and lasts through the end of October. After copulation, northern long-eared bats hibernate in caves in southeastern Nebraska from October 15 to March 15 before beginning migration to summer-use areas. After hibernation, pregnant females migrate to summer areas where they roost in small colonies and give birth to a single pup in June or early July (USFWS, 2015). Maternity colonies disperse toward hibernacula shortly after young are able to fly. Northern long-eared bats can live up to 19 years (USFWS, 2015).

3.6 Western Prairie Fringed Orchid

The western prairie fringed orchid (*Platanthera praeclara*) is an herbaceous perennial that was listed as federally threatened on September 28, 1989. This member of the orchid family is native to the Midwest prairies, typically found in wet-mesic sedge meadows (Sharma et al., 2003). Loss of habitat through agrarian and urban encroachment have caused population declines. Data depicting known historical presence shows a 75 percent decline where these populations are now extirpated (USFWS, 1996).

The western prairie fringed orchid is reportedly long lived, provided adequate environmental factors. This plant is entirely propagated by seed and perpetuates through a perennating bud which forms on fusiform tubers. The initial shoot will emerge between April and May. A single bud is produced on the rhizome but will remain dormant over the winter after the plant senesces in September. In the following spring, the bud will develop into vegetative shoots. Inflorescence typically occurs in July. Pollination is required, and is typically performed by various species of hawkmoths (USFWS, 1996). Mature seeds are released in the early fall and new progeny will form.

It is thought that a drought lasting longer than a year will severely increase mortality and reduce seed viability of remaining individuals. It is also sensitive to extensive periods of inundation. Habitat management practices such as grazing, mowing and burning may also affect survivorship.

3.7 Wetlands

The Corps and the EPA have defined wetlands as “those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances, do support a prevalence of vegetation typically adapted for life in saturated soil conditions”(Federal Register 1982; 1980). These habitats serve a variety of purposes and provide a multitude of benefits to the adjacent surroundings, fish, wildlife and vegetation as well as the social environment. It was estimated that the state of Nebraska had approximately 2.9 million acres of wetlands in 1780. Within two centuries there has been an estimated 35 percent loss, resulting in approximately 1.9 million acres (Dahl, 1990). The Corps Regulatory Program permits Section 404 of the CWA for placement of fill in waters of the United States and wetlands with a “significant nexus” to waters of the United States.

Utilizing the USFWS National Wetlands Inventory (NWI) Cowardin classification system, wetlands adjacent to Deadmans Run were determined in Figure 7 below. The landscape surrounding the study area is primarily urbanized, so, much of the wetlands have been filled in. Furthermore, existing conditions of the stream contribute to a lack of interaction with the floodplain, except in rare and extreme, damaging events. A small (approximately .15 acres) emergent wetland approximately 2,800 feet southwest of the N 48th Street and Leighton Avenue intersection on the descending left (west) bank line of Deadmans Run is the only wetland immediately adjacent to, and outside of, the proposed project construction footprint.

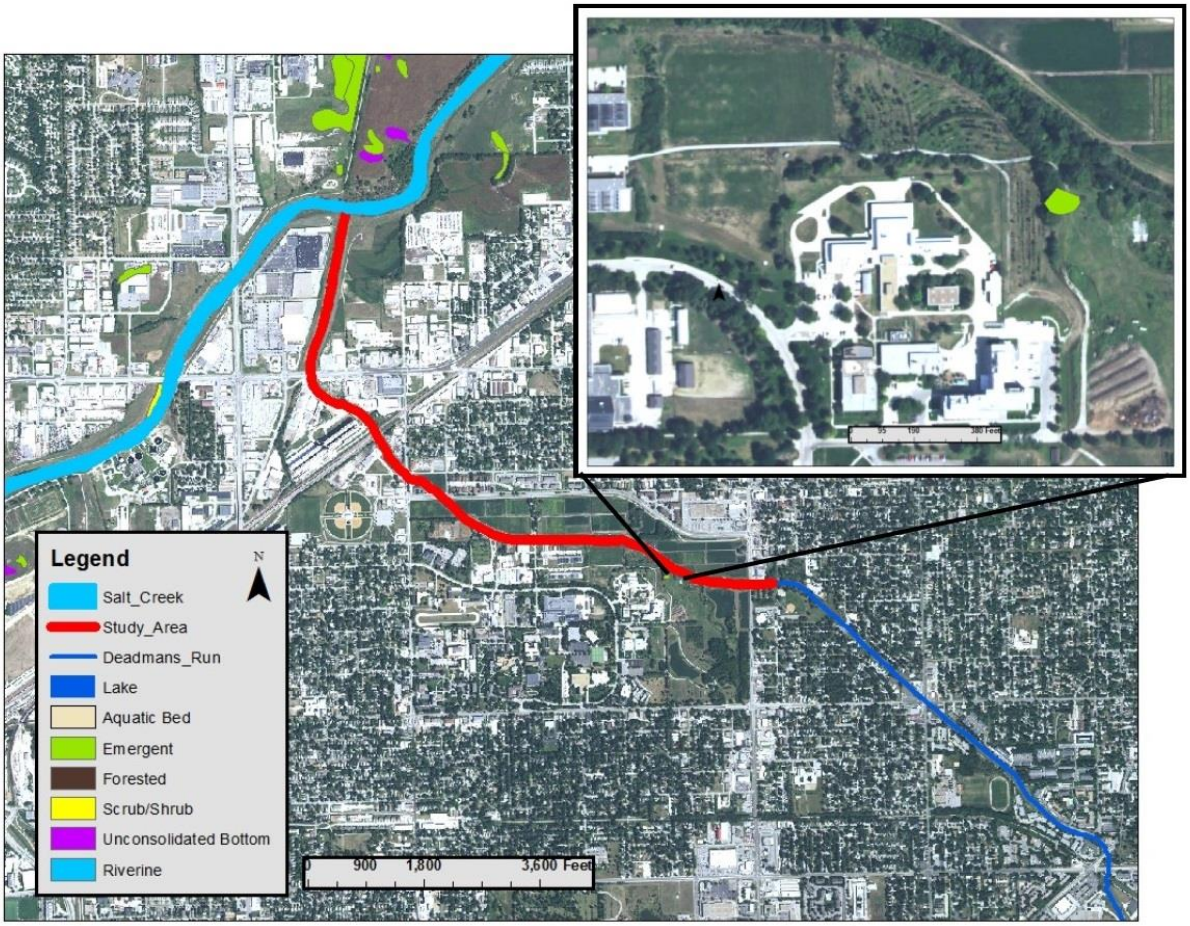

Figure 7. NWI classified wetlands associated with Deadmans Run

3.8 Vegetation

Vegetation in Eastern Nebraska was historically a tallgrass prairie with a limited extent of woody vegetation found adjacent to rivers and streams. Prior to 1855 a distinct prairie-forest ecotone restricted to floodplains, terraces and other uplands bordering riparian areas existed. It is thought that lack of fire intensity and frequency allowed woody vegetation to colonize the region. Presently, cottonwood (*Populus deltoides*), bur oak (*Quercus macrocarpa*), American basswood (*Tilia americana*) and rough-leaved dogwood (*Cornus drummondii*) are more common than they were prior to settlement of the region (Rothenberger, 1989).

Within the study area footprint, vegetation and native diversity are limited and invasive species and turf vegetation are common along the riparian corridor, as Deadmans Run is heavily urbanized. There are several invasive, non-native and noxious weeds found in the State of Nebraska. According to the University of Georgia Early Detection and Distribution Mapping System (2014), in Lancaster County, 226 species are considered introduced. It is noted that not all of the 226 species are considered noxious, but are noxious to the United States and may be listed as noxious elsewhere in the country. The Lancaster County Weed Control Authority identifies sericea lespedeza (*Lespedeza cuneata*), leafy spurge (*Euphorbia esula*), purple loosestrife (*Lythrum salicaria*), Japanese knotweed (*Fallopia japonica*), giant knotweed (*Fallopia sachalinensis*), spotted knapweed (*Centaurea maculosa*), diffuse knapweed (*Centaurea diffusa*), phragmites (*Phragmites australis*), musk thistle (*Carduus nutans*), plumeless thistle (*Carduus acanthoides*), Canada thistle (*Cirsium arvense*) and saltcedar (*Tamarix spp.*) as noxious in the State of Nebraska.

The area within the project footprint that has the highest vegetative biodiversity and ecological value is the portion of the stream adjacent to the East Campus area of UNL. Existing conditions of this area included a natural stream bed (no concrete matting), no gabion or rock riprap along the bankline, and vegetation reminiscent of the historic conditions (Eastern Riparian Forest community). This community has a state rank of S3. This rank, as defined by the National Heritage Program, is "State Vulnerable", due to a restricted range and relatively few populations, recent and widespread declines and other factors make this community vulnerable to extirpation (Rolfsmeier and Steinauer, 2010). Early on in the Feasibility Study process, this area was noted as the highest ecologically-functioning portion of the project area.

However, because the stream is situated in a highly urbanized setting, indicator species and expected riparian communities are not overly present within or adjacent to the project area and this small segment along the stream within the East Campus area still functions poorly as riparian habitat. The remnant functional value of this area is primarily derived from the presence of large wood (living and dead) which plays an important role in protecting river banks, reinforcing floodplains and creating and stabilizing landforms with which new woody vegetation may form (Camporeale et al., 2013). Trees and shrubs have been shown to play an important role in providing microclimate modifications and shading, streambank stabilization, inputs of organic litter and woody debris to aquatic systems, water and nutrient runoff cycling, wildlife habitat and general foodweb support for a wide range of both aquatic and terrestrial organisms (Sweeney, 1992).

3.9 Other Fish and Wildlife

Various fish species occur in Deadmans Run, one study conducted in 1977 in the Salt Creek basin collected individuals representing 12 families and 34 species. It was determined the general low diversity was indicative of the unstable conditions that small streams provide. Species such as channel catfish (*Ictalurus punctatus*), blue catfish (*Ictalurus furcatus*), largemouth bass (*Microterus salmoides*), walleye (*Sander vitreus*) and northern pike (*Esox lucius*) are desirable sport fish. Members from the sucker (Catostomidae), sunfish (Centrarchidae), carp, minnows and shiners (Cyprinidae) as well as topminnow (Cyprinodontidae) families are present. Other species include the shortnose gar (*Lepisosteus platostomus*), brook stickleback (*Culaea inconstans*), black and yellow bullhead (*Ameiurus melas* and *natalis*) and freshwater drum (*Aplodinotus grunniens*) (Maret and Peters, 1980). During field observations, invasive Asian carp (*Cyprinus carpio*), shortnose gar and schools of unidentified minnow-like fish were noted. Overall diversity is very poor within the channelized portion of Deadmans Run. Deadmans Run is very shallow and lacks cover across most of its length. It is expected a minor increase in species diversity may occur at the confluence of Salt

Creek and where more natural habitat areas exits in unlined portions of Deadmans Run and areas. These areas of potential higher diversity are likely located within the East Campus segment of the stream, and Deadmans Run downstream of the BNSF railroad bridges. In addition to these segments being un-lined with a concrete mattress, they are surrounded by a greater buffer of vegetation which contributes to woody and detritus inputs into the stream providing food, shelter and refugia as well as providing shading.

Mammals that may typically be found in the vicinity of waterways in eastern Nebraska, like that of Deadmans Run, include Virginia opossum (*Didelphis virginiana*), masked shrew (*Sorex cinereus*), least shrew (*Cryptotis parva*), eastern red bat (*Lasiurus borealis*), woodchuck (*Marmota monax*), white-footed mouse (*Peromysus leucopus*), northern grasshopper mouse (*Onychomys leucogaster*), southern bog lemming (*Synaptomys cooperi*), meadow vole (*Microtus pennsylvanicus*) and least weasel (*Mustela nivalis*) (Benedict et al. 2000). It is anticipated that generalist species prone to urbanized areas such as raccoon (*Procyon lotor*), Virginia opossum, skunk (*Mephitis mephitis*), gray squirrel (*Sciurus carolinensis*), white-footed mouse and red fox (*Vulpes vulpes*) would likely be present throughout the study area.

Although Deadmans Run does not provide high quality riparian habitat, it is anticipated that common breeding birds in eastern Nebraska in the vicinity of floodplain forests that may be found along Deadmans Run include the Cooper’s hawk (*Accipiter cooperii*), great horned owl (*Bubo virginianus*), northern flicker (*Colaptes auratus*), red-headed woodpecker (*Melanerpes erythrocephalus*), great crested flycatcher (*Myiarchus crinitus*), blue jay (*Cyanocitta cristata*), black-capped chickadee (*Poecile atricapilla*), house wren (*Troglodytes aedon*), eastern bluebird (*Sialia sialis*), American robin (*Turdus migratorius*), red-eyed vireo (*Vireo olivaceus*), yellow warbler (*Dendroica dominica*), Baltimore oriole (*Icterus galbula*), and northern cardinal (*Cardinalis cardinalis*) (Sharpe et al. 2001).

Presently, 13 species of amphibians and 47 species of reptiles are known to exist in the entire State of Nebraska. In Eastern Nebraska, the tiger salamander (*Ambystoma trigrinum*), cricket frog (*Acris crepitans*), woodhouse toad (*Bufo woodhousii*), western gray tree frog (*Hyla chrysoscelis*), plains leopard frog (*Rana blairi*), northern leopard frog (*Rana pipiens*) and western striped chorus frog (*Pseudacris triseriata*) are all amphibians that have a high probability of being found in and around the project area.

Some reptiles expected to be found around Deadmans Run would be the blue racer (*Coluber constrictor*), prairie kingsnake (*Lampropeltis calligaster*), milk snake (*Lampropeltis triangulum*), common watersnake (*Nerodia sipedon*), bull snake (*Pituophis catenifer*), varying species of gartersnakes (*Thamnophis* spp.) and the prairie skink (*Eumeces septentrionalis*). Snapping turtle (*Chelydra serpentina*) and painted turtle (*Chrysemys picta*) likely inhabit Deadmans Run within the project area (Lynch, 1985).

3.10 Lower Platte River

It was noted in the PAL received in January 2016 that since 1978 the USFWS has concluded in all of its Section 7 consultations on water projects in the Platte River basin, that the Platte River ecosystem is in a state of jeopardy and any federal action resulting in instream flow depletion to the Platte River ecosystem will further or continue to deteriorate the already stressed habitat conditions. Due to the cumulative effect of many water depletion projects in the Platte River basin, the USFWS considers any depletion (direct or indirect) significant. As such, the USFWS has adopted a jeopardy standard for all Section 7 consultations on federal actions which result in water depletions to the Platte River system.

The USFWS had concluded that water-related activities in the Platte River basin resulting in less than 0.1 acre-foot/year of depletions in flow to the nearest surface water tributary to the Platte River system do not affect the Platte River target species (pallid sturgeon, interior least tern and piping plover) and thus do not require consultation with the USFWS for potential effects on those species.

4. Effects

Direct effects include all immediate impacts (adverse and beneficial) from project-related actions. According to the ESA rules and regulations, direct effects occur at or very close to the time of the action itself.

Indirect effects are caused by or result from the proposed action, are later in time and are reasonably certain to occur. Indirect effects may occur outside of the area directly affected by the action.

Cumulative effects are defined as the effects of future state, local or private activities (non-federal) that are reasonably certain to occur in the action area. An interdependent activity is an activity that has no independent utility apart from the action under consultation.

4.1 Salt Creek Tiger Beetle

4.1.1 Direct Effects

As noted in Section 2.1 above, the Salt Creek tiger beetle relies on saline wetlands in Nebraska. No saline wetlands are present within the proposed project construction footprint. According to the NWI-classified saline wetlands map (see Figure 8), the nearest saline wetland which would have the potential to provide suitable habitat for this species, is approximately 1 mile north of the channel widening footprint. As noted in Figure 9, designated critical habitat is approximately 2 miles north and 3.8 miles west of the confluence of Deadmans Run and Salt Creek. These locations would serve as the closest potential suitable habitat for the Salt Creek tiger beetle. No project activities are expected to occur within the vicinity of suitable habitat.

4.1.2 Indirect and Cumulative Effects

As a result of the proposed project, no indirect or cumulative effects are anticipated to occur to the endangered Salt Creek tiger beetle.

4.1.3 Interrelated and Interdependent Effects

No interrelated and interdependent effects are anticipated to occur to the endangered Salt Creek tiger beetle.

4.1.4 Salt Creek Tiger Beetle Determination

After evaluating the potential effects of the proposed action, the Corps concludes that the proposed project would have "*no effect*" on the Salt Creek tiger beetle based on the premise that the project area is not located within or readily near suitable habitat for this species. This species has a highly specified habitat requirement and is dependent upon saline environments that do not exist within the action area.

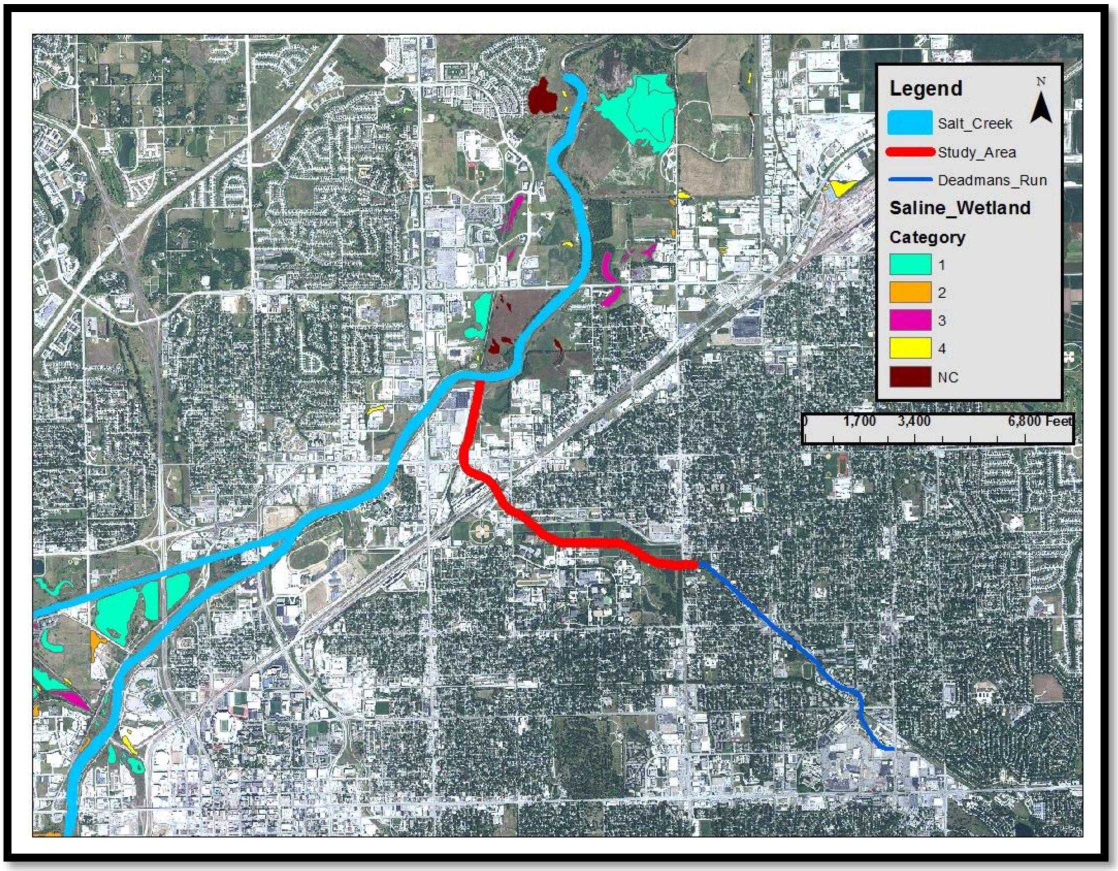

Figure 8. Saline wetlands near the Study Area of Deadmans Run

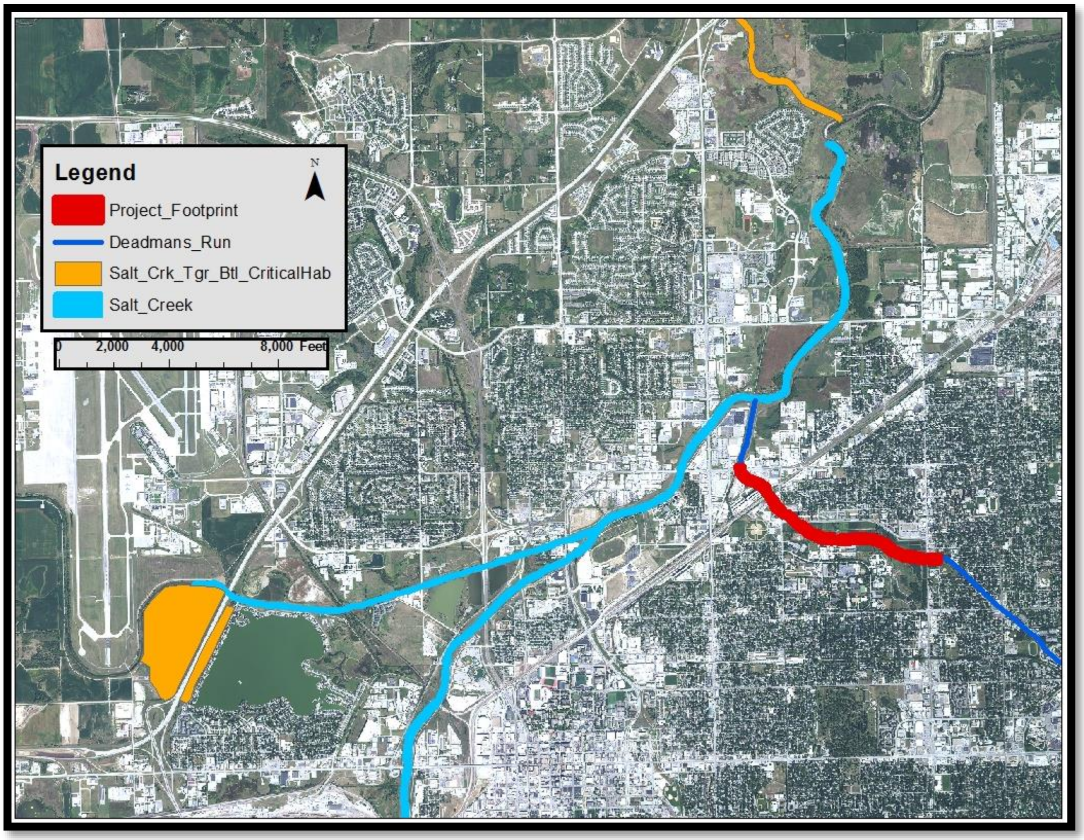

Figure 9. Designated critical habitat (orange) of the Salt Creek tiger beetle in relation to the project footprint of Deadmans Run

4.2 Whooping Crane

4.2.1 Direct Effects

Whooping crane migration periods occur between March and May and September to November and would only likely only be found in this region as it is passing through. Migrating birds will feed in croplands and roost in shallow, freshwater wetlands. It is not anticipated that the whooping crane would be negatively impacted by the proposed project as it is not likely they would be found in the action area. Due to the heavily urbanized setting of Deadmans Run, lack of freshwater wetlands and adjacent suitable foraging habitat, no direct effects are anticipated.

4.2.2 Indirect and Cumulative Effects

As a result of the proposed project, no indirect or cumulative effects are anticipated to occur to the endangered whooping crane.

4.2.3 Interrelated or Interdependent Effects

No interrelated and interdependent effects are anticipated to occur to the endangered whooping crane.

4.2.4 Determination
After evaluating the potential effects of the proposed action, the Corps concludes that the proposed project would have "*no effect*" on the whooping crane based on the premise that the project area is not located within or readily near suitable habitat for this species. Due to the highly urbanized setting of Deadmans Run, it is not anticipated the whooping crane would be located with or near the action area, nor would the proposed action have any indirect, cumulative, interrelated or interdependent impacts on this species.

4.3 Interior Least Tern and Piping Plover

4.3.1 Direct Effects
As noted in Section 3.3, the interior least tern and piping plover would be generally present within this region during their nesting period between late April to early August, as both bird species nests on gravely/sandy substrate on large rivers. The project area is approximately 50 miles south of the Platte River where interior least terns and piping plovers would have potential suitable habitat for nesting. No nesting interior least terns or piping plovers are anticipated to occur within the action area.

4.3.2 Indirect and Cumulative Effects
The USFWS indicated that the proposed project could have tributary and watershed-level effects that could influence sediment and hydrological cycles that drive the creation and maintenance of habitats used by the interior least tern and piping plover on the Platte River. While Salt Creek [and in turn Deadmans Run] does not provide significant contributions to the Platte River sand bedload (Alexander and Schaepe, 2015), an email dated December 7, 2016 from USFWS expressed concern on how accelerated flows from Deadmans Run into Salt Creek by implementing the recommended alternative may exacerbate channel degradation in the Platte River as there would be little to no corresponding bedload with these flows.

To address this concern, an analysis was preformed comparing the recommended alternative and existing conditions hydrographs. Deadmans Run, as noted, is an urbanized stream with extensive stabilization and little flow volume/sediment contribution in comparison to the Lower Platte River. It was shown in this analysis that the hydrographs are nearly identical after traveling about six miles down Salt Creek from the Deadmans Run confluence. Therefore, the effects of the Deadmans Run project appear to diminish about six miles into a 30 mile journey to the Platte River. Due to the existing extensive stabilization, urban stream characteristics, and insignificant sediment contribution from Deadmans Run, the proposed project will not significantly alter existing conditions within the Lower Platte River and therefore are anticipated to have no indirect or cumulative impact on channel degradation, and thus no indirect or cumulative effect to interior least tern and piping plover habitat.

Due to the extra capacity of the widened channel on Deadmans Run, flood waters that would have otherwise spilled into the overbanks causing widespread flooding, will now be retained in the flood control channel. The overall volume of water that is released into Salt Creek, and eventually the Platte River, will increase slightly due to less overbank flooding. However, this increase in water volume will occur at less frequent events like the 50- and 100-year flows and not at the more frequent events like the 10- to 2-year flows. The behavior of the frequent events should remain similar to the existing because channel modifications were focused on the higher elevations of the channel to increasing flood conveyance. The Deadmans Run watershed is a small area in comparison with the Salt Creek and Platte River watersheds. Deadmans Run drains less than 10 square miles while the area of the Salt Creek watershed at the United States Geological Survey (USGS) Salt Creek at Lincoln stream gage (No. 06803500), about one mile upstream of the confluence with Deadmans Run, drains 685 square miles. Therefore, if the project on Deadmans Run did create depletions, its overall impact to the Platte River would be minimal and fall within the threshold of the USFWS *de minimus* rule. As the project is designed now, all water drains back to Salt Creek within 24 hours and as such, depletions are not considered a direct, indirect or cumulative effect as a result of the recommended plan.

There is potential for both bird species to generally pass through the area during its migration period, however; it is anticipated that the interior least tern and piping plover would not be further impacted by construction activities due to the general urbanization and anthropogenic activities already existing within the project area.

4.3.3 Interrelated or Interdependent Effects

No interrelated or interdependent effects will occur to the interior least tern or piping plover as a result of implementing the recommended alternative.

4.3.4 Determination

After evaluating the potential effects of the proposed action, the Corps concludes that the proposed project would have a "*may effect, not likely to adversely affect*" determination on the interior least tern and piping plover based on the premise that the project area is not located within or readily near suitable nesting habitat for this species. Based on analysis of current channel conditions and "with project" conditions, it was determined that it is unlikely the recommended alternative would have an impact on the channel-forming velocity of the Platte River or contribute to channel bed degradation of the Platte River. Furthermore, the project has been designed in such a way that it falls under the USFWS *de minimus* threshold.

There is potential for these species to be generally passing through the region during the nesting season. If the interior least tern or piping plover do pass through during construction, the impact would be temporary and negligible as the birds would likely be deterred by surrounding urbanization and anthropogenic activities already occurring. Temporary construction activities would only further deter the birds from utilizing the immediate project area.

4.4 Pallid Sturgeon

4.4.1 Direct Effects

As noted in Section 3.4, pallid sturgeon occur in large rivers and their tributaries. No pallid sturgeon are anticipated to occur in Deadmans Run, or Salt Creek.

4.4.2 Indirect and Cumulative Effects

Similarly to the interior least tern and piping plover, in the PAL from January 2016 it was noted that Platte River depletions could be considered significant and would thus require formal consultation if they exceed the *de minimus* threshold of 0.1 acre/foot per year as a result of the proposed project at Deadmans Run. The recommended alternative is designed to safely pass the 100-year flood through a widened channel.

In addition, the Deadmans Run watershed is a small area in comparison with the Salt Creek and Platte River watersheds. Deadmans Run drains less than 10 square miles while the area of the Salt Creek watershed at the United States Geological Survey (USGS) Salt Creek at Lincoln stream gage (No. 06803500), about one mile upstream of the confluence with Deadmans Run, drains 685 square miles. Therefore, if the project on Deadmans Run did create depletions, its overall impact to the Platte River would be minimal and fall within the threshold of the USFWS *de minimus* rule. As the project is designed now, all water drains back to Salt Creek within 24 hours and as such, depletions are not considered a direct, indirect or cumulative effect as a result of the recommended plan.

4.4.3 Interrelated or Interdependent Effects

No interrelated and interdependent effects are anticipated to occur to the endangered pallid sturgeon.

4.4.4 Determination

After evaluating the potential effects of the proposed action, the Corps concludes that the proposed project would have "*no effect*" on the pallid sturgeon based on the premise that the project area is not located within or readily near suitable habitat for this species. Furthermore, no indirect or cumulative effect to the pallid sturgeon would occur as no depletions of flows would occur the Lower Platte River where pallid sturgeon occur. In fact, due to the extra capacity of the widened channel on Deadmans Run, flood waters that would have otherwise spilled into the overbanks causing widespread flooding, will now be retained in the flood control channel. The overall volume of water that is released into Salt Creek, and eventually the Platte River, will increase slightly due to less overbank flooding. However, this increase in water volume will occur at less frequent events like the 50- and 100-year flows and not at the more frequent events like the 10- to 2-year flows. The channel improvement project is designed to remain within the *de minimus* threshold.

4.5 Northern Long-eared Bat

4.5.1 Direct Effects

Direct effects to the northern long-eared bat would be considered minor and temporary, and occur in the form of removing approximately 2.34 acres of Eastern Riparian Forest. There is minor potential that this area may be utilized by northern long-eared bats as roosting sites or for maternity colonies. As noted in Section 3.5, the project area falls within the white nose buffer zone. As such, the *Key to the Northern Long-eared Bat 4(d) Rule for Federal Actions that May Affect Northern Long-eared Bats* (USFWS, 2016) was consulted. No tree clearing would occur June 1 through July 31, in order to avoid potential maternity colonies within the area.

Furthermore, take would not purposefully occur, known hibernacula does not occur within a 0.25 mile radius of the project area. The recommended alternative would not affect caves or mines where northern long-eared bats are known to hibernate, nor would it alter the entrance or the environment of hibernaculum.

4.5.2 Indirect and Cumulative Effects
No indirect or cumulative effects are anticipated to occur to the northern long-eared bat as a result of the recommended alternative.

4.5.3 Interrelated or Interdependent Effects
No interrelated or interdependent effects are anticipated to occur to the northern long-eared bat as a result of the recommended alternative.

4.5.4 Determination
After evaluating the potential effects of the proposed action, the Corps concludes that the proposed project would have a "*may affect, but not likely to adversely affect*" determination for the northern long-eared bat. This is based on the premise that the project area occurs wholly within the white nose buffer zone, and approximately 2.34 acres of trees will be removed. However, no adverse impacts are anticipated as tree clearing would be conducted outside the nesting period (June 1 through July 31) and the project area is not within a 0.25 mile radius of known hibernacula.

4.6 Western Prairie Fringed Orchid

4.6.1 Direct Effects
The disturbance caused by associated factors with urbanization has likely sequestered this species' ability to thrive within the study area. It is not expected that the western prairie fringed orchid would be found within the project area, therefore it is not expected there would be direct effects as a result of the recommended alternative.

4.6.2 Indirect and Cumulative Effects
As a result of the proposed project, no indirect or cumulative effects are anticipated to occur to the western prairie fringed orchid.

4.6.3 Interrelated or Interdependent Effects
No interrelated or interdependent effects are anticipated to occur as a result of the recommended alternatives.

4.6.4 Determination
Confirmed through desktop analysis and site visits, no high quality prairie or wet meadows exists within the project area. Therefore the Corps concludes that the proposed project would have *"no effect"* on the western prairie fringed orchid based on the lack of suitable habitat within the project area.

4.7 Wetlands

No direct effects to wetlands would occur as a result of the proposed project, as no wetlands exist within the project footprint. A 404(b)(1) analysis has been completed and may be found in Section II of the Biology Appendix (Appendix A) of the Feasibility Study.

4.8 Vegetation

The selected plan would impact approximately 28.5 acres of vegetation in the floodplain of Deadmans Run, acreage was calculated using the preliminary design project cross section as shown in Figure 4. The 28.5-acre estimate does not include the area currently occupied by the normal flow of Deadmans Run which was estimated to be approximately 20 feet wide through the project area nor does it include the assumed construction footprint of the non-federal sponsor project which will replace three bridges and construct a detention basin at Flemings Field near the West Tributary. Most of the acres affected consist of highly disturbed urban areas and upland weeds and turf grasses. Following construction, the disturbed areas would be seeded with a native grass mixture on reinforced turf mats. This would result in approximately 17.5 acres of native species with higher floristic quality that would contribute to the environmental setting of the riparian corridor. Within the 25-foot buffer adjacent to the channel, a wetland-mesic prairie seed mix would be planted to result in an additional 5 acres of wet-mesic habitat (see typical cross section, Figure 4 in Section 2).

Included in the 28.5-acre impacted vegetation is approximately 2.34 acres of trees along Deadmans Run near the East Campus area. As noted in Section 2, several channel alignment variations were discussed by the team to avoid, minimize and mitigate impacts to this Eastern Riparian Forest community; however, the recommended plan has been designed to improve flow conveyance and alleviate flooding, while avoiding impacts to the north bank of trees. Based on the hydraulic analysis it is not possible to replace trees below the flood-prone zone without inducing overbank flooding during higher frequency events. Due to this constraint, in-kind, on-site mitigation can still be achieved, however, species composition would vary based on replacing trees in the upland areas verses immediately adjacent to the stream (See Figure 10). It was noted in the letter received by USFWS, dated January 9, 2017, that the USFWS has a standard recommended 3:1 replacement ratio of impacted trees. However, impacts associated with the removal of this bank of trees is considered negligible as a result of concurrent environmental mitigation measures.

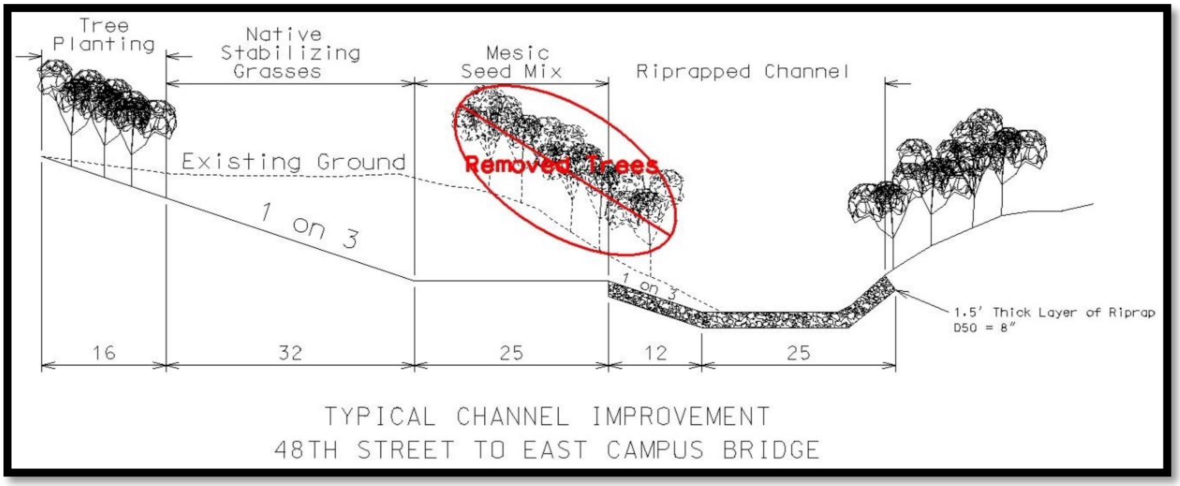

Figure 10. Typical cross section through East Campus

The Nebraska Stream Condition Assessment Procedure (NESCAP) was utilized to determine these impacts and the concurrent with-project mitigation features. Through this analysis, it was determined that the supplemental vegetation plantings would result in no net adverse impact to the overall environment and habitat function of the project area (Table 1). Please see the Biology Appendix (Appendix A: Section III) of the Feasibility Report for information and technical analysis on existing habitat condition, impact analysis and mitigation measures to impacted vegetation. Appendix A: Section V contains the monitoring plan and adaptive management for these mitigative measures.

Table 1. Utilizing NESCAP, comparison of alternative impacts to existing conditions. Note that total Stream Condition Index (SCI) rating is on a 0 to 1 scale, with 1 being reference standard conditions and 0 being non-functional. SCI area is calculated by multiplying riparian area and SCI to provide a habitat unit. Under the recommended plan, SCI retains existing condition rating (no net impact) and increases in overall SCI area.

	Existing Conditions	Structural Alternative Impacts	Optimized Reccommended Plan
Total Stream Condition Index Rating	0.26	0.24	0.26
Stream Condition Index Area (sqft)	761.14	1,158.86	1,268.57

4.9 Other Fish and Wildlife

Direct and indirect impacts to fish in the project area would be temporary and negligible. Impacts would mainly be related to construction activities within the channel in the form of human disturbance. During construction, water in the channel would be temporarily diverted/de-watered (most likely during low flows in summer or winter) in order to facilitate the in-channel work to widen and shape the bank lines, remove old bed-lining and emplace new riprap on the channel bed and sides. Impacts of this nature would be minimized as screens or seining nets could be used to drive resident fish out of the project area before dewatering/diverting the immediate segment to be worked on. After construction activities are finished, fish may return to the area. It is anticipated some fatalities to fish residing in the project area may occur should they not be relocated. Clearing the Eastern Riparian Forest-classified community along the south bank of the East Campus area would cause temporary loss of the vegetative buffer on one stream bank which could increase water temperature and increased runoff in the immediate area. These impacts would be minor and short-term until vegetation re-establishes. See the Biology Appendix (Appendix A: Section III) of the Feasibility Study for more information.

Direct and indirect impacts to birds, mammals and herpetofuana would also primarily be caused by disturbance of construction activities and vegetation removal. Long-term operation of the project would not cause ongoing adverse impacts to wildlife species in the area. Impacts resulting from construction activities and vegetation removal would be considered temporary and minor. Clearing of trees would occur outside of the primary nesting season of migratory birds (identified as September 15 through January 31) to minimize impacts to nesting birds. A migratory bird survey would be conducted prior to clearing and grubbing activities to determine if any migratory birds that nest outside of the primary nesting season, are nesting in the project area.

Other impacts to wildlife would be minor and short-term in occur as a result of increase human activity and auditory and vibratory disturbances from construction. It is anticipated that due to these temporary disturbances, resident wildlife and wildlife passing through would disperse or be deterred from the immediate area and return upon completion of activities.

4.10 Lower Platte River

As noted in Sections 4.3 and 4.4, the USFWS indicated that the proposed project could have tributary and watershed-level effects that could influence sediment and hydrological cycles that drive the creation and maintenance of habitats used by the interior least tern and piping plover on the Platte River. While Salt Creek [and in turn Deadmans Run] does not provide significant contributions to the Platte River sand bedload (Alexander and Schaepe, 2015), an email dated December 7, 2016 from USFWS expressed concern on how accelerated flows from Deadmans Run into Salt Creek by implementing the recommended alternative may exacerbate channel degradation in the Platte River as there would be little to no corresponding bedload with these flows.

To address this concern, an analysis was preformed comparing the recommended alternative and existing conditions hydrographs. Deadmans Run, as noted, is an urbanized stream with extensive stabilization and little flow volume/sediment contribution in comparison to the Lower Platte River. It was shown in this analysis that the hydrographs are nearly identical after traveling about six miles down Salt Creek from the Deadmans Run confluence. Therefore, the effects of the Deadmans Run project appear to diminish about six miles into a 30 mile journey to the Platte River. Due to the existing extensive stabilization, urban stream characteristics, and insignificant sediment contribution from Deadmans Run, the proposed project will not significantly alter existing conditions within the Lower Platte River and therefore are anticipated to have no indirect or cumulative impact on channel degradation, and thus no indirect or cumulative effect to interior least tern and piping plover habitat.

Due to the extra capacity of the widened channel on Deadmans Run, flood waters that would have otherwise spilled into the overbanks causing widespread flooding, will now be retained in the flood control channel. The overall volume of water that is released into Salt Creek, and eventually the Platte River, will increase slightly due to less overbank flooding. However, this increase in water volume will occur at less frequent events like the 50- and 100-year flows and not at the more frequent events like the 10- to 2-year flows. The behavior of the frequent events should remain similar to the existing because channel modifications were focused on the higher elevations of the channel to increasing flood conveyance. The Deadmans Run watershed is a small area in comparison with the Salt Creek and Platte River watersheds. Deadmans Run drains less than 10 square miles while the area of the Salt Creek watershed at the United States Geological Survey (USGS) Salt Creek at Lincoln stream gage (No. 06803500), about one mile upstream of the confluence with Deadmans Run, drains 685 square miles. Therefore, if the project on Deadmans Run did create depletions, its overall impact to the Platte River would be minimal and fall within the threshold of the USFWS *de minimus* rule. As the project is designed now, all water drains back to Salt Creek within 24 hours and as such, depletions are not considered a direct, indirect or cumulative effect as a result of the recommended plan.

5. Conclusion

After evaluating the potential effects of the proposed action, the Corps concludes that the proposed project would have *"no effect"* on the Salt Creek tiger beetle, whooping crane, pallid sturgeon and western fringed prairie orchid based on the premise that suitable habitat is not present within the project footprint and no related project activities would impact potential or suitable habitat. Furthermore a "*no effect*" determination was made in regards to the recommended plan contributing to Platte River depletions. The project has been designed so it falls within the *de minimus* threshold established by the USFWS and thus does not require formal consultation. A "*may affect, but not likely to adversely affect*" determination was made for the northern long-eared bat, interior least tern and piping plover. Table 2 summarizes these determinations.

Table 2. Determination Summary

SPECIES	DETERMINATION	RATIONALE
Salt Creek Tiger Beetle	No Effect	Lack of highly specialized habitat needs within the project area, critical habitat nearly 2 miles north of project location. No saline wetland or impacts to saline wetlands as a result of the recommended alternative.
Whooping Crane	No Effect	Lack of habitat in the immediate project area within urbanized Lincoln, Nebraska.
Interior Least Tern	Not Likely to Adversely Affect	Lack of habitat in the immediate area, construction activities limited to a highly urbanized tributary of Salt Creek (which in turn is a contributing watershed to the Platte River). Construction activities and resulting project will not contribute to channel bed degradation of the Platte River nor the channel-forming velocity of the Platte River and sandbar formation of the Platte River
Piping Plover	Not Likely to Adversely Affect	Lack of habitat in the immediate area, construction activities limited to a highly urbanized tributary of Salt Creek (which in turn is a contributing watershed to the Platte River). Construction activities and resulting project will not contribute to channel bed degradation of the Platte River nor the channel-forming velocity of the Platte River and sandbar formation of the Platte River
Pallid Sturgeon	No Effect	Lack of habitat in the immediate area, construction activities limited to a highly urbanized tributary of Salt Creek (which in turn is a contributing watershed to the Platte River). Construction activities and resulting project will not contribute to channel bed degradation of the Platte River nor the channel-forming velocity of the Platte River and sandbar formation of the Platte River
Northern Long-eared Bat	Not Likely to Adversely Affect	No tree clearing would occur June 1 through July 31, in order to avoid potential maternity colonies within the area. Furthermore, take would not purposefully occur, known hibernacula does not occur within a 0.25 mile radius of the project area.
Western Prairie Fringed Orchid	No Effect	Lack of habitat in the immediate area, no high quality prairies or wet meadows within urbanized Lincoln, Nebraska.

6. Literature Cited

50 Federal Register 21784. May 28, 1985.

Alexander, J.S. and N.J. Schaepe. 2015. Sedimentologic and Bed-material Budget Analyses of Sandbars, Lower Platte River, Eastern Nebraska, 1970 to 2011. USGS in cooperation with USACE, Omaha District and the Lower Platte River Corridor Alliance. 126pp.

Camporeale, C., E. Perucca, L. Ridolfi and A.M. Gurnell. 2013. Modeling the Interactions Between River Morphodynamics and Riparian Vegetation. Reviews of Geophysics. 51: 379-414.

Jacobson, R.B., M.L. Annis, M.E. Colvin, D. James, T.L. Welker and M.J. Parsley. 2016. Missouri River *Scaphirhynchus albus* (Pallid Sturgeon) Effects Analysis: Integrative Report 2016. U.S. Geological Survey Scientific Investigations Report- 2016-5064. 154pp. https://pubs.er.usgs.gov/publication/sir20165064.

Rolfsmeier, S.B. and G. Steinauer. 2010. Terrestrial Ecological Systems and Natural Communities of Nebraska (Version IV- March 9, 2010). Nebraska Natural Heritage Program and the Nebraska Game and Parks Commission, Lincoln, Nebraska.

Sharma, J., L.W. Zettler, J.W. Van Sambeek, M.R. Ellersieck, C.J. Starbuck. 2003. Symbiotic Seed Germination and Mycorrhizae of Federally Threatened *Platanthera praeclara* (Orchidaceae). America Midland Naturalist. 149:104-20.

Sweeney, B.W. 1992. Streamside Forests and the Physical, Chemical, and Trophic Characteristics of Piedmont Streams in Eastern North America. Water and Science Technology 29:2653-2673.

USACE. 2011. Final Programmatic Environmental Impact Statement for the Mechanical and Artificial Creation and Maintenance of Emergent Sandbar Habitat in the Riverine Segments of the Upper Missouri River.

USFWS. 1996. Western Prairie Fringed Orchid Recovery Plan. Department of the Interior, U.S. Fish and Wildlife Service.

USFWS. 1998. Fact sheet: Pallid sturgeon. http://www.fws.gov/midwest/endangered/fishes/palld_fc.html. March 6, 2015.

USFWS. 2015. Northern long-eared bat (Myotis septentrionalis). http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=A0JE. Last accessed May 26, 2016.

USFWS. 2016. Draft Revised Recovery Plan for the Northern Great Plains Piping Plover (*Charadrius melodus*): First Revision. Region 6, U.S. Fish and Wildlife Service-Department of the Interior.

USFWS. 2016. Key to the Northern Long-eared Bat 4(d) Rule for Federal Actions that may Affect Northern Long-eared Bats. https://www.fws.gov/Midwest/endangered/mammals/nleb/KeyFinal4dNLEBFedProjects.html. Accessed December 14, 2016.

Wildhaber, M.L., A.J. Delonay, D.M. Papoulias, B.L. Galat, R.B. Jacobson, D.G. Simpkins, P.J. Braaten, C.E. Korschgen, and M.J. Mac. 2007. A conceptual life-history model for pallid and shovelnose sturgeon. U.S. Geological Circular 1315.

1. Section 404(b)(1) Guidelines Evaluation

This Section 404(b)(1) Guidelines Evaluation is for the proposed construction of structural flood risk reduction measures along Deadmans Run in urbanized Lincoln, Lancaster County, Nebraska. Lincoln has had a history of flooding from Salt Creek and its tributaries since it was founded after the Civil War. The U.S. Army Corps of Engineers (Corps) has worked with the City of Lincoln and more recently the Lower Platte South-Natural Resource District (LPSNRD) to construct levees, dams and channel improvement projects on Salt Creek and on its many tributary streams. Additionally, more than 30 smaller dams have been constructed on smaller tributaries by the Natural Resources Conservation Service (NRCS). The flood threat in many areas of the Salt Creek Basin has become less severe following construction of those projects. To date, flood risk reduction efforts on Deadmans Run have been limited to channel improvement efforts constructed primarily to reduce streambank erosion.

A thorough Feasibility Study with an integrated Environmental Assessment (EA) has been conducted to identify alternatives, compare effects of alternatives, and select the best alternative for addressing the flooding problem along Deadmans Run in Lincoln, Nebraska. The Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies (P&Gs) (U.S. Water Resources Council 1983) establish the standards and procedures that the Corps and other Federal agencies use for planning and evaluating the merits of a water project. The Feasibility Study and EA evaluated, in detail, the environmental, social, and economic effects of the Recommended Plan and alternatives to the Recommended Plan.

1.1 Purpose of Evaluation

An important aspect of the Feasibility Report and EA is the evaluation of the Recommended Alternative consistent with Section 404(b)(1) Guidelines. Section 404(b)(1) Guidelines (40 CFR 230) are the substantive criteria used in evaluating discharges of dredged or fill materials in waters of the United States under Section 404 of the Clean Water Act (33 U.S.C. § 1251, et seq.). Fundamental to these Guidelines is the precept that dredged or fill materials should not be discharged into an aquatic ecosystem unless it can be demonstrated that such discharges would not have unacceptable adverse impacts either individually or in combination with known or probable impacts of other activities affecting the ecosystem of concern.

The purpose of this analysis is to demonstrate that the Recommended Alternative (Structural Alternative 1) would not have unacceptable adverse impacts either individually or in combination with known or probable impacts of other activities affecting the aquatic resources in the project area, thus satisfying compliance with Section 404(b)(1) Guidelines.

1.2 Authority and Scope of Analysis

This study is being conducted under the authority of Section 205 of the Flood Control Act of 1948, as amended. The purpose of the Section 205 program is to implement flood risk reduction measures (structural or nonstructural) to reduce damages caused by flooding. The program focuses on solving local flood problems that are of limited scope and complexity. Projects implemented under Section 205 authority are formulated for flood risk management in accordance with current policies and procedures governing projects of the same type that are specifically authorized by Congress.

In the course of planning studies, consideration of Department of the Army regulatory programs (especially Section 10 of the River and Harbor Act of 1899, Section 404 of the Clean Water Act of 1972 and Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972) would be incorporated into the planning process. Evaluation of the effects of the discharge of dredged or fill material, including consideration of the Section 404(b)(1) Guidelines, is included in an EA, Environmental Impact Statement (EIS) or EIS Supplement prepared for all Corps actions in planning, design and construction where the recommended plan or approved project involves the discharge of dredged or fill material into waters of the United States.

The purpose of this analysis is to demonstrate that the Recommended Alternative would not have unacceptable adverse impact either individually or in combination with known or probable impacts of other activities affecting the aquatic ecosystem, thus satisfying compliance with Section 404(b)(1) Guidelines.

2. Project Description

2.1 Location

The study area is the floodplain of Deadmans Run, a right bank tributary to Salt Creek in Lincoln, Nebraska from the confluence of Salt Creek upstream to 52nd Street (Figure 1). The watershed is a mostly urbanized right bank tributary to Salt Creek, which in turn is a right bank tributary to the Platte River. Deadmans Run begins in the gently rolling hills of suburban eastern Lincoln, Nebraska, located between the Stevens Creek watershed to the east and Antelope Creek watershed to the west. The soils are generally clay or clay loam with modest infiltration rates. Deadmans Run flows northward before entering Wedgewood Lake, a private lake surrounded by homes. Wedgewood Lake has no designated flood storage and limited capacity to attenuate streamflow. Land use is primarily residential, with limited open space. The channel is lined with gabions with undersized bridge crossings by residential streets. At 48th Street, the channel becomes more natural, flowing through the East Campus of the University of Nebraska-Lincoln (UNL) and the floodplain in this reach is not highly urbanized. At Huntington Avenue, the floodplain transitions to primarily industrial land use, and the channel is constricted by a series of road and rail bridges. This lower reach of the watershed is also subject to flooding by Salt Creek as well as by Deadmans Run.

Flooding on both Deadmans Run and Salt Creek is primarily the result of warm season thunderstorms, with flooding or significant high water possible from April into October. Rapid snow melts have historically remained in bank and ice jam flooding has not been a problem within the historical range of information.

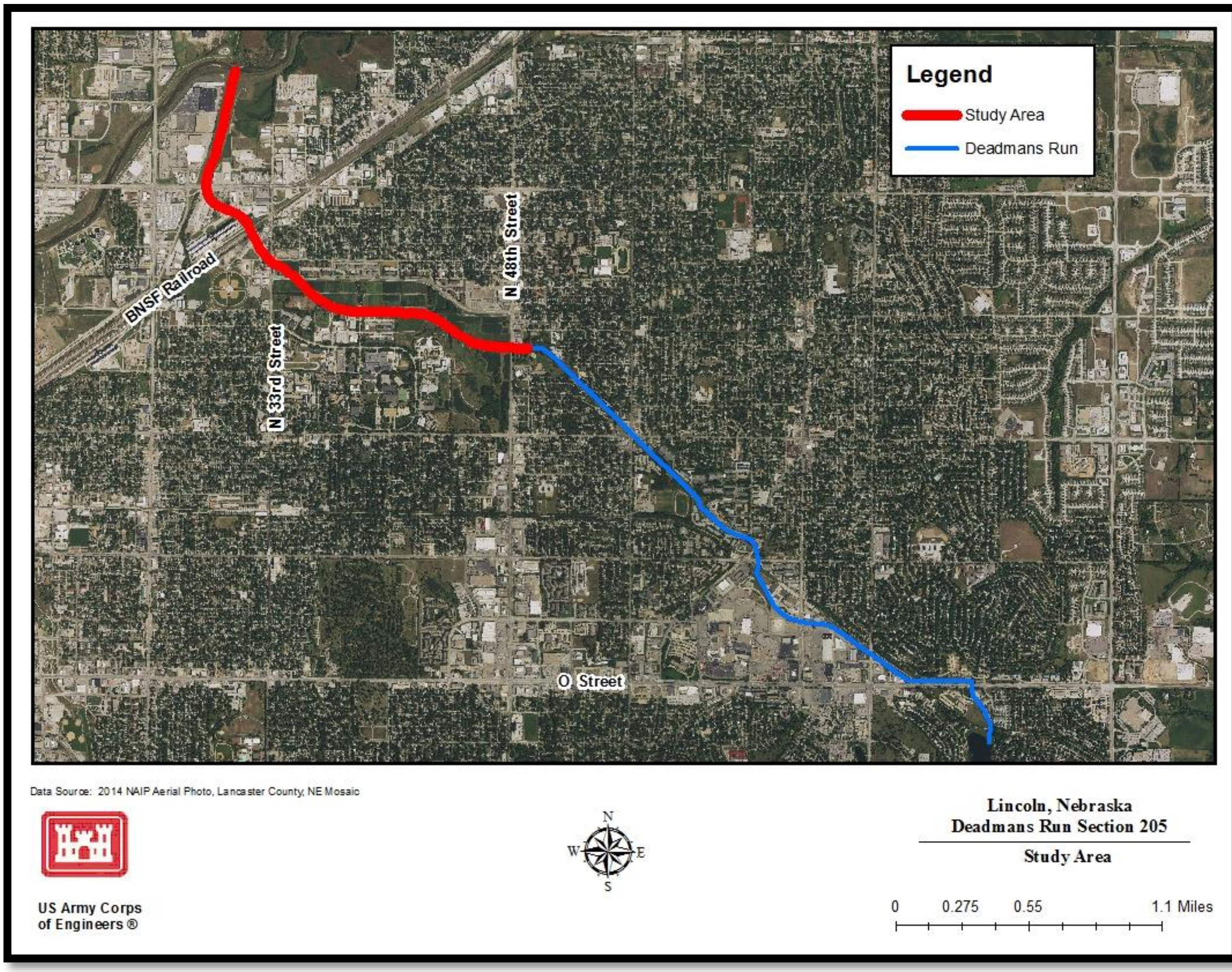

Figure 1. Section 205 Study Area on Deadmans Run in Lincoln, Nebraska

2.2 General Description

As described in the Section 205 Feasibility Report and Integrated EA, the Corps proposes to implement the Recommended Plan- Updated Alternative 1. The Recommended Plan would consist of widening and improving Deadmans Run from Cornhusker Avenue upstream to just east of 48th Street, installation of a concrete flume under the BNSF Bridge and rail spur to improve conveyance, and removal and replacement of an existing concrete mattress with 44,672 tons of rock riprap extending 7,196 linear feet of the project area. The concrete flume will require 18,677 tons of riprap for the spall filter, resulting in a net total 63,349 tons of riprap utilized within the channel.

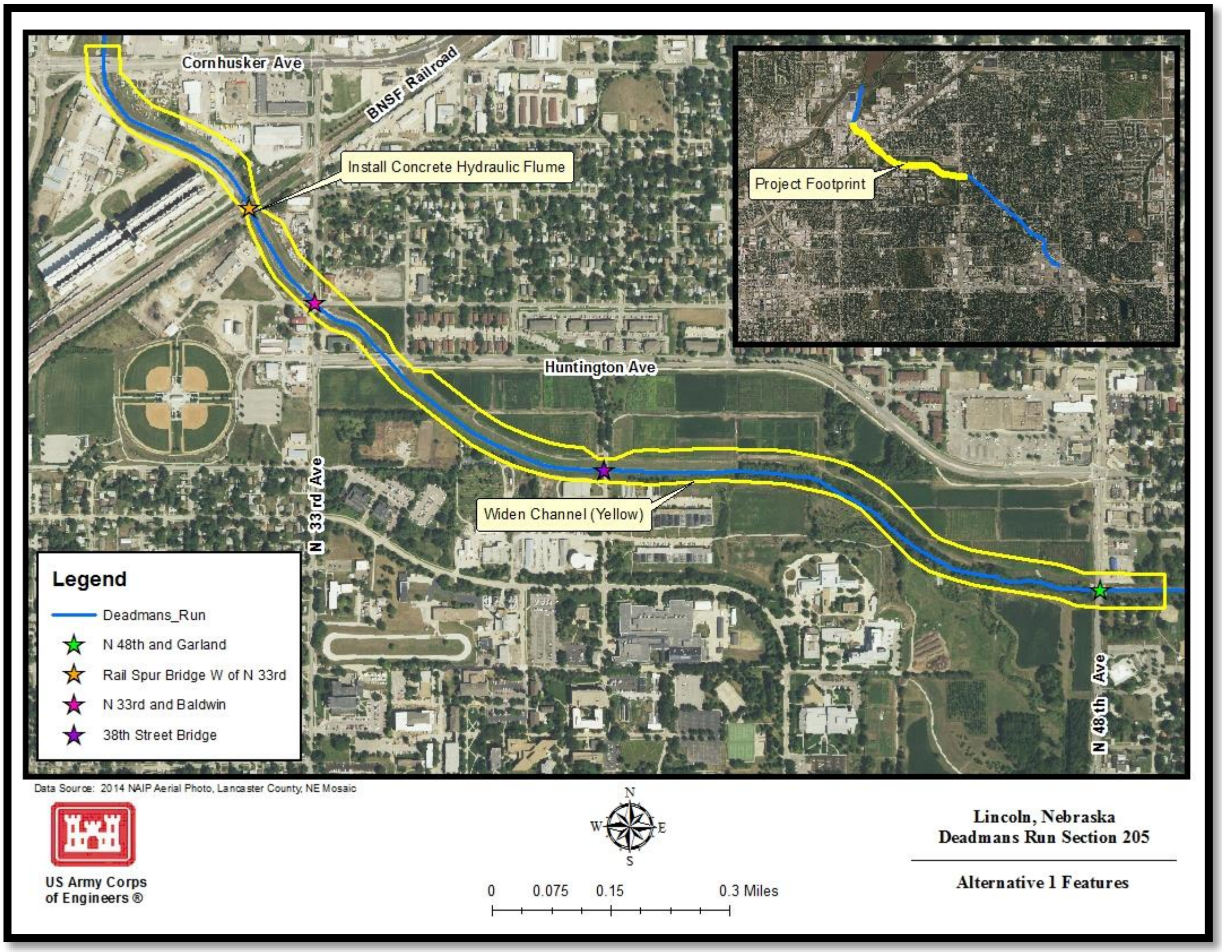

Figure 2. Proposed project components of the Preferred Alternative

Typical cross sections of the existing channel top-width are approximately 120 feet. Utilizing the typical cross section, channel widening would generally enlarge the width of Deadmans Run to an approximate top-width of 177 feet from Cornhusker Highway to 48th Street (see Figure 3). Within the channel widening cross section, a native seed buffer approximately 25 feet would be utilized for native vegetation plantings directly adjacent to the channel. This would equate to approximately 5 acres designated along the channel for native seeding. Additionally, areas designated with a turf reinforced mat will also host native grass species to stabilize the new banks.

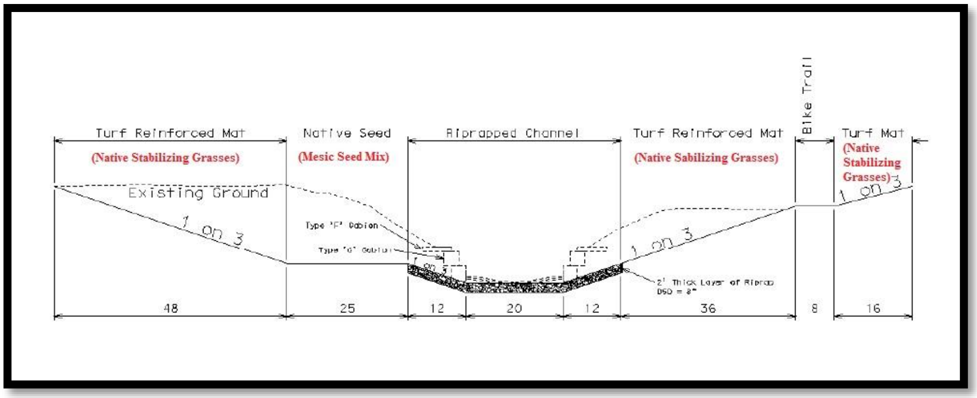

Figure 3. Typical cross-section of channel widening configuration from Cornhusker Avenue upstream to just east of 48th Street.

Several alignment variations of channel widening were discussed for the East Campus portion at UNL where approximately 5 acres of an Eastern Riparian Forrest-classified community on both banksides exists (see Figure 4). The channel widening footprint for Variation I would require the removal of all trees on both the north and south bank, whereas Variation II.a shifts the channel footprint and would require only the removal of the trees on the north bank. Variation II.a was deemed not hydraulically feasible without having to emplace a levee on the north bank near the 38th Street Bridge, or completely removing the 38th Street Bridge. However, as described in Section 4.4 of the main feasibility report, the City of Lincoln have identified the 48th and 38th street bridges for replacement due to their age and condition and having started discussions of replacing the 33rd street culvert with a bridge to accommodate the future Railroad Transportation Safety District (RTSD) project. The City project would be initiated prior to, or during construction of the Section 205 Preferred Alternative. As such, it was determined that with the replacement of the 38th Street Bridge with a wider span, this would only require the removal of the south bank of trees (2.34 acres). The non-federal sponsor will work with the Corps' Regulatory office for a 404 permit for the planned bridge replacements and detention basin construction. See Section 4.4 of the main report for more information on the non-federal sponsor project.

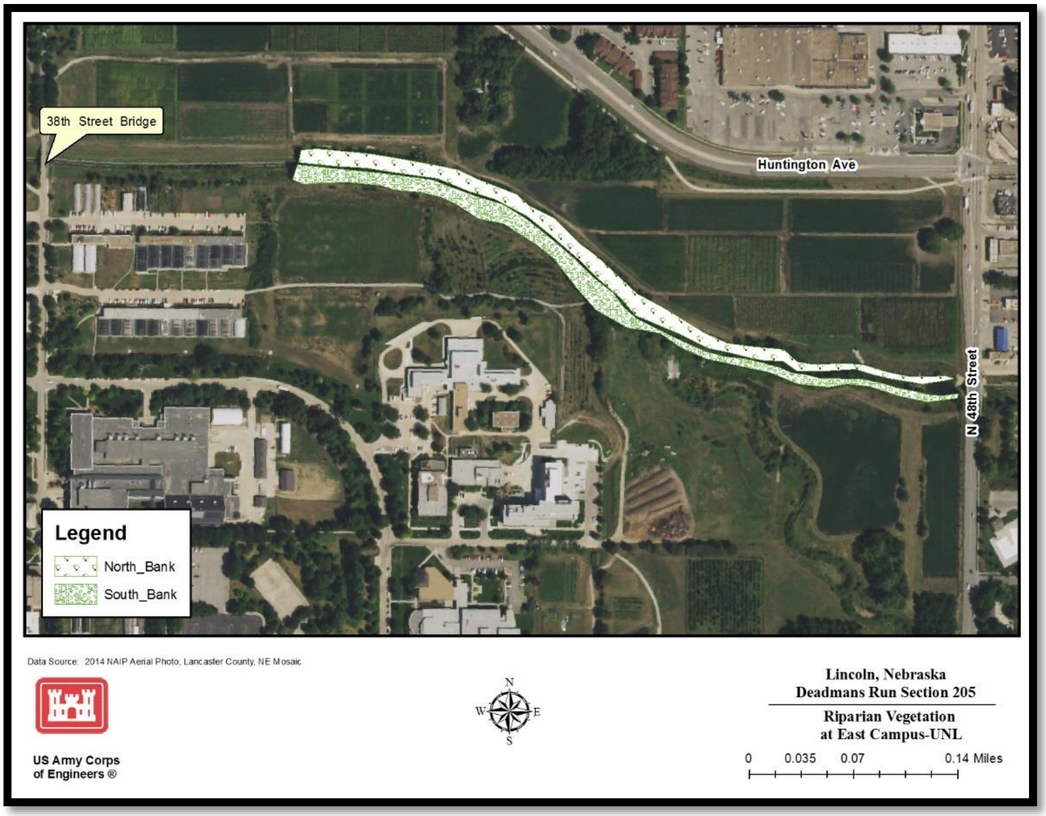

Figure 4. North (left) and south (right) banks of Eastern Riparian Forest classified community at East Campus on Deadmans Run

As shown in the typical cross section for the 2,600 feet of stream length through the Eastern Riparian Forest of East Campus area in Figure 5, tree plantings would be replaced in the upland right-of-way of the channel footprint on the south bank. Replacing trees along this area would result in approximately 1 acre of native tree plantings. These trees would be placed in the upland zone of the new channel footprint as hydraulic modeling has indicated that these new tree plantings would not negatively impact conveyance or induce overbank flooding. These plantings will also replace a semblance of the acreage loss, with higher floristic quality species.

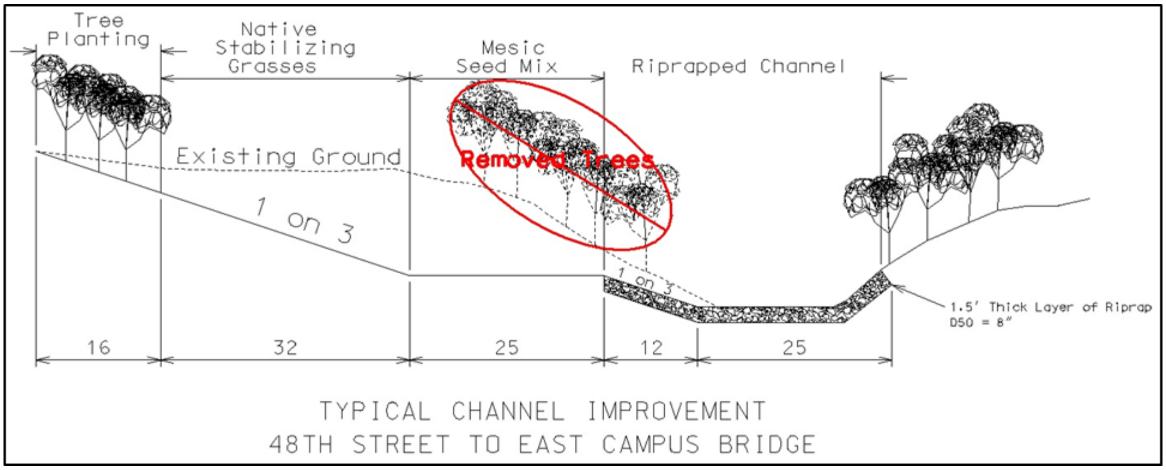

Figure 5. Typical cross section through East Campus, note the upper banks of the channel footprint on the south bank, native stabilizing grasses placed on the reinforced turf mat, the mesic seed mix immediately adjacent to the channel and the undisturbed trees on the north bank.

No impacts are anticipated to occur to wetlands as a result of the Recommended Plan. The closest and only wetland within the study area, a small (approximately .15 acres) emergent wetland approximately 2,800 feet southwest of the N 48th Street and Leighton Avenue intersection on the left (ascending, west) bankline of Deadmans Run (Figure 6), is not within the channel widening footprint.

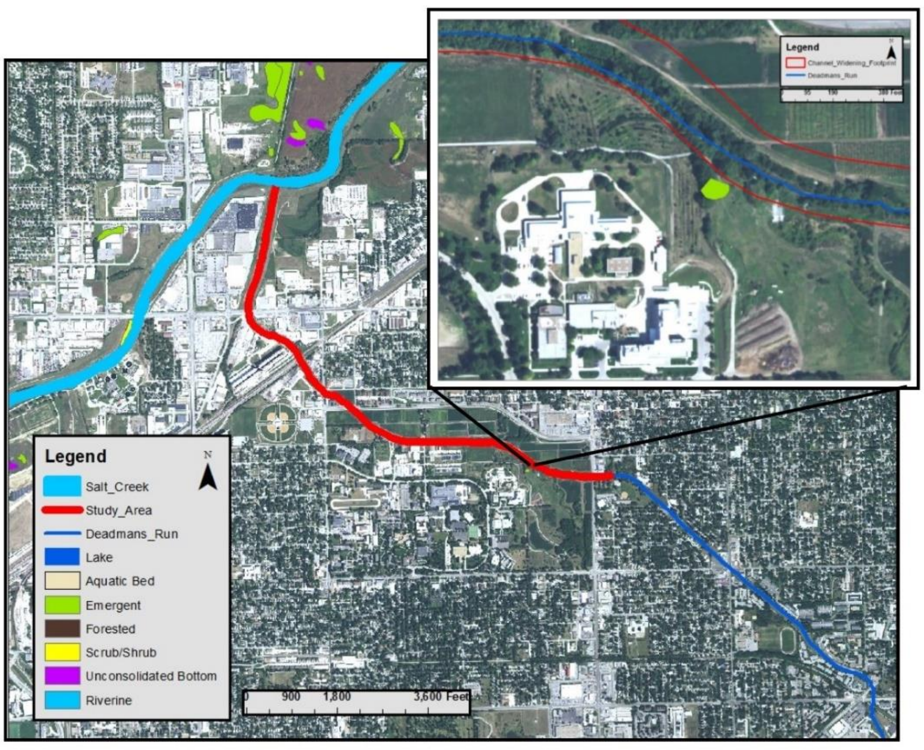

Figure 6. Wetlands within the Deadmans Run and Salt Creek Basins. Note the inset which depicts a small emergent wetland adjacent to Deadmans Run within the East Campus area.

Temporary impacts to the aquatic environment during construction activities would occur as a result of placing a coffer dam bisecting the channel to create a dry workspace. Construction would start at the downstream end of the channel, a coffer dam would be placed upstream and downstream of the work area, and water would be pumped to the upstream side of the most upstream coffer dam. As the construction activities continue, the coffer dams would be moved farther upstream to accommodate a workspace for channel improvement. It is anticipated that this work would span over two construction seasons. Best management practices would be utilized to minimize impacts to the aquatic environment such as installing these temporary barriers during low-flow season and during warmer weather after the potential of winter or early spring peaks have passed. Barriers with earthen fill would be used (such as sandbags, plywood barriers or water-filled bags/tubes).

2.3 General Description of Dredged or Fill Material

Material associated with the project would include clean, earthen silt loam or silty clay loam material mechanically excavated from the banks of Deadmans Run from Cornhusker Avenue upstream to just east of 48th Street, removal of the concrete mattress along the same reach and replacement with clean rock riprap obtained from commercial sources. An estimated 171,000 cubic yards (cy) would be excavated from the banks and hauled offsite to an approved upland disposal location and approximately 63,349 tons of rock riprap would be placed along this approximately 1.4 mile construction footprint reach.

2.4 Description of the Proposed Disposal Sites

Disposal sites for the excavated material would be hauled off-site to an approved upland disposal location. Maximum material anticipated to be excavated from the construction of the recommended plan would total no more than 171,000 cy.

2.5 Disposal Method

The disposal site for excavated material would be hauled off site by the contractor to an approved upland disposal location. No material would be disposed of in wetland areas or Waters of the United States.

3. Factual Determinations- Evaluation of Potential Impacts of Proposed Dredge and Fill Materials

3.1 Physical Substrate Determinations

The substrate of the aquatic ecosystem underlies open waters and constitutes the bed of the Deadmans Run. It consists mainly of silt loam or silty clay loam with minor amounts of organic and inorganic materials, and includes water and other liquids or gases that fill the spaces between solid particles.

No significant impacts to the benthic environment of the Deadmans Run are anticipated to occur from the removal of the concrete mattress and replacement with the rock riprap along approximate1.4 mile streambed. Negligible and long-term impacts would occur to the benthic environment of the approximate 2,600 linear feet through the East Campus area, as this area was not previously hardened. Prior to construction, the water within the channel would be likely be diverted in order to allow for the in-channel work to take place. Silt fencing would be installed prior to any earth work and the placement of rock riprap. The silt fencing would trap any loose particles of earthen material before it is able to reach the waterway. The silt fencing would be removed following project completion. Permanent effects to the physical substrate would be localized to the immediate linear area of the discharge as the riprap placed along the streambed and on the banks during construction would permanently become part of the streambank.

3.1.1 Substrate Elevation and Slope

Negligible and long-term impacts would occur to the streambed elevation and slope due to widening the channel and lowering and grading the banksides to a 1:3 slope. The existing wetland adjacent (Figure 6) to the proposed project area would be avoided as this wetland does not fall within the construction footprint. The Corps has incorporated measures into the design to adequately minimize adverse effects to the substrate elevation and slope. This is in compliance with the Section 404(b)(1) guidelines.

3.1.2 Sediment Type

The sediment type is silt loam to silty clay loam. According to the Natural Resource Conservation Service (NRCS) Web Soil Survey tool the majority parent material is alluvium or loess and the dominant soil type found within the proposed project footprint is classified as Urban-Kennebec Complex.

3.1.3 Dredge/Fill Material Movement

Approximately 171,000 cy of material would be excavated and hauled off site under the recommended plan along the banks of Deadmans Run and approximately 63,349 tons of rock riprap would be placed along the streambed for approximately 1.4 miles. The rock riprap is sized so as to stabilize the channel and would remain in situ. The Corps has adequately minimized dredge/fill material movement and the project is in compliance with Section 404(b)(1) guidelines.

3.1.4 Physical Effects on Benthos

No significant impacts to the benthic environment of the Deadmans Run are anticipated to occur from the removal of the concrete mattress and replacement with the rock riprap along approximate1.4 mile streambed. Negligible and long-term impacts would occur to the benthic environment of the approximate 2,600 linear feet through the East Campus area, as this area was not previously hardened. Prior to construction, the water within the channel would be diverted in order to allow for the in-channel work to take place. Moderate and temporary impacts would occur to the aquatic environment during construction activities as a result of placing a barrier bisecting the channel to create a dry workspace. Construction would start at the downstream end of the channel, a barrier would be placed upstream and downstream of the work area, and water would be pumped to the upstream side of the most upstream barrier. As the construction activities continue, the barriers would be moved farther upstream to accommodate a workspace for channel improvement. It is anticipated that this work would span over two construction seasons. Details of water care and diversion would be further refined in Design and Implementation and provided to Nebraska Department of Environmental Quality when seeking a 401 certification. Best management practices would be utilized to minimize impacts to the aquatic environment, such as installing these temporary barriers during low-flow season and during warmer weather after the potential of winter or early spring peaks have passed. Barriers with earthen fill would be used (such as sandbags, plywood barriers or water-filled bags/tubes). Minimal impacts are anticipated to occur to the benthic aquatic environment as a result of water diversion, as the majority of the project footprint is lined with a concrete mattress and currently provides negligible habitat to benthic aquatic life. However, it is assumed that as the barriers are being installed into the channel, most aquatic life and motile benthos would flee the area as a result of vibration, auditory and visual disturbances from human activity.

Silt fencing would be installed prior to any earth work and the placement of rock riprap. The silt fencing would trap any loose particles of earthen material before it is able to reach the waterway. The silt fencing would be removed following project completion. Permanent effects to the physical substrate would be localized to the immediate linear area of the discharge as the riprap placed along the streambed and on the banks during construction would permanently become part of the streambank. The potential physical effects on benthos are minor and the project is in compliance with the 404(b)(1) Guidelines.

3.2 Water Circulation, Fluctuation and Salinity Determinations

Current patterns and water circulation are the physical movements of water in the aquatic ecosystem. Currents and circulation respond to natural forces as modified by basin shape and cover, physical and chemical characteristics of water strata and masses, and energy dissipating factors.

3.2.1 Water

3.2.1.1 *Salinity*

Not Applicable.

3.2.1.2 *Water Chemistry*

Work on in-channel improvements and construction would likely be conducted during low flow periods such as summer or winter. Before construction would take the water would be temporarily diverted from the immediate work area. Minor, temporary, and localized effects to water chemistry (see below) of the immediate project footprint would primarily include a slight increase in turbidity due to construction activities, and possibly a temporary decrease in immediate dissolved oxygen and increase in temperature; however, these would be minimized by implementation of water quality best management practices (BMPs) such as silt fencing.

3.2.1.3 *Clarity*

A potential for a temporary and minor increase in turbidity could occur within the localized area as the water is diverted during in-channel work. However, this turbidity would quickly fall to levels that would be within the existing water quality conditions and would not adversely impact water quality standards' aquatic life uses designated for Deadmans Run or Salt Creek.

3.2.1.4 *Color*

A minor, temporary change in color is possible due to the potential increased turbidity during construction. Similar to clarity above, any color change would be greatest during the diversion or re-routing of the water back into the channel following construction. Any changes in color would be expected to fall within the range that is within existing water quality conditions and would not adversely impact water quality standards' aquatic life designated uses.

3.2.1.5 *Odor*

No impacts are anticipated.

3.2.1.6 *Taste*

Not Applicable.

3.2.1.7 *Dissolved Gas Levels*

Minor and temporary changes to dissolved oxygen may occur to the diverted water. It is anticipated that the construction would divert the water in segments as it moves through the channel. As one segment of channel work is complete, diverted water would be returned to the channel, and another segment of construction would begin. Dissolved oxygen may become decreased should water temperature increase.

3.2.1.8 *Nutrients*

The alluvial sediments, and associated nutrients within the immediate area could be mobilized during the water diversion or re-routing process. This would be minor and short-term and recommended plan is not anticipated tot adversely impact life forms in the immediate project area or in areas downstream.

3.2.1.9 *Eutrophication*

No impacts are anticipated.

3.2.2 Current Patterns and Circulation

Normal current patterns and circulation would not change as a result of the recommended plan.

3.2.3 Normal Water Level Fluctuations

Normal water level fluctuations would not change as a result of the recommended plan.

3.2.4 Salinity Gradients

Not applicable.

3.2.5 Actions to Minimize Impacts

The Corps has taken steps to minimize impacts that include implementation of project-appropriate construction BMPs. Several measures would be implemented during construction to minimize water quality impacts that would include both structural and non-structural BMPs. Structural BMPs include: perimeter controls such as straw bales and/or silt fencing and earthen berms. Non-structural BMPs would include: keeping heavy construction equipment out of the waterway whenever possible, protecting construction materials from precipitation/flooding and stabilizing bare soil by mulching, re-vegetating exposed soil. Utilizing erosion control to prevent sediment from entering existing wetlands adjacent to the project area is an example of a BMP that would be used to reduce the amount of potential pollutants that reach the water resources adjacent to or downstream of the proposed project area.

3.3 Suspended Particulate and Determination

As noted above, a temporary localized, minor increase in turbidity may occur during the water diversion and re-routing phases of construction. No excavated material would be placed within the channel, wetlands or other Waters of the United States. Suspended particulates and turbidity would increase during construction activities; however, any increases in suspended particulate matter and turbidity resulting from construction activities would be within existing water quality standards. Therefore impacts are limited to the in-channel construction phase. The fish and other aquatic species found in Deadmans Run are tolerant of lower water quality, high turbidity, warm water temperatures and low dissolved oxygen conditions.

3.3.1 Actions to Minimize Impacts

The Corps has adequately mitigated negative impacts through avoidance and minimization. The proposed alignment was designed to avoid existing wetland and vegetation resources to the greatest extent practicable. Excavated material would be hauled to an approved offsite, upland disposal area. No excavated material would be placed in wetlands or Waters of the US. Structural BMPs during construction include: perimeter controls that may include straw bales and/or silt fencing, check dams, earth dikes, and spill containment. Non-structural BMPs would include: keeping equipment out of the waterway whenever possible, protecting construction materials from precipitation, and stabilizing bare soil by mulching, and re-vegetating exposed soil.

3.3.2 Contaminant Determination

Only clean rock riprap would be placed within the Deadmans Run channel. This material would not violate any water quality standards criteria for Nebraska and Title 117 Nebraska Surface Water Quality Standards.

3.3.3 Aquatic Ecosystem and Organisms Determination

Organisms present in the construction area would be most affected by the initial clearing and grubbing activities. Clearing and grubbing activities would occur outside the primary nesting season for migratory birds, so impacts to nesting birds would be avoided. However, resident birds would be displaced, and other organisms could be displaced or killed by clearing and grubbing activities or placement of riprap if they are not able to move out of the way. For reptiles and amphibians, relocation would be highly unlikely during fall or winter. Those organisms that were able to relocate would typically be more susceptible to predation. Placement of excavated material would avoid wetlands and aquatic habitat.

3.3.4 Determination of Cumulative Effects on the Aquatic Ecosystem

No significant negative cumulative effects would be anticipated as a result of the proposed project. A description of the cumulative water quality effects of the recommended plan which involves the removal of the existing concrete mattress on the streambed and replacement of rock riprap on the streambed as well as a portion of the bank sides, and excavation of approximately 171,000 cy of material from the channel is provided in Section 5.1 of the Feasibility Study and integrated EA.

In addition to the channel improvement project undertaken as part of this Section 205 study, an adjacent tributary, Antelope Creek was studied under Section 101(b)(19) of the Water Resources Development Act of 2000 (PL 99-662, as amended) in October 2000. The Antelope Creek Flood Protection project consists of an improved flood conveyance channel reaching from the J Street Bridge to the confluence of Antelope Creek and Salt Creek. The channel is approximately 2 miles long, with a depth of 12 to 30 feet and a constructed top width ranging from 80 to 300 feet and side slopes of 3H:1V. Like the recommended plan at Deadmans Run, the project at Antelope Creek provides flood damage reduction up to the 100-year event, includes vegetated banks and rock riprap protection. It also includes an underground conduit, concrete retaining walls near bridges and a labyrinth weir. It is not anticipated that significant adverse effects would cumulatively occur to the Deadmans Run basin or the overall Salt Creek watershed as a result of past and potential future projects on the tributary system of Salt Creek. Both tributaries have been channelized and are concrete-lined, therefore, current conditions of both streams offer minimal aquatic habitat.

The USFWS has noted concerns in their letter dated January 15, 2016 and an email dated December 7, 2016 (see Biology Appendix A- Section IV: Agency Correspondence) regarding the potential of flow depletions to the Lower Platte River from the proposed project at Deadmans Run as well as the contribution of previous work conducted within the Salt Creek watershed. To address this concern, an analysis was preformed comparing the recommended alternative and existing conditions hydrographs. Deadmans Run, as noted, is an urbanized stream with extensive stabilization and little flow volume/sediment contribution in comparison to the Lower Platte River. It was shown in this analysis that the hydrographs are nearly identical after traveling about six miles down Salt Creek from the Deadmans Run confluence. Therefore, the effects of the Deadmans Run project appear to diminish about six miles into a 30 mile journey to the Platte River. Due to the existing extensive stabilization, urban stream characteristics, and insignificant sediment contribution from Deadmans Run, the proposed project will not significantly alter existing conditions within the Lower Platte River and therefore are anticipated to have no indirect or cumulative impact on channel degradation, and thus no indirect or cumulative effect to interior least tern and piping plover habitat.

Due to the extra capacity of the widened channel on Deadmans Run, flood waters that would have otherwise spilled into the overbanks causing widespread flooding, will now be retained in the flood control channel. The overall volume of water that is released into Salt Creek, and eventually the Platte River, will increase slightly due to less overbank flooding. However, this increase in water volume will occur at less frequent events like the 50- and 100-year flows and not at the more frequent events like the 10- to 2-year flows. The behavior of the frequent events should remain similar to the existing because channel modifications were focused on the higher elevations of the channel to increasing flood conveyance. The Deadmans Run watershed is a small area in comparison with the Salt Creek and Platte River watersheds. Deadmans Run drains less than 10 square miles while the area of the Salt Creek watershed at the United States Geological Survey (USGS) Salt Creek at Lincoln stream gage (No. 06803500), about one mile upstream of the confluence with Deadmans Run, drains 685 square miles. Therefore, if the project on Deadmans Run did create depletions, its overall impact to the Platte River would be minimal and fall within the threshold of the USFWS *de minimus* rule. As the project is designed now, all water drains back to Salt Creek within 24 hours and as such, depletions are not considered a direct, indirect or cumulative effect on the aquatic ecosystem as a result of the recommended plan.

3.3.5 Determination of Secondary Effects on the Aquatic Ecosystem:

Secondary effects are effects on an aquatic ecosystem that are associated with a discharge of dredged or fill materials but do not result from the actual placement of the dredged or fill material. A discussion of secondary impacts has been included where applicable in the Factual Determination Sections above. Secondary impacts would also be associated with the clearing and grubbing of vegetation of the south bank of trees prior to construction. Long-term operation and maintenance of the project would not cause ongoing adverse impacts to wildlife species that inhabit the area. Vegetation impacts would mitigated by planting native stabilizing grasses, wetland-mesic prairies seed mixes and tree plantings on disturbed areas. Temporary construction impacts to local wildlife would occur in the form of noise, disturbance and displacement. Upon completion of the recommended plan, wildlife would likely return to the area. Clearing of trees and brush would occur outside of the primary nesting season for migratory birds as well as outside of the time frame northern long-eared bat maternity colonies have the potential to be present.

It is not anticipated the proposed project would result in significant secondary effects on the aquatic ecosystem. The Corps has taken appropriate steps to avoid and minimize potential secondary effects or indirect effects by including pre- and post-construction monitoring plans for water quality, biological response, and engineering performance, and BMPs during construction.

3.4 Findings of Compliance or Non-compliance

a) There are no less environmentally damaging practicable alternatives that would fulfill the overall purpose of the project.
b) Our review of water quality standards established by the State of Nebraska indicates that the proposed discharge would not violate any applicable state water quality standards.

c) The proposed project would not result in significant adverse impacts to human health and welfare, including municipal and private water supplies, recreational and commercial fishing, plankton, fish, shellfish, wildlife or special aquatic sites.
d) All appropriate steps to minimize adverse environmental impacts have been taken.
e) The proposed project would not jeopardize the existence of federally-listed endangered or threatened species or their habitat. The purpose of the proposed project is to restore habitat for the endangered pallid sturgeon and other native species.
f) No significant adaptations of the guidelines were made relative to this evaluation.

4. Conclusions

Based on all of the above, the proposed project is determined to be in compliance with the Section 404(b)(1) guidelines.

U.S. Army Corps of Engineers
Omaha District

Section 205: Deadmans Run Environmental Analysis

Comparative Analysis of Baseline Conditions to "With Project" Conditions and the Associated Environmental Impacts

August 2018

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APPENDIX

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1 Introduction

The Nebraska Stream Condition Assessment Procedure (NESCAP) was the selected habitat assessment tool to assess baseline environmental conditions for the Section 205 Deadmans Run Project. On May 22, 2015, a reconnaissance site visit was conducted to determine the overall project setting. Supplemental site visits were conducted on June 5 and July 24, 2015 to collect data for the model parameters described in the sections below.

2 Procedure Overview

NESCAP is a hydrogeomorphic assessment method that measures thematic variables for the major physical, ecological and anthropogenic factors that can strongly influence stream and adjacent riparian systems. The minimum assessment area used for this method includes the bankfull stream channel and active floodplain. The six variables utilized in this method are as follows:

- V_1- Hydraulic Conveyance and Sediment Dynamics
- V_2- In-stream Habitat/Available Cover
- V_3- Floodplain Interaction-Connectivity
- V_4-Riparian Vegetation Composition
- V_5- Riparian Buffer Continuity and Width
- V_6- Riparian Land Use

Each variable receives a Condition Index Rating (CIR) between 0.10 and 1.00 based on conditions observed or measured at the project site in conjunction with off-site information. The most degraded, culturally disturbed conditions are assigned a 0.10, and the reference standard condition is assigned a 1.00. Conditions not measured or observed may receive a CIR of 0.0. If a given variable is non-applicable, the variable may be completely omitted from scoring from a particular River Reach (RR), and thus receive a "NA". The RR is an aggregated assessment unit, which is defined laterally as a segment of a mainstem stream channel and adjacent riparian ecosystem that is relatively homogenous in terms of geomorphology, soils, hydrology, channel morphology, vegetation and cultural alteration. The RR includes the bankfull stream channel, active floodplain and the less frequently flooded, historical floodplains and terraces.

Once each RR has been assessed with applicable variables, a finalized Stream Condition Index (SCI) is calculated. The SCI is defined as the sum of the scores for the rated variables divided by the maximum sum of the scores for the variables rated, where: $SCI = \frac{\Sigma V}{\Sigma Vmax}$. The resultant SCI (habitat quality) for the given RR is then multiplied by stream lengths or area (habitat quantity) for a unit-less weighted score.

2.1 Variables

Below is a description of variable parameters. V_1 and V_2 assess channel and bankfull width, with emphasis being on channel stability, sediment transport and the interface of the channel with the immediate overbank area and morphological conditions that influence habitat diversity. The remaining four variables (V_3 thru V_6) assess the interaction of fluvial processes as it affects riparian system dynamics.

2.1.1 V_1 Hydraulic Conveyance and Sediment Dynamics

Hydraulic conveyance and sediment dynamics address fluvial processes for the active channel within the RR. Altered hydraulic conveyance (AHC) is used in the description of this variable to indicate the degree to which engineered techniques have been utilized to "improve" the capacity of channels to convey surface water. Engineered techniques which lend to AHC reduce frictional resistance (roughness) which is caused by channel substrate, vegetation, woody debris and other objects in the channel, thus limiting the wetted perimeter. Specific techniques include straightening, hardening/lining and removal of vegetation. All these techniques have been utilized extensively at Deadmans Run lending to overall habitat degradation and long-term environmental impacts. When the continuity of sediment transport is interrupted by activities such as techniques listed above, the flow may become "sediment-starved," which enhances erosion to the channel bed and banks.

For this variable to receive a favorable reference standard condition rating of 1.00, movement of sediment in the channel must be considered in equilibrium in terms of supply, erosion, deposition and accretion. The channel is stable, no active down-cutting is observed or less than 5% of the channel within the RR is considered AHC. The majority of the data collected on Deadmans Run shows a CIR of 0.10, this metric depicts highly disrupted hydrology and corresponding sediment dynamics. The channel is deeply incised, with little to no riparian habitat occurring, excessive down-cutting and greater than 50% of the RR with AHC.

2.1.2 V_2 In-stream Habitat/Available Cover

The biological components of riparian ecosystems have adapted episodic cycles of disturbance and developed a variety of mechanisms to survive and flourish where other species cannot. The type, amount and temporal availability of in-stream habitat influence a variety of life history requirements for aquatic species, such as shelter, food and reproductive areas. Natural structures in streams, such as large rocks or cobble which cause riffles and pools, fallen trees, persistent leaf packs and undercut banks provide refugia or function as feeding and spawning sites as well as contributing to niches which leads to overall habitat diversity.

For this variable to receive a 1.00 rating, the floodprone area must be designated by greater than 50% coverage of diverse habitat features favorable for stream faunal colonization and maintenance of vegetative dynamics for recruitment. These features may include snags, submerged logs, undercut banks, roots, cobble and rocks, leaf packs, pools or other stable habitat at a stage which allow colonization. A severely degraded rating of 0.10 is mostly applicable to Deadmans Run where the channel bottom is hardened and flat, and the habitat features mentioned above are relatively non-existent.

2.1.3 V_3 Floodplain Interaction-Connectivity

Floodplain interaction-connectivity indicates the degree to which the hydrologic interaction between the bankfull channel and active floodplain remains intact. Connectivity is the degree to which water, organisms and suspended elements and compounds move across the fluvial system landscape and is based on the presence/absence of barriers. The assessment area is the floodprone area and abandoned floodplain/terraces. Figure 1 below depicts stream condition classes during the six stages of channel evolution and is used as a resource to determine CIR for this variable. Most data points at Deadmans Run had a Class II or Class III condition.

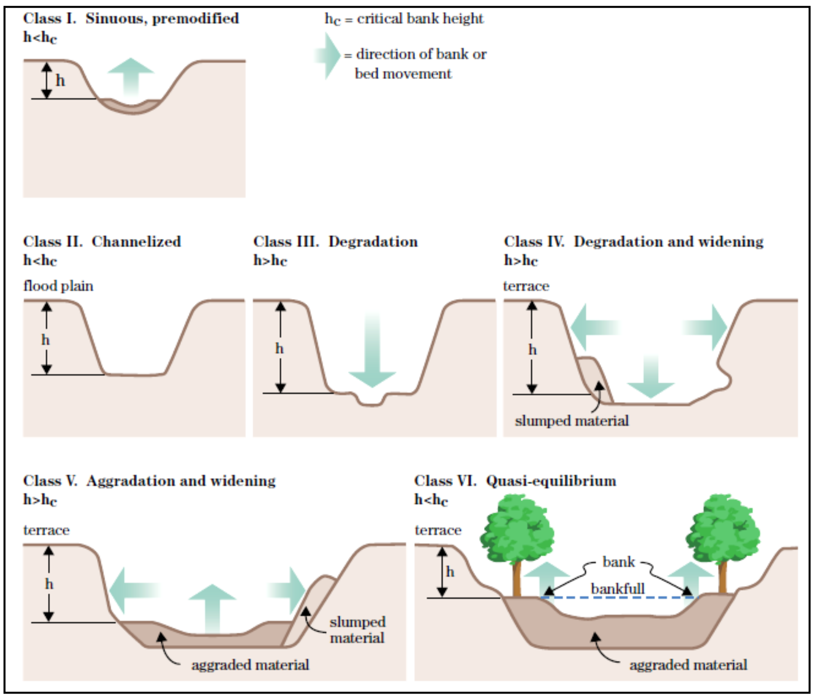


Figure 1. The six stages of channel evolution, derived from Simon 1989 and Natural Resource Conservation Service 2010.

When assigning this variable a CIR, V_1 and V_2 should be taken into account as well as observable indicators. To receive a 1.00, the floodplain must not be physically manipulated, no surface alterations such as dams, dikes, diversions or concrete lining may be present. A severely degraded CIR is indicative of complete geomorphic modification to the floodprone area which restricts channel movement and prevents overbank flow. Most of Deadmans Run is considered to be severely degraded for this variable and received a CIR of 0.10 or in some cases a 0.25.

2.1.4 V_4 Riparian Vegetation Composition

This variable is a response to both natural and anthropogenic disturbance. Plant communities are identified and diagnostic species are used to classify composition. Assessment of vegetation is conducted by determining dominance from field observation and follows the rapid test and dominance test described in the Regional Supplement to the Corps' 1987 Delineation Manual (USACE, 2010a; 2010b). Vegetation characterizations are stratified by observations above the floodprone area (V_{4a}) and below the floodprone area (V_{4b}).

For this variable to receive a 1.00 CIR, diagnostic species dominance is greater than 95%, minimal management would be required to preserve natural processes and no chronic anthropogenic disturbances are evident. At the most degraded vegetative communities, dominant plants observed with diagnostic species is noted between 5% and 25%, native vegetation is largely absent and the area is hardened (urbanized) or graded. The majority of Deadmans Run is concrete lined, highly urbanized and comprises of invasive or non-native vegetative species.

2.1.5 V_5 Riparian Buffer Continuity and Width

Riparian ecosystems typically form a relatively continuous corridor along the stream channel and floodplain. Continuity, for the purposes of this assessment variable, is the estimated percentage of the perimeter which is bordered by permanent vegetation. Average width is estimated based on areas where a buffer of permanent vegetation is present and is measured perpendicular from the top of the bank laterally out to 100 feet. Aerial photography was used to estimate the boundary and the results were field verified. The following table is used to determine the CIR:

Table 1. V_5 Buffer and continuity width with associated variable score

V_5 Riparian Buffer Continuity and Width

	Continuity (%)	100	80-99	60-79	40-59	20-39	5-19	<5
Width(ft)	≥100	1.00	0.90	0.70	0.50	0.30	0.15	0.00
	75-99	0.80	0.75	0.60	0.40	0.25	0.10	0.00
	50-74	0.60	0.50	0.50	0.30	0.20	0.10	0.00
	25-49	0.40	0.30	0.30	0.20	0.15	0.05	0.00
	10-24	0.20	0.20	0.15	0.10	0.10	0.05	0.00
	5-9	0.10	0.10	0.10	0.05	0.05	0.01	0.00
	<5	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Corresponding Summary Rating with Variable score:

If summary rating is between :	Assign the following Condition Index Score:
0.80 - 1.00	1.00
0.60 - 0.79	0.75
0.40 - 0.59	0.50
0.20 - 0.39	0.25
0.01 - 0.19	0.10

0.00 - OR No buffer of permanent vegetation is present = 0

As depicted in the table above, to receive a reference standard CIR of 1.00, buffer and continuity- percent must be ≥80%. This variable may receive a value of 0.00 if no vegetative buffer is present. Only three of the 10 data points had a riparian vegetative buffer.

2.1.6 V_6 Riparian Land Use

Land use refers to how a tract of land is utilized, has been developed or the type of vegetation that is present. As is true for V_5, the assessment area is defined laterally as a distance of 100 feet from the top of the bank. General land use classes and associated weights are depicted in Table 2 below. Each bankside is assigned a CIR and the weighted scores are summed and divided by the total area to give the RR a weighted average CIR.

Table 2. V_6 Land use category and corresponding weight and condition rating

Land Use Category	Land Use Weight
Impermeable Surface	1
Feed Lot	1
Row Crop or Small Grain	3
Farmstead	6
Woodlot/Shelterbelt	6
Perennial Cover (of any type)	8
Managed for Native Vegetation Cover/Diversity	10

It is important to note that for V_6 land use categories range from most intensely managed (impermeable surface) to least intensely managed (managed for native cover/diversity). The majority of Deadmans Run within the riparian buffer zone (lateral distance of 100 feet from the top of each bank) is mowed turf grass. For this assessment, it was assumed managed turf grass was in the farmstead land use category.

2.2 Stream Assessment Area

The overall stream area, which is multiplied by the calculated SCI at a given location, is defined by multiplying the width of the stream by the left descending bank height and is measured in square feet (sq ft). This quantifies the stream quality for comparison of baseline existing conditions to changed conditions as a result of alternatives. Essentially, this SCI-area represents the total quality of a quantified area.

2.3 Assumptions and Limitations

Some assumptions were applied while using this model assessment tool to quantify and qualify habitat at Deadmans Run in recognition of limitations, and in some cases, the sensitivity (or lack thereof) of a measured variable to a condition. Operational models include only a representative subset of variables required by theoretical definitions of suitable stream functionality. It is noted that a model user should be consistently aware of operational and theoretical definitions (real-word verses desktop).

For Deadmans Run, when characterizing the flood prone areas, both the location of the basin and the flood frequency were considered. While NESCAP recommend that a flood prone area is ideally defined as two-times (2X) the bankfull area, Deadmans Run at most data collections sites exhibited the same elevation for both flood prone and bankfull assessments area. This is due to the highly altered hydraulic conditions and adjacent landuse. In the lower basin of Deadmans Run, near its confluence with Salt Creek, flood prone and bankfull areas are influenced by the restricted hydraulic capacity of the 33rd Street and Baldwin Avenue Bridge and the BNSF Bridge, as well as backflows from Salt Creek. Through the East Campus area of Deadmans Run, influences on flood prone and assessment areas include hydraulic restrictions from the 48th Street Bridge. Upstream of the East Campus area, the flood prone area and bankfull area tend to remain in the channel as there is less restriction from bridges.

Corresponding with the above assumption of similar elevation of flood prone and bankfull areas, it is assumed that the mean annual flood does not exceed a 2/3 bankfull elevation as it has less than a two-year return period frequency. A riparian community is not expected to thrive where inundation is that infrequent. Therefore, for the V_{4a} and V_{4b} variables, riparian vegetation composition is going to be restricted to elevations below the 2/3 bankfull elevation for existing conditions.

Limitations of the model, specifically applicable to the environmental setting at Deadmans Run, include no distinguished value or weight assigned to stratum layers (*e.g.* mature tree stands hold no more habitat value than grasses). Only native dominant indicator species are assessed in order to describe vegetation composition and major plant associations for Nebraska riparian and wetland communities. It is left up to the project team, in coordination with resource agencies and other stakeholders to determine if one stratum is desired over another. Because the stream is situated in a highly urbanized setting, indicator species and expected riparian communities are not overly present. Within riparian zones, hydrological, geomorphological and ecological process interact strongly, generating a dynamic landscape that is characterized by a mosaic of habitat. There are important feedbacks between standing vegetation and fluvial process, which have an impact on the character and dynamics of the riparian habitat mosaic. Thus, naturally functioning riparian systems show high biodiversity and production, act as important ecological corridors that provide refugia and dispersal pathways for fauna, attenuate floods and moderate water balances by retaining runoff and increasing rates of infiltration and evapotranspiration. Naturally functioning riparian zones are highly heterogeneous and disturbed environments, and as such, vary greatly in time and space. This inherently provides a challenging environment for plant colonization, and of the wide range of plants that grow in riparian zones, riparian shrub and tree species are particularly important for river morphodynamics. Large wood (living and dead) plays an important role in protecting river banks, reinforcing floodplains and creating and stabilizing landforms on which new woody vegetation can form (Camporeale et al., 2013). Trees and shrubs have been shown to play an important role in providing microclimate modifications and shading, streambank stabilization, inputs of organic litter and woody debris to aquatic systems, water and nutrient runoff cycling, wildlife habitat and general foodweb support for a wide range of both aquatic and terrestrial organisms (Sweeney, 1992).

In addition, the assumption to elevate a tree stratum to a higher qualitative value over an herbaceous or shrub layer for this analysis at Deadmans Run was based on key knowledge of historic site conditions that have been altered. Prior to urbanization, the historic landscape at the project site was considered an Eastern Riparian Forest. This community is occurs in floodplains and lower terraces of rivers and larger streams within the channels of large rivers which are occasionally to infrequently flooded. Soils are moderately well-drained to poorly drained sands, sandy loams, loams and silt loams formed in sand, silt or clay alluvium. This community has a state rank of S3. This rank, as defined by the National Heritage Program, is “State Vulnerable”, due to a restricted range and relatively few populations, recent and widespread declines and other factors make this community vulnerable to extirpation (Rolfsmeier and Steinauer, 2010). Thereby, it is reasonable to assume for this urbanized project site, that mature stands of native trees would have an increased weight in the model compared to other vegetative stratum.

3 Methods

The nearly 7-mile urbanized stretch of Deadmans Run was classified into five RR segments based on surrounding features from an initial desktop analysis. Because Deadmans Run is such a highly altered and degraded system, RRs were broken up depending on whether or not the channel was lined with concrete or unimproved (see Figure 2). Three RRs were determined to be more “natural” based on the lack of armoring, RR 1, RR 3 and RR 5. RR 2 and RR 4, which were concrete-lined, comprised the majority of Deadmans Run, RR 2 was approximately 6,230 feet in length, and RR 4 was twice a long at approximately 13,700 feet.

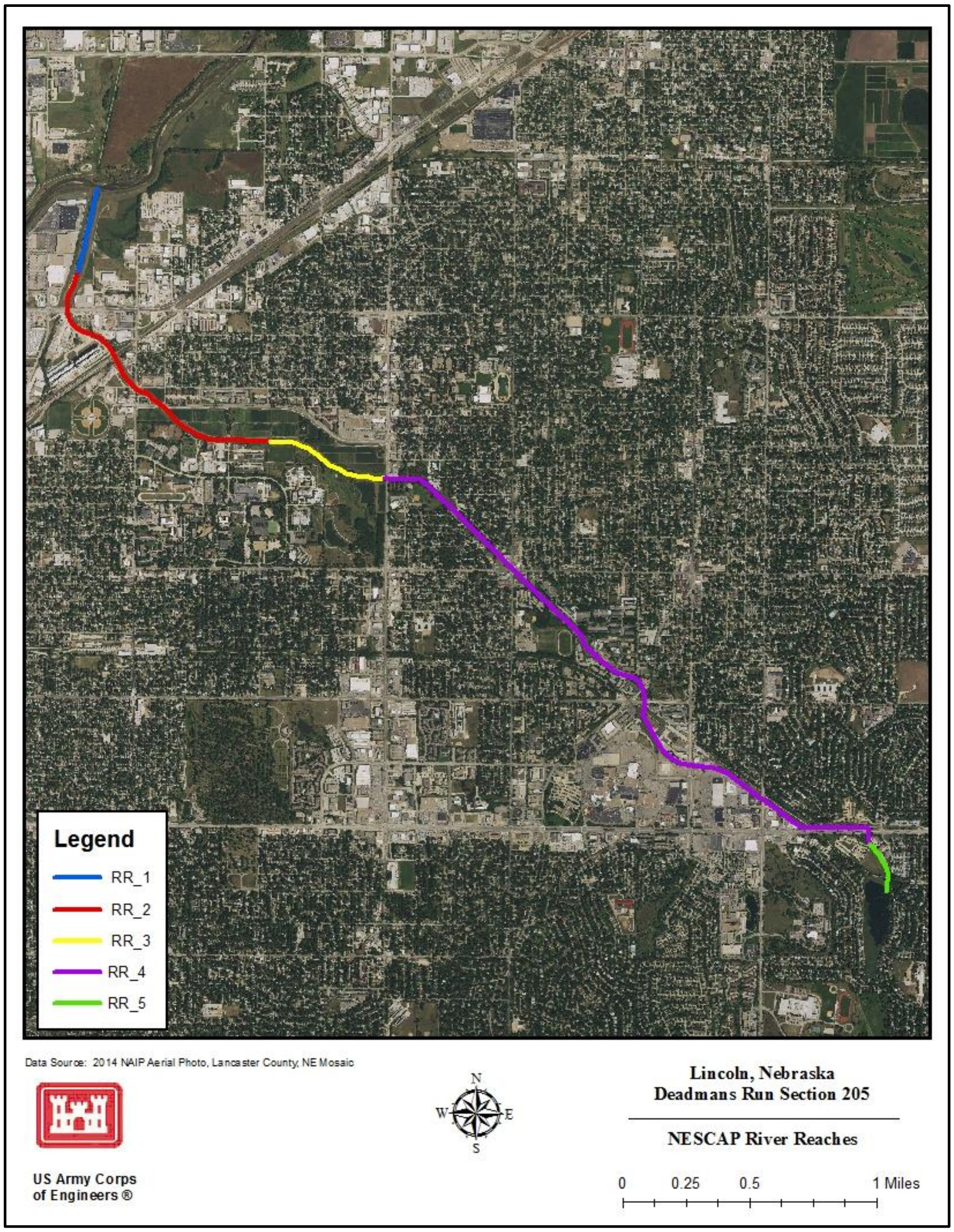


Figure 2. Deadmans Run five river reaches. River reaches defined based on presence or absence of hardened, armored banks.

Within these five RRs, a total of 10 data points were placed within the segments (see Figure 3). These data points were areas where a cross section would be selected to collect data on the six defined variables of NESCAP (see section 2.0 for a description of variables). Utilizing ArcGIS and aerial photography, data points were placed strategically to receive a representative dataset. Because the stream is so degraded and the adjacent area is highly urbanized, the sample point locations were selected to capture the relatively small portions of Deadmans Run which do provide some habitat and environmental benefit.

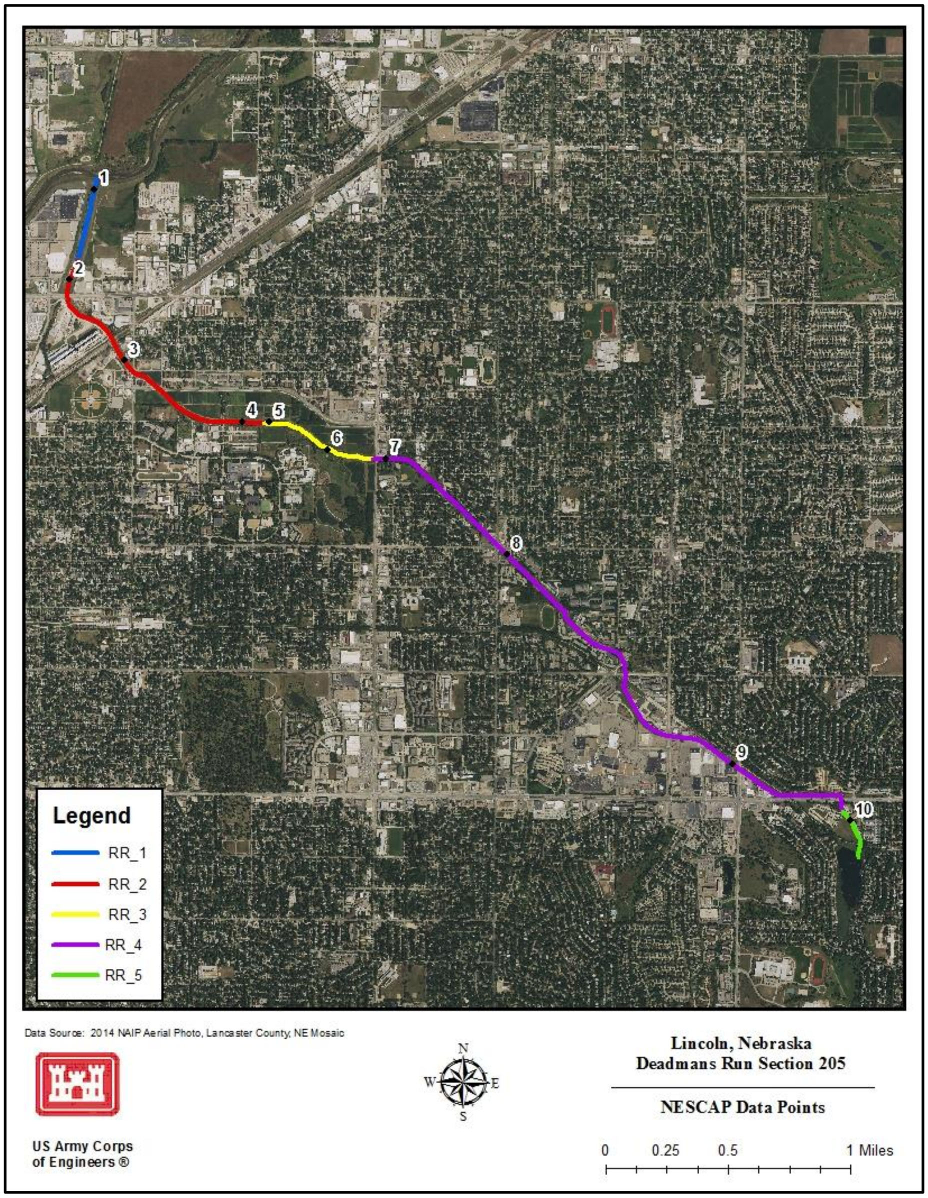


Figure 3. Data collection locations established along Deadmans Run**

**As the study progressed, it was determined that the proposed project footprint where any alternatives would impact the channel only include data points 3, 4, 5, 6 and 7 within RR 2, RR 3 and RR 4. Therefore, DPs 1, 2, 8, 9 and 10 are located outside of the proposed project footprint and these data points will be removed from future with project analysis, nomenclature of data points will remain the same.

4 Results for Existing Conditions and Future without Project

4.1 Existing Conditions

The data below represent the existing, baseline conditions of Deadmans Run. Baseline conditions are established to provide a reference for comparison of formulated alternatives for flood risk management reduction measures. It is assumed for this project that Future without Project (FWOP) conditions would remain generally the same, and thus, the baseline results are also extrapolated as the FWOP conditions. As depicted in

Table 3 below, Data Point 5 and 6 collection sites exhibited the overall highest SCI rating with 0.41 and 0.46, respectively. These data sites are within the East Campus area of the University of Nebraska-Lincoln's agricultural campus. As expected, the RRs that were not gabion-lined or concrete armored had higher SCIs than gabion-lined/concrete armored RRs. The average baseline SCI for the entire stretch of Deadmans Run is 0.22, which is indicative of a highly degraded condition. The total area was 5,208 sq ft. This value was multiplied by the cross-section areas to give a SCI/area value of 1,145.76 feet. The average baseline SCI for only data points 3, 4, 5, 6 and 7 which are located within the proposed project footprint is 0.26. The total area assessed was 2,327 sq. ft. This value was multiplied by the SCI to give the SCI/area value of 601.7 sq. ft. It is important to note that while data points 1, 2, 8, 9 and 10 remain in the existing conditions discussion, they will not be brought forward to assess in the impact analysis. It was decided to leave data collected in the existing conditions in order to give the reader other reference points on Deadmans Run. These data points are assumed to not change from existing conditions as a result of the proposed project. Cross sections and raw data are available in Appendix I of this document.

Table 3. Baseline CIR assignments for six defined variables of the 10 established data points along Deadmans Run. Note DPs 3, 4, 5, 6 and 7 are only in the project footprint, however, previous data collected on DPs 1, 2, 8, 9 and 10 remain in the existing conditions to reference to the reader other site conditions along Deadmans Run.

		RR_1	RR_2			RR_3		RR_4			RR_5
Variable	**Baseline (Pre project)**	DP_1	DP_2	DP_3	DP_4	DP_5	DP_6	DP_7	DP_8	DP_9	DP_10
1	Hydraulic Conveyance and Sediment Dynamics	0.25	0.10	0.10	0.10	0.25	0.25	0.10	0.10	0.10	0.25
2	In-stream Habitat/Available Cover	0.50	0.10	0.10	0.10	0.50	0.50	0.10	0.10	0.10	0.25
3	Floodplain Interaction-Connectivity	0.10	0.10	0.10	0.10	0.25	0.25	0.10	0.10	0.10	0.25
4a	Riparian Vegetation Composition	0.10	0.10	0.10	0.10	0.10	0.25	0.10	0.10	0.10	0.10
4b	Riparian Vegetation Composition	0.25	0.25	0.10	0.25	0.75	0.75	0.10	0.10	0.10	0.10
5	Buffer continuity & Width	0.50	0.10	0.10	0.10	0.50	0.75	0.10	0.10	0.10	0.25
6	Land use adjacent to Active Flood plain zone	0.50	0.25	0.25	0.50	0.50	0.50	0.25	0.25	0.25	0.25
Stream Condition Index		0.31	0.14	0.12	0.18	0.41	0.46	0.12	0.12	0.12	0.21
Left descending bank -Length (ft)		50	44	33	13	32	38	8	28	13	15
Right descending bank -Length (ft)		56	85	50	41	52	55	9	27	33	8
width (ft)		23	18	18	7	19	23	20	18	15	16
Area		1,150	792	594	91	608	874	160	504	195	240
Stream condition Index * area		361.43	113.14	72.13	16.25	247.54	405.79	19.43	61.20	23.68	49.71

4.1.1 Data Point 1

As indicated in Figure 3 above, Data Point 1 (DP1) is located near the confluence of Deadmans Run and Salt Creek in an unarmored portion of the bankline. Baseline conditions assessed based on field and desktop analysis conclude a total SCI of 0.31. Hydraulic conveyance and sediment dynamics (V_1) received a CIR of 0.25. Conditions noted under this variable included sediment erosion and deposition out of equilibrium, accelerated bank erosion (see Figure 4), bank slumping, and vegetation present consisted of primarily pioneer/ruderal species.

Figure 4. Bank erosion at DP1. Standing on the east bank, oriented west.

DP1 received a 0.50 CIR for in-stream habitat/available cover (V_2) as it was determined that within the floodprone area approximately 25-percent coverage of habitat features such as large and downed woody debris favorable for stream faunal colonization and/or cover was present. Short-nosed gar (*Lepisosteus platostomus*), common carp (*Cyprinus carpio*) and unknown minnow species fish schools were observed at DP1. Floodplain interaction/ connectivity (V_3) received a CIR of 0.10, as complete geomorphic modification to the floodplain has occurred; however, occasional overbank flooding still occurs and the current stage of the channel indicated a Class III condition (reference Figure 1 for channel Class Conditions) .

Plant species present below the floodprone area (V_{4b}) and above the floodprone area (V_{4a}) are listed in Table 4 below. Utilizing the 50/20 dominance test (as described in the Regional Supplements to the Corps' 1987 Delineation Manual [USACE, 2010a;2010b]), V_{4a} was determined to be a Japanese brome (*Bromus japonicus*)-dominated community and V_{4b} was determined to be a reed canarygrass (*Phalaris arundinacea*)/Japanese brome-dominated community. V_{4a} received a CIR of 0.10, percent concurrence of dominant plants with diagnostic species observed is below the minimum 25% requirement for diagnostic species, vegetation composition is dominated by invasive and/or ruderal species and the existing riparian habitat is severely degraded. For V_{4b}, while percent concurrence of dominant plants with diagnostic indicator species was below the minimum 25% requirement, it received a CIR of 0.25. Rationale used for assigning the 0.25 CIR verses the 0.10 rating was that the area at this location is not hardened, and native vegetation does occur in localized patches.

Table 4. Riparian vegetation composition (V_{4a} and V_{4b}) of DP1.

V4a				V4b			
	Absolute % cover	Dominant Species (Y/N) (50/20 Rule)	Native Species (Y/N)		Absolute % cover	Dominant Species (Y/N) (50/20 Rule)	Native Species (Y/N)
TREE STRATUM							
-	-	-	-	*Fraxinus pennsylvanica*	10	N	Y
-	-	-	-	*Acer saccharinum*	5	N	Y
SAPPLING/SHRUB STRATUM							
-	-	-	-	*Fraxinus pennsylvanica*	15	N	Y
-	-	-	-	*Acer saccharinum*	5	N	Y
-	-	-	-	*Populus deltoides*	2	N	Y
HERB STRATUM							
Bromus japonicus	80	Y	N	*Ambrosia trifida*	20	N	Y
Festuca spp.	25	Y	N	*Phalaris arundinacea*	75	Y	N
-	-	-	-	*Conium maculatum*	10	N	N
-	-	-	-	*Acer saccharum*	2	N	Y
-	-	-	-	*Echinochloa crus-galli*	7	N	N
-	-	-	-	*Bromus japonicus*	40	Y	N
WOODY VINE							
Vitis spp.	3	N	Y	*Vitis spp.*	5	N	Y
Convolvulus arvensis	10	N	N	-	-	-	-

By utilizing the formula in Table 1 of Section 2.5.1, riparian buffer continuity and width (V_5) received a CIR of 0.50 as no riparian vegetative buffer existed within the 100 feet lateral assessment area above the bankline. Adjacent land use (V_6) within the 100 feet lateral assessment area above the bankline consisted of mowed turf grasses, with a levee and a portion of a row crop field on the east bank. Because mowed turf grass is considered perennial cover of any type, the two banks were averaged together to produce a CIR of 0.50. The total area for DP1 was 1,150 sq. ft. That area is multiplied by the SCI value to give DP1 a SCI-area value of 361 sq. ft.

4.1.2 Data Point 2

Data Point 2 (DP2) is in RR 2 as bank stabilization and rock rip-rap methods were on the west bank (see Figure 5). This DP was located adjacent to the Cornhusker Highway bridge crossing. Total baseline condition SCI rating of DP2 was determined to be 0.14. V_1 received a CIR of

Figure 5. Bank stabilization (rock rip-rap) shown on the west bank. Standing on the east bank looking southwest.

0.10, sediment transport is out of equilibrium along the whole of Deadmans Run, but it may be important to note that there is slightly better local sediment transport in areas where the streambed is not concrete-lined. Bank erosion and active incising are also present at this data collection site (see Figure 6). Sediment dynamics are seriously disrupted as sediment starved-water erodes the bankline as it flows through the area and into Salt Creek.

Figure 6. Channel incising at DP2. Standing on the east bank looking northwest.

V_2 received a CIR of 0.10 as habitat features and pools are buried and lacking and the channel bank is primarily stabilized on the left descending bank with rip-rap. V_3 received a CIR of 0.10 as the cross section at DP2 was similar to a Class II condition which is indicative of channelization and active bed degradation, it is likely that some overbank flooding may occasionally occur during high water events.

Fescue (*Festuca spp*.) was the primary species noted above the floodprone area with some patches field bindweed (*Convolvulus arvensis*). Below the floodprone area, the dominant species were Japanese brome, native smartweed (*Persicaria hydropiperoides*) and common milkweed (*Asclepias syriaca*). Table 5 below depicts all the species identified at DP2 and their corresponding coverages. V_{4a} received a CIR of 0.10 had no percent concurrence of diagnostic species while V_{4b} received a CIR of 0.25 as smartweed is an indicator species and have an overall percent concurrence of 36%. Vegetation composition of both above and below floodprone areas at DP2 had a high prevalence of invasive and ruderal species and existing riparian habitat is severely degraded.

Table 5. Riparian vegetation composition (V_{4a} and V_{4b}) of DP2.

V4a				V4b			
	Absolute % cover	Dominant Species (Y/N) (50/20 Rule)	Native Species (Y/N)		Absolute % cover	Dominant Species (Y/N) (50/20 Rule)	Native Species (Y/N)
TREE STRATUM							
-	-	-	-	*Populus deltoides*	2	N	Y
-	-	-	-	*Fraxinus pennsylvanica*	2	N	Y
-	-	-	-	*Acer saccharinum*	2	N	Y
SAPPLING/SHRUB STRATUM							
-	-	-	-	*Fraxinus pennsylvanica*	5	N	Y
-	-	-	-	*Morus alba*	5	N	N
-	-	-	-	*Ulmus pumila*	5	N	N
-	-	-	-	*Populus deltoides*	5	N	Y
HERB STRATUM							
Festuca spp.	100	Y	N	*Ambrosia trifida*	20	Y	Y
-	-	-	-	*Asclepias syriaca*	20	Y	Y
-	-	-	-	*Persicaria hydropiperoides*	25	Y	Y
-	-	-	-	*Rumex crispus*	10	N	N
-	-	-	-	*Bromus japonicus*	75	Y	N
-	-	-	-	*Solidago canadensis*	5	N	Y
WOODY VINE							
Convolvulus arvensis	15	N	N	-	-	-	-

V_5 received a CIR of 0.10 as no appreciable continuous vegetative corridor that would be conducive for faunal movement exists at this location. On the west bank there is a gravel road along the bankline adjacent to a parking lot and the east bank contains a parking lot and building within the 100 feet lateral zone assessment area. V_6 at DP2 was assigned a 0.50 as the landuse adjacent to Deadmans Run at this location consisted of an impermeable surface on the east bank and mowed turf grasses on the west bank. The total area for DP2 was 792 sq. ft. That area is multiplied by the SCI value to give DP2 a SCI-area value of 130.11 sq .ft.

4.1.3 Data Point 3

Data Point 3 (DP3) received an overall SCI of 0.12. DP3 is located approximately 250 feet northwest of the N 33rd St and Baldwin Avenue intersection bridge crossing. This area was highly disturbed with the channel being entirely concrete lined (see Figure 7). V_1 received a CIR of 0.10, as the entire DP collection location was concrete lined along the streambed and on the banksides and the channel is deeply incised with sediment dynamics seriously disrupted. V_2 received a 0.10 as no in-stream habitat cover or refugia suitable for feeding and breeding exists at DP3. V_3 received a CIR of 0.10 as there has been complete geomorphic modification to the channel and the channel is similar to a Class II condition.

Figure 7. Concrete lining at DP3. Standing in-stream looking south, southeast towards N 33rd St and Baldwin Ave intersection.

Vegetation present at DP3 is listed below in Table 6. As shown in Figure 8, vegetation primarily present above the floodprone area is Kentucky bluegrass (*Poa pratensis*), fescue and crown vetch (*Securigeria varia*). Some native species were observed immediately adjacent to the stream in the floodprone area, including sawtooth sunflower (*Helianthus grosseserratus*), swamp smartweed and peachleaf willow (*Salix amygdaloides*) saplings. Both vegetation composition variables received a CIR of 0.10.

Table 6. Riparian vegetation composition (V_{4a} and V_{4b}) of DP3.

V4a				V4b			
	Absolute % cover	Dominant Species (Y/N) (50/20 Rule)	Native Species (Y/N)		Absolute % cover	Dominant Species (Y/N) (50/20 Rule)	Native Species (Y/N)
TREE STRATUM							
-	-	-	-	-	-	-	-
SAPPLING/SHRUB STRATUM							
Fraxinus pennsylvanica	2	N	Y	*Salix amygdaloides*	10	Y	Y
HERB STRATUM							
Trifolium repens	15	N	N	*Solidago canadensis*	5	N	Y
Festuca spp.	25	N	N	*Elymus canadensis*	5	Y	Y
Securigeria varia	10	N	N	*Helianthus grosseserratus*	7	Y	Y
Poa pratensis	100	Y	N	*Rumex crispus*	5	N	N
-	-	-	-	*Chenopodium album*	5	N	Y
-	-	-	-	*Asclepias syriaca*	2	N	Y
-	-	-	-	*Persecaria hydropiperoides*	10	Y	Y
-	-	-	-	*Verbena hastata*	3	N	Y
WOODY VINE							
-	-	-	-	-	-	-	-

Figure 8. Standing in-stream, depicting the vegetative community at DP3. Looking north, northwest.

V_5 received a CIR of 0.10, the artificial convention of 100 feet laterally from the top of the bankline is primarily mowed turf grass on both banks for approximately 50 feet, then giving way to parking lots. Land adjacent to the riparian corridor is mowed turf grasses on both bank sides, giving way to impermeable surfaces within the 100 lateral feet assessment area; therefore, V_6 averaged a 0.25 CIR. The total area for DP3 was 594 sq. ft. That area is multiplied by the SCI value to give DP3 a SCI-area value of 72.13 sq .ft.

4.1.4 Data Point 4

Data Point 4 (DP4) is located approximately 380 feet west of the 38th Street Bridge near East Campus. It is still located in RR2 as it is concrete lined and stabilized. Because of this it received a 0.10 CIR for V_1, sediment dynamics are extremely disrupted due to the anthropogenic-constructed streambed and streambank. V_2 received a CIR of 0.10, as the area is not providing adequate habitat cover for faunal life stage processes. However, despite the bank and bed armament, the amount of vegetation below the floodprone area likely provides some small benefit, compared to the armored site at DP3 (see Figure 9).

Figure 9. DP4 near East Campus at UNL. Standing on the west bank, looking north at the gabion-lined channel.

V_3 was assigned a CIR of 0.10, complete geomorphic modification to the floodprone area exists, restricting channel movement and preventing overbank flow. DP4 was identified as corresponding with a Class II condition.

Vegetation present at this site is listed in Table 7 with the species' corresponding coverage. It is important to note that DP4 is located near the University arboretum and greenhouses. Species that would not naturally be expected to occur within this area exist because of ornamental plantings, such as catalpa (*Catalpa speciosa*), white cedar (*Thuja occidentalis*) and jack pine (*Pinus banksiana*).

Table 7. Riparian vegetation composition (V_{4a} and V_{4b}) of DP4.

V4a				V4b			
	Absolute % cover	Dominant Species (Y/N) (50/20 Rule)	Native Species (Y/N)		Absolute % cover	Dominant Species (Y/N) (50/20 Rule)	Native Species (Y/N)
TREE STRATUM							
Catalpa speciosa	7	N	Y	-	-	-	-
Pinus banksiana	5	N	Y	-	-	-	-
Thuja occidentalis	7	N	Y	-	-	-	-
SAPLING/SHRUB STRATUM							
Qurecus macrocarpa	2	N	Y	*Amorpha fruiticosa*	80	Y	Y
HERB STRATUM							
Bromus japonicus	85	Y	N	*Ambrosia trifida*	5	N	Y
Solidago canadensis	5	N	Y	*Phalaris arundinacea*	20	N	N
Securigeria varia	80	Y	N	*Rumex crispus*	10	N	N
Rumex crispus	10	N	N	*Bromus japonicus*	25	N	N
Meliotus officinalis	5	N	N	-	-	-	-
Cirsium arvense	5	N	N	-	-	-	-
WOODY VINE							
Vitis spp.	10	N	Y	-	-	-	-
Convolvulus arvensis	10	N	N	-	-	-	-

Above the floodprone area, the vegetative community was primarily dominated by Japanese brome and crown vetch. Below the floodprone area, false-indigo bush (*Amorpha fruitcosa*) was heavily present (see Figure 10), as well as Japanese brome and reed canarygrass. $V4_a$ received a CIR of 0.10 and V_{4b} received a CIR of 0.25.

Figure 10. False-indigo bush located in the floodprone area. Standing on the west bank, oriented south of Deadmans Run, looking north.

V_5 received a CIR of 0.10 as percent-continuity of this DP was estimated to be approximately 25% and buffer width averaged for both banks was approximately 20 feet. For V_6, the east bank had agronomy plots (row crops) and the west bank was adjacent to a parking lot (impermeable surface). The two riverbanks were averaged together to yield a CIR of 0.50. The calculated overall SCI for DP4 was 0.18. The total area for DP4 was 91 sq. ft. That area is multiplied by the SCI value to give DP4 a SCI-area value of 16.25 sq .ft.

4.1.5 Data Point 5

Data Point 5 (DP5) received an overall SCI rating of 0.41. DP5 is located within the East Campus portion of University of Nebraska-Lincoln and is at the area where the gabion-lined and bed armored channel gives way to natural streambed and riverbank sides in RR 3. V_1 was determined to have a CIR of 0.25, sediment erosion and deposition are out of equilibrium and channel incising is actively occurring; however, some sediment transport is occurring compared to other areas that have a lined streambed. V_2 received a CIR of 0.50, as shown in Figure 11 below, some in-stream habitat and cover is present in the form of downed woody debris and rocks.

Figure 11. DP5, in-channel looking southeast

V_3 received a CIR of 0.25 as complete geomorphic alteration has occurred to the entire floodplain (see Figure 12) and has been severely altered. Overbank flow does not occur except in extreme high water events and DP5 most closely corresponds to a stream Class IV condition.

Figure 12. DP5, in-channel, standing near the left ascending (west) bank looking southeast

Table 8 below lists species identified at DP5 and their associated coverages. DP5 had greater biodiversity compared to the other data locations sites. Below the floodplain area, the dominant species include Japanese brome, crown vetch, silver maple (*Acer saccharinum*), Amur honeysuckle (*Lonicera maackii*) and green ash (*Fraxinus pennsylvanica*). American basswood (*Tilia americana*) and black walnut (*Juglans nigra*) were also noted. Native species unique to this site included skunkbush (*Rhus trilobata*), smooth sumac (*Rhus glabra*) and American elm (*Ulmus americana*). Above the floodprone area, the dominant species noted were ornamental with a thick understory of Japanese brome and Kentucky bluegrass. V_{4a} received a CIR of 0.10. Percent concurrence of diagnostic species was below the 25% minimum and dominated by invasive species. V_{4b} received a CIR of 0.75. The percent concurrence of dominant plants was 36%, it was determined while the existing habitat is degraded, preservation or improvement of the area is attainable but with significant management effort and native vegetation is present for some communities. As noted in Section 2.3 of this document, it was determined that mature, native tree stratums would be weighted higher than other herbaceous or shrub communities based on the lack of riparian woodlands in urbanized Lincoln. Species found at this location are representative of the eastern riparian forest community that is listed as "vulnerable" by the National Heritage Program.

Table 8. Riparian vegetation composition (V4a and V4b) of DP5.

V4a				V4b			
	Absolute % cover	Dominant Species (Y/N) (50/20 Rule)	Native Species (Y/N)		Absolute % cover	Dominant Species (Y/N) (50/20 Rule)	Native Species (Y/N)
TREE STRATUM							
-	-	-	-	*Fraxinus pennsylvanica*	35	Y	Y
-	-	-	-	*Acer saccharinum*	30	Y	Y
-	-	-	-	*Robina pseudoacacia*	15	N	Y
-	-	-	-	*Populus deltoides*	20	N	Y
-	-	-	-	*Ulmus americana*	5	N	Y
-	-	-	-	*Acer saccharinum*	10	N	Y
-	-	-	-	*Tilia americana*	5	N	Y
-	-	-	-	*Juglans nigra*	2	N	Y
SAPPLING/SHRUB STRATUM							
-	-	-	-	*Populus deltoides*	20	N	Y
-	-	-	-	*Ulmus pumila*	15	N	N
-	-	-	-	*Morus alba*	15	N	N
-	-	-	-	*Rhus trilobata*	5	N	Y
-	-	-	-	*Rhus glabra*	5	N	Y
-	-	-	-	*Lonicera maackii*	65	Y	N
HERB STRATUM							
Bromus japonicus	60	Y	N	*Viola pratincola*	5	N	Y
Agropyron cristatum	15	N	N	*Asclepias syriaca*	5	N	Y
Poa pratensis	15	N	N	*Hesperis matronalis*	5	N	Y
Phalaris arundinacea	10	N	N	*Solidago canadensis*	10	N	Y
Conium maculatum	5	N	N	*Rumex crispus*	5	N	N
-	-	-	-	*Cirsium arvense*	5	N	N
-	-	-	-	*Securigeria varia*	25	N	N
-	-	-	-	*Bromus japonicus*	50	Y	N
WOODY VINE							
-	-	-	-	-	-	-	-

V_5 received a CIR of 0.10 as percent coverage was averaged to 100% and buffer width on both banks averaged 40 feet. V_6 received a CIR of 0.50. Farther out in the floodplain (to the length of the designated 100-foot buffer), the agronomy plots exist on the east bank, and the arboretum and open grass lots exist on the west bank. The total area for DP5 was 608 sq. ft. That area is multiplied by the SCI value to give DP5 a SCI-area value of 247.54 sq .ft.

4.1.6 Data Point 6

Data Point 6 (DP6) is located in the same RR as DP5 and also has an overall high SCI rating, a total of 0.46, in comparison to other locations along Deadmans Run. DP6 received a CIR of 0.25 for V_1, sediment erosion and deposition is out of equilibrium and accelerated bank erosion exists. V_2 received a CIR of 0.50 as approximately 25% coverage was estimated within the floodprone area to provide favorable in-stream habitat for faunal movements. Substrate appears to be frequently disturbed and some channel deepening is noticed. V_3 was assigned a CIR of 0.25, complete geomorphic modification of the area exists but there is still some access to the floodplain during flooding events, also, the channel most closely resembles a Class IV condition.

Figure 13. DP6, standing on the west bank, looking northeast

V_{4a} was an Illinois bundleflower (*Desmanthus illnoensis*)-dominated community. Above the floodprone area, the three species primarily present were all native species. Below the floodprone area, the overstory was a green ash/cottonwood (*Populus deltoides*)-dominant community and soft-stem bulrush (*Schoenoplectus tabernaemontani*) was prevalent in the herb stratum (Table 9). Due to the degraded state and lack of native/desirable species in the majority of the DP locations along Deadmans Run, major plant associations with diagnostic indicator species could not be analyzed to determine the primary community. DP6 contains native indicator species representative of an eastern riparian forest. As noted in Section 2.3 of this document, it was determined that mature, native tree stratums would be weighted higher than other herbaceous or shrub communities based on the lack of riparian woodlands in urbanized Lincoln. V_{4b} received a CIR of 0.75 and V_{4a} received a CIR of 0.25.

Table 9. Riparian vegetation composition (V4a and V4b) of DP6.

V4a				V4b			
	Absolute % cover	Dominant Species (Y/N) (50/20 Rule)	Native Species (Y/N)		Absolute % cover	Dominant Species (Y/N) (50/20 Rule)	Native Species (Y/N)
TREE STRATUM							
Fraxinus pennsylvanica	5	Y	Y	*Fraxinus pennsylvanica*	30	Y	Y
-	-	-	-	*Populus deltoides*	30	Y	Y
-	-	-	-	*Acer saccharinum*	25	N	Y
SAPPLING/SHRUB STRATUM							
-	-	-	-	*Fraxinus pennsylvanica*	10	N	Y
-	-	-	-	*Acer saccaharum*	10	N	Y
-	-	-	-	*Acer saccharinum*	20	N	Y
-	-	-	-	*Catalpa speciosa*	5	N	Y
HERB STRATUM							
Desmanthus illinoensis	35	N	Y	*Leersia oryzoides*	20	N	Y
Solidago canadensis	20	N	Y	*Desmanthus illinoensis*	100	Y	Y
Bromus japonicus	30	N	N	*Ratibida pinnata*	25	N	Y
Poa Pratensis	100	Y	N	*Schoenoplectus tabernaemontani*	75	Y	Y
-	-	-	-	*Persicaria pennsylvanica*	10	N	Y
WOODY VINE							
-	-	-	-	-	-	-	-

V_5 received a CIR of 0.75 as the entire west (south) bank was considered 100% vegetated with perennial cover for the 100 feet lateral assessment area. The east (north) bank was mostly row crop, however had an approximate 35 foot buffer of vegetation. For V_6, a CIR of 0.50 was assigned. Landuse adjacent to the channel within the 100 foot lateral distance at the top of the banks consisted of row crops and mowed turf grasses on the east bank and UNL's arboretum on the west bank. It should also be noted, that directly upstream of DP6, a small tributary on the west bank, named No Name Creek, flows into Deadmans Run. The total area for DP6 was 874 sq. ft. That area is multiplied by the SCI value to give DP6 a SCI-area value of 405.79 sq .ft.

4.1.7 Data Point 7

Data Point 7 (DP7) is located in RR 4, as the streambed and riverbanks become lined and armored. DP7 is approximately 180 feet southeast of the N 48th St Bridge crossing (see Figure 14). The total SCI calculated for this DP was 0.12. All variables received a CIR of 0.10, with the exception of V_6 which received a CIR of 0.25.

Figure 14. DP7, standing on the east (or right ascending) bank, looking northwest at the 48th St bridge

Hydraulic conveyance and sediment dynamics are seriously disrupted in the channel. Figure 15 below depicts the concrete lined channel, which also shows the lack of in-stream habitat cover and availability, lack of ability for the stream to connect to the floodplain and invasive vegetative community.

Figure 15. DP7 is heavily armored and altered, standing on the east bank looking across the channel

V_{4a} was primarily Kentucky bluegrass-dominated. Grape vines (*Vitis spp*.) and Japanese hops (*Humulus japonicus*) also comprised a fair amount of the ground cover. Below the floodprone area, the vegetative community primarily consisted of rice cutgrass (*Leersia oryzoides*) and Japanese brome (see Table 10). Landuse adjacent to the area consisted of mowed turf grasses, classified as perennial cover, of any type, on the west bank, and impermeable surface on the east bank. The total area for DP7 was 160 sq. ft. That area is multiplied by the SCI value to give DP7 a SCI-area value of 19.43 sq .ft.

Table 10. Riparian vegetation composition (V_{4a} and V_{4b}) of DP7.

V4a				V4b			
	Absolute % cover	Dominant Species (Y/N) (50/20 Rule)	Native Species (Y/N)		Absolute % cover	Dominant Species (Y/N) (50/20 Rule)	Native Species (Y/N)
TREE STRATUM							
-	-	-	-	-	-	-	-
SAPPLING/SHRUB STRATUM							
Rhus glabra	10	N	Y	-	-	-	-
HERB STRATUM							
Poa pratensis	100	Y	N	*Leersia oryzoides*	70	Y	Y
Meliotus officinalis	5	N	N	*Schoenoplectus tabernaemontani*	10	N	Y
-	-	-	-	*Ambrosia trifida*	30	N	Y
-	-	-	-	*Conium maculatum*	5	N	N
-	-	-	-	*Persicaria hydropiperoides*	20	N	Y
-	-	-	-	*Bromus japonicus*	40	Y	N
WOODY VINE							
Vitis spp.	20	N	Y	*Vitis spp.*	15	N	Y
Humulus japonicus	15	N	N	-	-	-	-

4.1.8 Data Point 8

Data Point 8 (DP8) is also located in RR 4, approximately 100 feet south of the Holdrege St and N 56th St intersection bridge, and is highly degraded and urbanized (see Figure 16). DP8 received the exact same CIRs for all six variables as DP7 (all 0.10 ratings with the exception of V_6 which received a CIR of 0.25).

Figure 16. DP8, standing on the east bank, looking north towards the Holdredge St and N 56th St intersection bridge

Above the floodprone area, only Kentucky bluegrass was present. Below the floodprone area, a Japanese brome/swamp smartweed-dominated community was present. Other species in the area included curly dock, giant ragweed (*Ambrosia trifida*) and Canada rye (*Elymus canadensis*) (see Table 11). The overall SCI for DP8 was 0.12. The total area for DP8 was 504 sq. ft. That area is multiplied by the SCI value to give DP5 a SCI-area value of 61.2 sq .ft.

Table 11. Riparian vegetation composition (V_{4a} and V_{4b}) of DP8.

V4a				V4b			
	Absolute % cover	Dominant Species (Y/N) (50/20 Rule)	Native Species (Y/N)		Absolute % cover	Dominant Species (Y/N) (50/20 Rule)	Native Species (Y/N)
TREE STRATUM							
Acer saccaharum	5	N	Y	-	-	-	-
SAPPLING/SHRUB STRATUM							
-	-	-	-	-	-	-	-
HERB STRATUM							
Poa pratensis	100	Y	N	*Ambrosia trifida*	5	N	Y
-	-	-	-	*Persicaria hydropiperoides*	10	Y	Y
-	-	-	-	*Elymus canadensis*	5	N	Y
-	-	-	-	*Rumex crispus*	5	N	N
-	-	-	-	*Bromus japonicus*	10	Y	N
WOODY VINE							
-	-	-	-	-	-	-	-

4.1.9 Data Point 9

Data Point 9 (DP9) is also located in RR 4 and is approximately 130 feet north of the N 70th St bridge, adjacent to the Mopac bike trail (see Figure 17). As the other two DPs within this RR, DP9 also received the same CIRs as DP7 and DP8 and therefore had the same overall SCI of 0.12.

Figure 17. DP9, standing on the east bank, looking south to the N 70th St bridge

Figure 18. Standing on the east bank, looking west across Deadmans Run

As is apparent in Figures 17 and 18, this DP has highly urbanized adjacent land use, impermeable surfaces within the floodplain and an invasive vegetative community. Table 12 depicts the primary species composition above and below the floodprone zone. V_{4a} is Kentucky bluegrass-dominated with Japanese brome and annual sunflower (*Helianthus annus*). Maximilian sunflower (*Helianthus maximillani*) dominated the absolute cover below the floodprone zone. The total area for DP9 was 195 sq. ft. That area is multiplied by the SCI value to give DP9 a SCI-area value of 20.89 sq .ft.

Table 12. Riparian vegetation composition (V_{4a} and V_{4b}) of DP9.

V4a				V4b			
	Absolute % cover	**Dominant Species (Y/N) (50/20 Rule)**	**Native Species (Y/N)**		**Absolute % cover**	**Dominant Species (Y/N) (50/20 Rule)**	**Native Species (Y/N)**
TREE STRATUM							
-	-	-	-	-	-	-	-
SAPPLING/SHRUB STRATUM							
-	-	-	-	-	-	-	-
HERB STRATUM							
Bromus japonicus	15	N	N	*Helianthus annus*	20	N	Y
Helianthus annus	10	N	Y	*Helianthus maximiliani*	75	Y	Y
Poa pratensis	100	Y	N	*Asclepias syriaca*	10	N	Y
-	-	-	-	*Bromus japonicus*	2	N	N
-	-	-	-	*Persicaria hydropiperoides*	7	N	Y
WOODY VINE							
-	-	-	-	-	-	-	-

4.1.10 Data Point 10

Data Point 10 (DP10) is approximately 800 feet downstream of Wedgewood Lake in RR 5. This DP is located within an unarmored portion of the stream (see Figure 19).

Figure 19. DP10, standing on the east bank looking north towards the Corporate Drive bridge crossing

V_1 received a CIR of 0.25, as some sediment exchange is occurring, though it is still out of equilibrium. V_2 also received a CIR of 0.25, some habitat cover is apparent in the forms of dense vegetation mats and rocks. Additionally, V_3 received a 0.25 CIR as complete geomorphic modification has occurred at this location, but overbank flooding allows the channel to access portions of the floodplain, specifically on the west bank (see Figure 20).

Figure 20. Standing on the east bank, facing west across Deadmans Run

Vegetation within the area still is indicative of a highly disturbed and urbanized environment, with Kentucky bluegrass above the floodprone area. Below the floodprone area, the community is dominated by rice cutgrass and barnyard grass (*Echinochloa crus-galli*); however, there was a fair coverage of softstem bulrush (see Table 13). Both riparian vegetation composition received a CIR of 0.10. V_5 received a CIR of 0.25 as the west bank is entirely vegetated with mowed turf grasses. V_6 received a CIR of 0.25, the west bank was entirely mowed turf grass and the east bank was impermeable surface. The total SCI assigned to DP10 was 0.21. The total area for DP10 was 240 sq. ft. That area is multiplied by the SCI value to give DP10 a SCI-area value of 49.71 sq .ft.

Table 13. Riparian vegetation composition (V_{4a} and V_{4b}) of DP10.

V4a				V4b			
	Absolute % cover	Dominant Species (Y/N) (50/20 Rule)	Native Species (Y/N)		Absolute % cover	Dominant Species (Y/N) (50/20 Rule)	Native Species (Y/N)
TREE STRATUM							
-	-	-	-	*Robina pseudoacacia*	2	N	Y
-	-	-	-	*Pinus resinosa*	2	N	Y
-	-	-	-	*Acer saccaharum*	2	N	Y
SAPPLING/SHRUB STRATUM							
-	-	-	-	-	-	-	-
HERB STRATUM							
Poa pratensis	100	Y	N	*Schenoplectus tabernaemontani*	10	N	Y
-	-	-	-	*Rumex crispus*	5	N	N
-	-	-	-	*Echinochloa crus-galli*	25	Y	N
-	-	-	-	*Leersia oryzoides*	40	Y	Y
WOODY VINE							
-	-	-	-	-	-	-	-

5 Alternative Formulation

During the Plan Formulation Process, the Product Development Team (PDT) discussed an array of measures, to include bridge modifications, channel improvements, storage and levees. Initially, these measures were assessed alone, or in combination with other measures. Through economic analysis, it was determined the most feasible alternatives to be brought forward for further discussion include Alternative 1 (Channel and Bridge Improvements, Channel Conveyance Improvements); Alternative 2 (Channel and Bridge Improvements with a Right Bank Levee); Alternative 3 (Stand-alone Non-structural Flood Risk Adaptive Measures); and Alternative 4 (No Action). More information regarding alternative development, plan formulation and screening of alternatives may be found in the main Feasibility Report.

5.1 Structural Alternatives

Two structural alternatives were analyzed utilizing NESCAP for this Feasibility Study. Both structural alternatives shared similar features, as listed below:

- Channel Widening, either side of railroad bridges, Cornhusker to Huntington
- Widen DMR channel, Huntington to 48th Street, within the Lower Platte South- Natural Resources District (LPSNRD) easement and wider if economically justified
- Replace 48th Street Bridge with wider span
- Construct a dry detention basin at the Flemings Field Complex
- Improve Deadmans Run channel to limits of economically justifiable right-of-way (ROW), 48th to 52nd St.

- Site-specific nonstructural measures where needed to supplement structural measures.

Typical cross sections of the existing channel top-width are approximately 120 feet. Utilizing the typical cross section, channel widening would generally enlarge the width of Deadmans Run to an approximate top-width of 177 feet from Cornhusker Highway to Huntington Avenue and from Huntington Avenue to 48th Street (see typical cross section, Figure 21). Within the channel widening cross section, approximately 25 feet would be utilized for native vegetation plantings. This would equate to approximately 5 acres designated along the channel for native seeding. The total area of the project footprint for the widened channel is approximately 39.5 acres across an approximate 1.4 mile-length.

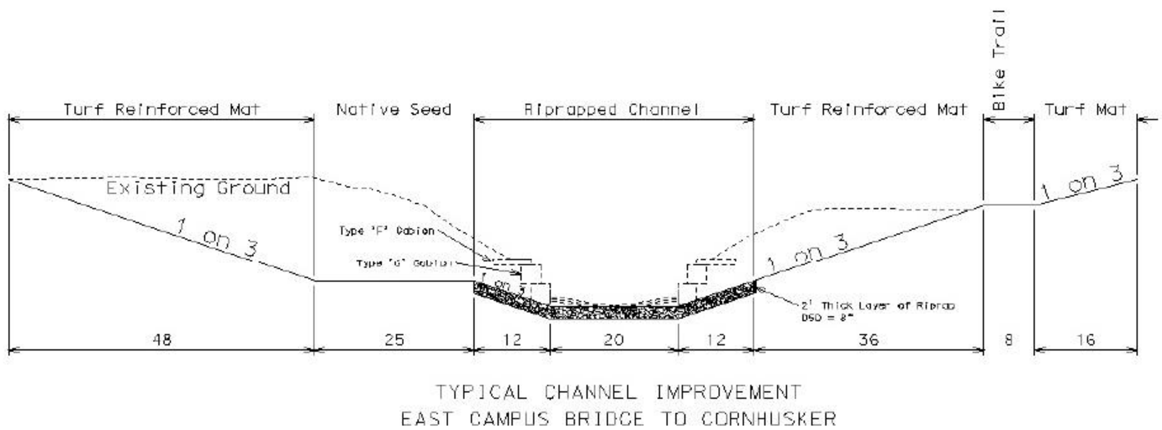


Figure 21. Typical cross section of proposed widening and improvement along Deadmans Run from Cornhusker Highway upstream to 48th Street.

Variations of channel widening were discussed for the East Campus portion at UNL where DP5 and DP6 are located in order to avoid and/or minimize impacts to the Eastern Riparian Forest Community. The channel widening footprint for Variation I would require the removal of all trees on both the north (right) (2.48 acres) and south (left) bank (2.34 acres), totaling 4.82 acres of trees, whereas Variation II.a shifts the centerline of the channel footprint and would require only the removal of the trees on the north bank (2.48 acres). Variation II.b. maintains the centerline of the existing channel and requires the removal of the trees only on the south bank (2.34 acres).

The 48th Street Bridge is currently 60 feet in width, according to the CDM Watershed Master Plan; it is functionally obsolete and does not adequately accommodate current traffic patterns. The 48th Street Bridge would be widened to a length of 135 feet. Refer to the main Feasibility Report for detailed information regarding alternative development, screening and features.

5.1.1 Alternative 1- Channel and Bridge Widening, Channel Conveyance Improvement

This alternative would include the features discussed above in Section 5.1. In addition, the culvert at 33rd and Baldwin Intersection would be replaced with a bridge that spans 200 feet in length and Baldwin Avenue west of North 33rd Street would be abandoned and the road would be redirected east. Conveyance at the BNSF rail spur bridges would be improved by removing piles from the main channel and the bridge would be braced as necessary. At the rail spur bridge, a flume would also be placed to improve conveyance (see Figure 22).

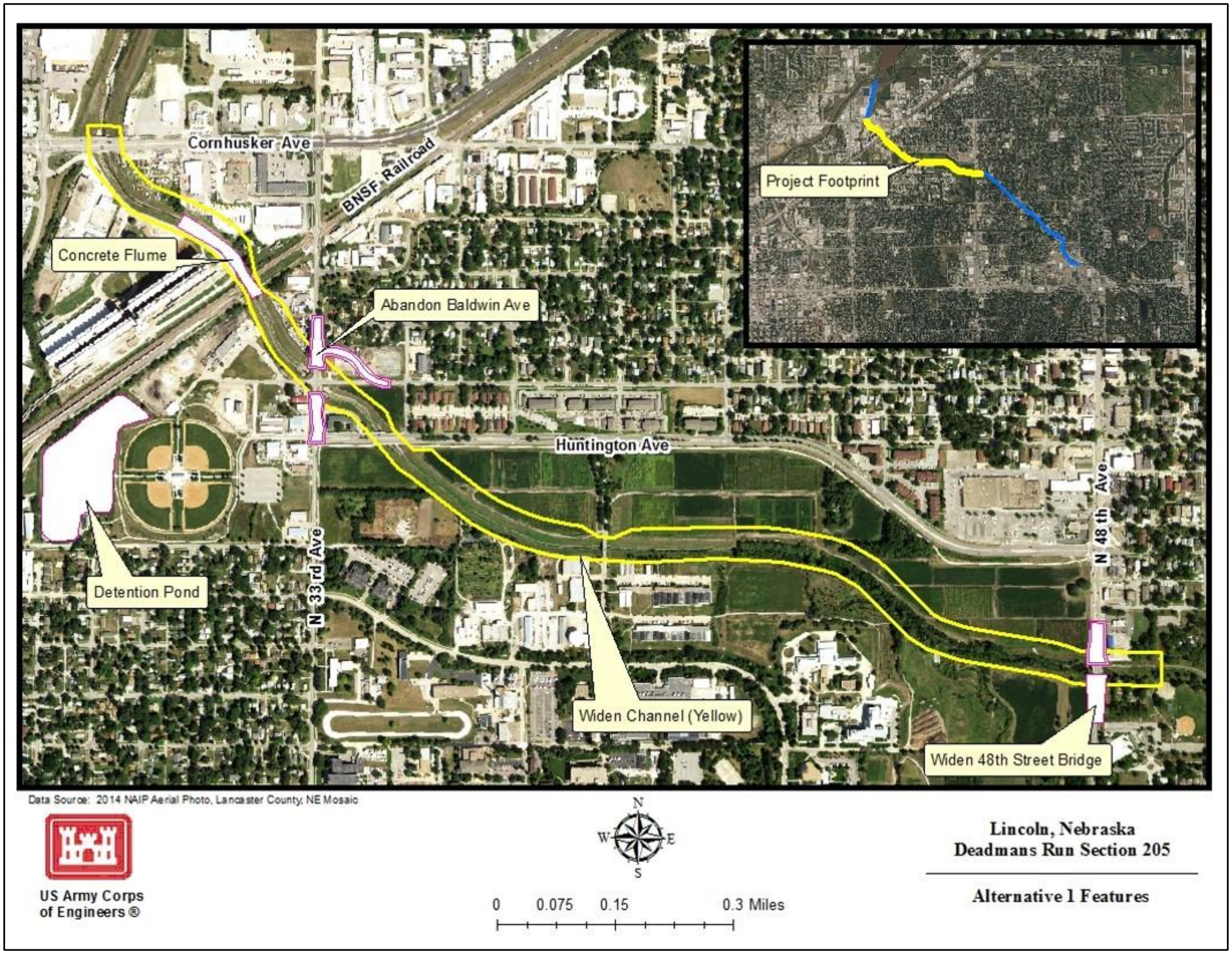


Figure 22. Structural features of Alternative 1 for Deadmans Run

5.1.2 Alternative 2- Channel Improvements Combined with Bridge Modifications and Levees

This alternative would include the features discussed above in Section 5.1. In addition, a levee setback would be constructed on the right bank between the BNSF Railroad and Huntington Avenue. Also, full-height road raises across the levee setback for both 33rd Street and Baldwin Avenue would be constructed (see Figure 23)

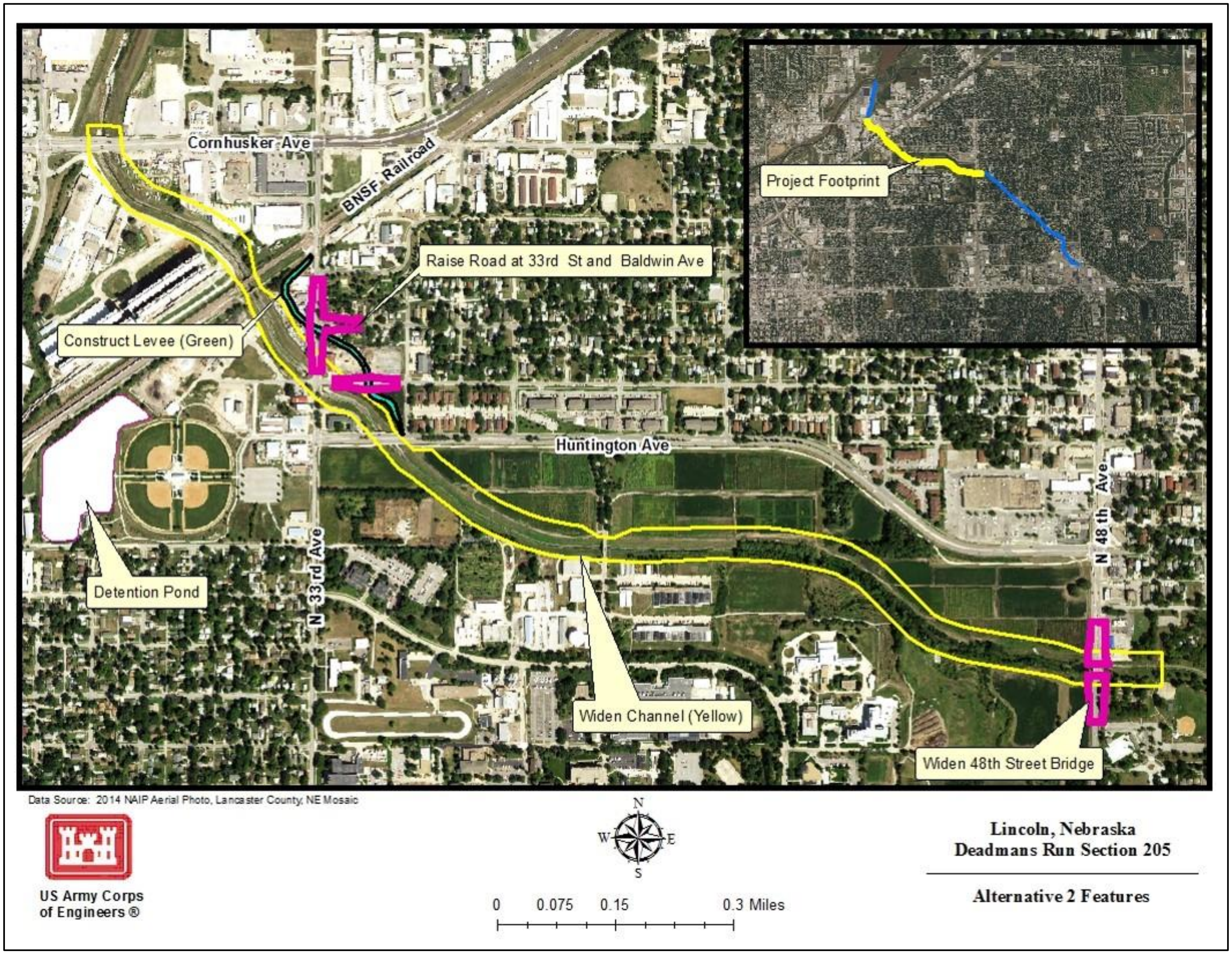


Figure 23. Structural features of Alternative 2 for Deadmans Run

5.2 Recommended Optimized Plan

Structural Alternative 1 was recommended as the Tentatively Select Plan (TSP). In order to determine maximized efficiency, optimization was performed on Alternative 1 to ensure the optimal channel width as well as realize any efficiencies gained with incremental bridge replacements. Through optimization, it was determined that the 100-year channel was the optimal channel width, and the additional replacement of the 38th Street Bridge would cost-effectively increase conveyance. In addition, the replacement of the 38th Street Bridge would minimize impacts to the UNL's agricultural research plots (near DPs 4, 5 and 6), and also minimize impacts to the riparian vegetation along DPs 5 and 6. Only one bank of trees would be required to be removed under the optimized plan (see variation analysis in Section 6.1 and 6.2). For more information regarding the recommended alternative and optimization of that alternative, see Sections 4.2 and 4.3 of the main Feasibility Report.

5.2.1 Updated Selected Plan

Although the optimized selected plan was economically justified, the project costs exceeded the Continuing Authorities Program Section 205 per project cost limit of approximately $15.3 million. Meetings between the Lower Platte South Natural Resource District (LPS NRD), City of Lincoln, Northwestern Division-Corps, Headquarters-Corps, and the Omaha District PDT led to the development of a revised selected plan. The revised plan involves removing the three vehicle bridges from the federal project, as well as the detention basin. This plan was developed due to the City of Lincoln and LPS NRD already having identified the 48th and 38th Street Bridges for replacement due to their age and condition and having started discussions of replacing the 38th Street culvert with a bridge to accommodate the future Railroad Transportation Safety District (RTSD) project. Additionally, the detention basin was removed from the Federal project because the City of Lincoln and LPS NRD are planning to begin the bridge replacement projects in the near future. When the larger structures are put in place, additional channel flow will make it further downstream in the project area, so the detention basin is needed to reduce the impacts of this additional conveyance. The 48th and 38th Street Bridge modifications and the detention basin will be initiated prior to the federal Section 205 Project by the non-federal Sponsor and will be constructed prior to or during construction of the federal Section 205 Project.

The rest of the project components remained unchanged (channel widening, removal and replacement of existing concrete mattress with 44,672 tons of rock riprap extending 7,196 linear feet and installation of a concrete flume, the concrete flume will require 18,677 tons of riprap for the spall filter, resulting in a net total 63,349 tons of riprap utilized within the channel) and Figure 24 shows the updated selected plan. While the City of Lincoln and LPSNRD plan to begin design efforts on the bridge replacement/construction and detention basin projects prior to the federal Section 205 project they do not plan to implement the project until this study is approved and the project is authorized for construction.

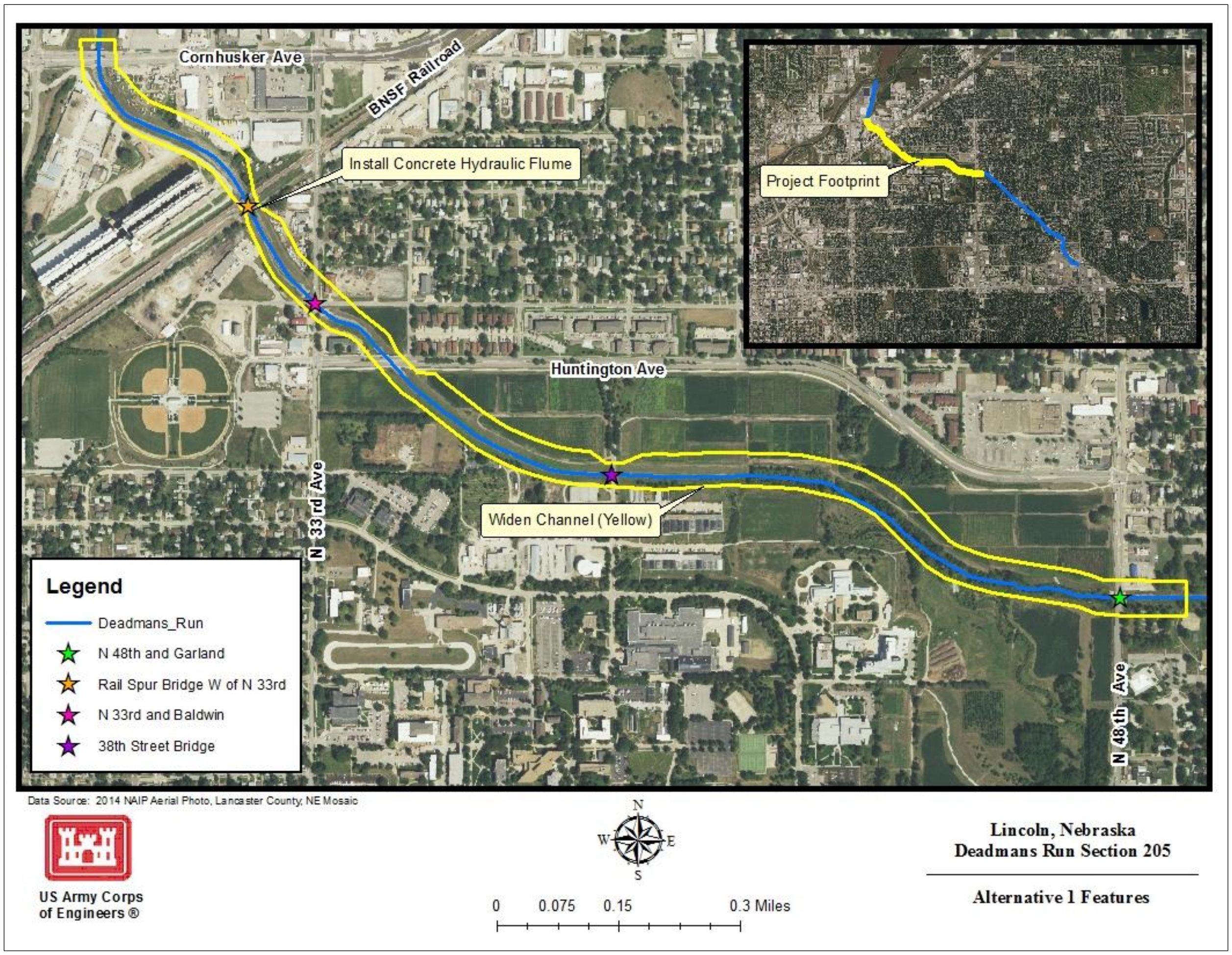


Figure 24. Updated, optimized TSP

5.3 Assumptions

The following assumptions were made when calculating alternative impacts to existing conditions:

1) DPs 1, 2, 8, 9 and 10 are located outside of the proposed project footprint. None of the variables quantified in NESCAP were assumed to improve or degrade at these data points as no proposed actions would impact these areas.
2) In order to ensure that data from existing conditions that was previously collected but will not be utilized, only DPs 3, 4, 5, 6 and 7 were pulled out, assessed, and reflected in Table 14 below. Note the SCI for Deadmans Run when only utilizing data from those five points is now 0.26. The total area was 2,327 sq ft. This value was multiplied by the cross-section areas to give a SCI/area value of 601.7 sq. ft.

Table 14. CIR assignments for the six defined variables for five of the 10 established data points along Deadmans Run

		RR_2		RR_3		RR_4
Variable	**Baseline (Pre project)**	DP_3	DP_4	DP_5	DP_6	DP_7
1	Hydraulic Conveyance and Sediment Dynamic	0.10	0.10	0.25	0.25	0.10
2	In-stream Habitat/Available Cover	0.10	0.10	0.50	0.50	0.10
3	Floodplain Interaction-Connectivity	0.10	0.10	0.25	0.25	0.10
4a	Riparian Vegetation Composition	0.10	0.10	0.10	0.25	0.10
4b	Riparian Vegetation Composition	0.10	0.25	0.75	0.75	0.10
5	Buffer continuity & Width	0.10	0.10	0.50	0.75	0.10
6	Land use adjacent to Active Flood plain zone	0.25	0.50	0.50	0.50	0.25
Stream Condition Index		0.12	0.18	0.41	0.46	0.12
Left descending bank -Length (ft)		33	13	32	38	8
Right descending bank -Length (ft)		50	41	52	55	9
width (ft)		18	7	19	23	20
Area		594	91	608	874	160
Stream condition Index * area		72.13	16.25	247.54	405.79	19.43

3) The impacts from the abandonment of Baldwin Avenue in Alternative 1 and the levee setback and road raise in Alternative 2 were not assessed in this model. Furthermore, the off-channel detention basin was not assessed utilizing this model. Only the channel widening/improvement components of the alternatives were analyzed with NESCAP.
4) Sensitivity to some model variables had to be altered in order to remain applicable to meet the needs of assessing impacts to the project. Where necessary, those assumptions and reasoning behind assumptions are explained.

6 Results, With Project

As a result of channel widening, it is important to reference the gains of riparian area acreage as a whole. The existing average cross section resulted in an area 2,327 sq. ft. at Data Points 3, 4, 5, 6 and 7 and with project conditions from widening the channel and sloping the banks from from Cornhusker Highway to below 48th Street, the overall area of those data points increases to 4,800 sq ft. Approximately 5 acres along the channel would be designated for native plantings below the floodprone zone, and approximately 17.5 acres above the floodprone zone would have native stabilizing grasses.

6.1 Variation I- Removal of Both Banks of Trees within East Campus Area

By removing both banks of mature tree stands at East Campus and armoring the channel with gabions and riprap, the SCI average degraded from 0.26 baseline condition to an overall average of 0.24 (see Table 15) with the implementation of channel widening for all Structural Alternatives with the Variation I alignment that removes both banks of trees throughout the East Campus area. When utilizing the NESCAP model, the SCI is a multiplier of total area. Units in this scenario multiplied the descending bank length by the width of the channel bottom. Approximately 398 “units” (SCI-area) of riparian habitat measured by the six variables is being added as a result of channel widening. It is important to note, that while the SCI-area increases by 398 units, the overall condition of the stream is degraded. The SCI-area is driven by the increase in length of bank gained as a result of widening the channel footprint. However, this does not designate an increase in quality units, as indicated by the decreased SCI from baseline to with-project conditions.

SCI-value is gained in Data Points 3, 4 and 7 is gained, while lost in Data Points 5 and 6. Reasons for this loss stem from hardening the stream bed, where not previously hardened, thus impacting sediment dynamics and removing the mature tree stands which impacts both in-stream habitat and available cover (woody debris, leaf litter and shade) and riparian vegetation composition.

Table 15. CIR assignments for the six defined variables for five of the 10 established data points along Deadmans Run. Note the decrease in Stream Condition Index rating for DP 5 and DP 6, and slight increase in DP 3, DP 4 and DP 7 and overall increase in area from the existing condition to the proposed Variation I alignment.

	VARIATION I	RR_2		RR_3		RR_4
Variable	**Post Project (PROPOSED)**	DP_3	DP_4	DP_5	DP_6	DP_7
1	Hydraulic Conveyance and Sediment Dynamics	0.10	0.10	0.10	0.10	0.10
2	In-stream Habitat/Available Cover	0.10	0.10	0.10	0.10	0.10
3	Floodplain Interaction-Connectivity	0.25	0.25	0.25	0.25	0.25
4a	Riparian Vegetation Composition	0.25	0.25	0.25	0.25	0.25
4b	Riparian Vegetation Composition	0.25	0.25	0.25	0.25	0.25
5	Buffer continuity & Width	0.10	0.50	0.50	0.50	0.10
6	Land use adjacent to Active Flood plain zone	0.25	0.50	0.50	0.50	0.25
Stream Condition Index		0.19	0.28	0.28	0.28	0.19
Left descending bank -Length (ft)		48	48	48	48	48
Right descending bank -Length (ft)		73	73	73	73	73
width (ft)		20	20	20	20	20
Area		960	960	960	960	960
Stream condition Index * area		178.29	267.43	267.43	267.43	178.29

6.1.1 Data Point 1

No change from existing, baseline conditions. See Section 4.1.1.

6.1.2 Data Point 2

No change from existing, baseline conditions. See Section 4.1.2.

6.1.3 Data Point 3

Hydraulic conveyance and sediment dynamics (V_1) would retain the baseline assigned CIR of 0.10. This assumption is based on the replacement of the concrete mattress with rock riprap and replacement of gabion along the bankline. Once the channel is widened to a bottom width of 20 feet, and an additional 12 feet on either bank side with a 1:3 slope, the streambed will be hardened and the gabion lining reset along the 1:3 slope. No increase in sediment transport would exist and sediment dynamics would still be out of equilibrium. No in-channel benefits such as point-bar formation or riffle/pool networks would be able to form with the hardened lining. Engineering techniques that increase capacity of channels to convey surface water downstream impact natural sediment equilibrium. Engineering techniques reduce Manning's "n" which occurs from channel substrate, vegetation, woody debris and other objects in the channel, thus minimizing the wetted perimeter. For a data point to be assigned a 0.10 value, sediment dynamics within the channel must be seriously disrupted, no significant storage or recruitment of sediment occurs and reaches are actively incising.

In-stream habitat/available cover, V_2, would also retain the existing baseline CIR of 0.10. As noted previously, in-channel benefits would not be gained as a result of the proposed alternative. The channel bed will remain flat, banks will be completely armored and habitat features such as riffle/pools, vegetation and woody debris would not be present or have the ability to form.

Floodplain interaction-connectivity, V_3, would improve from the baseline condition with an expected CIR of 0.25. Geomorphic modification of the floodprone area would continue to restrict channel movement, thus continuing to limit the ability of Deadmans Run to interact with its floodplain at this location. However, by lowering the banks and widening the channel area, the bankfull channel would have a slightly increased ability to move across the fluvial system landscape.

Riparian vegetation composition above the floodprone area (V_{4a}) is anticipated to improve with a native seed mix on the turf mat areas. The *Nebraska Department of Roads* (NDOR) *Roadside Vegetation Establishment and Management handbook* (2014) and the *Guide to Prairie and Wetland Restoration in Eastern Nebraska* (Steinauer et al., 2003) were consulted for seed mix recommendations (see Section 8). The expected CIR would be 0.25 as the percent concurrence of dominant diagnostic species is anticipated to be between 25- and 50-percent, though the riparian habitat would still be degraded and preservation and improvements would still require a significant management effort. Native vegetation would be localized to the assessment area and disturbance through natural fluvial process would not be evident.

However, V_{4b} is anticipated to increase to an assigned CIR of 0.25, as a result of the 25 foot buffer strip designated for native plantings. A modified wet-mesic prairie seed mix with would be utilized for the area which would increase the percent concurrence of the identified diagnostic species in NESCAP. Within the 25 foot cross section, the soil topography would be constructed to undulate to capture pools of water. Again, utilizing the NDOR's guidebook (2014) and the *Guide to Prairie and Wetland Restoration in Eastern Nebraska* (Steinauer et al., 2003) as well as cross-referencing preferable plant species with Appendix B-1 and B-2 of NESCAP, the native seed mix (see Section 8) would be utilized within the buffer below the floodprone zone.

The gabion walls would be erected at DP3, however it is anticipated that due to the flashy nature of Deadmans Run, water would likely top these gabions on a bi-annual basis at a minimum. If flows are not deep enough to cross the top of the gabion, water would still leach through to a degree and interact with the native planting buffer. It is assumed the percent concurrence of dominant plants would be greater than 50-percent, but less than 75-percent, the existing riparian area would still remain somewhat degraded and the preservation of such improvement would require a significant management effort to maintain the environmental improvements. It is anticipated that some invasive or ruderal (weedy) species would still be prevalent as the adjacent areas in the corridor would likely be managed turf areas and woody vegetation would be prevented from growing due to operation and maintenance (O&M) efforts of the non-federal sponsor.

V_5 is anticipated to remain the same as baseline conditions, a CIR of 0.10. The assessment area for this variable is an artificial convention of 100 feet laterally from the top of each bank; both the east and west bank have little to no continuity and width as the area is primarily parking lots. V_6, landuse, would remain the same, a CIR of 0.25. The overall SCI for DP3 would increase from a baseline of 0.12 to 0.19. In addition, the channel area also increases, from 594 sq. ft. to 960 sq. ft. at this cross section of DP3 as the channel would be widened and the banks sloped.

6.1.4 Data Point 4

Both V_1 and V_2 would remain consistent with baseline conditions, a CIR of 0.10, each. As stated previously, the replacement of the concrete mattress with rock riprap and replacement of gabion along the bankline would be placed after the channel is widened and the bankline is re-shaped to a 1:3 slope. No increase in sediment transport would exist and sediment dynamics would still be out of equilibrium. Floodplain interaction-connectivity would slightly increase at DP4 as a result of the channel widening and gradual bank sloping, thereby increasing the CIR to 0.25.

V_{4a} would increase to a CIR of 0.25 as a result of planting the turf mat with native grasses. The percent concurrence of dominant diagnostic species would increase, though the riparian habitat would still be considered fairly degraded. V_{4b} would remain consistent to existing conditions as a result of the designated buffer for native plantings. Within the 25 foot cross section, the soil topography would be constructed to undulate to capture pools of water. The gabion walls would be erected at DP4, however it is anticipated that due to the flashy nature of Deadmans Run, water would likely top these gabions on a bi-annual basis at a minimum. If flows are not deep enough to cross the top of the gabion, water would still leach through to a degree and interact with the native planting buffer. It is assumed the percent concurrence of dominant plants would be greater than 50-percent, but less than 75-percent, the existing riparian area would still remain somewhat degraded and the preservation of such improvement would require a significant management effort to maintain the environmental improvements. It is anticipated that some invasive or ruderal species would still be prevalent as the adjacent areas in the corridor would likely be managed turf areas and woody vegetation would be prevented from growing due to O&M efforts of the non-federal sponsor.

V_5 would increase to a CIR of 0.50 as the assessment area from the artificial convention of 100 feet from the top of each newly constructed bank would include approximately 24 feet of perennial vegetation and 76 feet of row crop on the north bank and approximately 100 feet of perennial vegetation on the south bank (UNL's arboretum). V_6 would remain the same as baseline conditions, a CIR of 0.50. The overall SCI for DP4 would increase from a baseline of 0.18 to 0.28. In addition, the riparian area also increases, from 91 sq. ft. to 960 sq. ft. at this cross section of DP4 as a result of widening the channel.

6.1.5 Data Point 5

At DP5, V_1 and V_2 both will decrease from baseline conditions to a CIR of 0.10, as a result of lining the channel bed with rock riprap and installing gabions along the bankline. This further reduces the stability and equilibrium of sediment dynamics and the ability for sediment storage and recruitment. Additionally, habitat features would be lacking and the channel bottom will be completely flattened. All in-channel, aquatic benefits would be reduced as a result of armoring. V_3 is anticipated to remain the same as existing conditions, a CIR or 0.25. DP5 had an existing Class IV condition (see Figure 1), but would change to a Class II condition as a result of the channel shaping and armoring. However, it is anticipated that some overbank flooding would still occur, despite the complete geomorphic modification of the floodprone area.

V_{4a} would increase as a result of planting native grasses on the turf mat to a CIR of 0.25 and V_{4b} would decrease from baseline conditions to a CIR of 0.25. Variation I assumes that all trees on both the north and south bank would be completely removed. Because the model does not take into account that one stratum layer is more optimal than another, it was assumed that the trees at the UNL East Campus area do have a higher environmental benefit than the herbaceous or shrub layer, and therefore would require a greater loss of benefits and a higher mitigation rate should the trees be removed. This assumption was made based on the current environmental setting of Deadmans Run as well as taking into account nearby streams, such as Salt Creek and Antelope Creek. This general area is highly urbanized, with little riparian buffer consisting of mature trees surrounding these streams in the City of Lincoln. Therefore, it was assumed that this habitat type is generally lacking in these urbanized areas. Additionally, historic conditions prior to armoring and stabilizing Deadmans Run did consist of an eastern riparian forest vegetative community, and this area provides some semblance of such a vegetative community. Other reasons for elevating a stratum composed of trees as higher vegetative quality is also discussed in Section 2.3.

V_5 and V_6 would remain consistent with baseline conditions, a CIR of 0.50 assigned to each variable. Buffer continuity and width slightly changes with the second variation, moving the footprint more northerly, however, the difference is negligible and overall does not elevate or decrease the CIR of V_5 from baseline conditions. The same is true with landuse, by shift the footprint, the assessment area for V_6 includes less mowed turf grasses and more row crops and more perennial cover. The overall weighted score was higher with the project condition, however, is still rated in the same CIR category. The overall SCI for DP5 would slightly decrease from a baseline of 0.41 to 0.28. This decrease is a result in removal of both banks of mature trees and due to the loss of in-channel function as a result of armoring and lining the channel bed with rock riprap and the bankline with gabion. The riparian area increases, from 608 sq. ft. to 960 sq. ft. at this cross section of DP5.

6.1.6 Data Point 6

At DP6, V_1 and V_2 both will decrease from baseline conditions to a CIR or 0.10 for both, as a result of lining the channel bed with rock riprap and installing gabions along the bankline. This further reduces the stability and equilibrium of sediment dynamics and the ability for sediment storage and recruitment. Additionally, habitat features would be lacking and the channel bottom will be completely flattened. All in-channel benefits would be reduced as a result of armoring. V_3 is anticipated to remain the same as existing conditions, a CIR or 0.25. V_{4a} would also retain the same CIR, 0.25, as baseline conditions. The turf mat areas above the floodprone zone would be planted with species listed in Section 8. V_{4b} would decrease from baseline conditions to a CIR of 0.25. The vegetative composition would change, trees on both banks would be completely removed. Stabilizing native grasses would be seeded on the upland turf mats and a wet-mesic native prairie mix would be placed in the native buffer would be the species reflected in Section 8**Error! Reference source not found.**. As was true with DP5, it was assumed that the trees at the UNL East Campus area do have a higher environmental benefit than the herbaceous or shrub layer, and therefore would require a greater loss of benefits and a higher mitigation rate should the trees be removed. This was decided based on the current environmental setting of Deadmans Run as well as taking into account nearby streams, such as Salt Creek and Antelope Creek. This general area is highly urbanized, with little riparian buffer consisting of mature trees surrounding these streams in the City of Lincoln. Therefore, it was assumed that this habitat type is generally lacking in these urbanized areas. Additionally, historic conditions prior to armoring and stabilizing Deadmans Run, did consist of an Eastern Riparian Forest vegetative community, and this area provides some semblance of such a vegetative community. V_5 would slightly decrease to a CIR of 0.50 as a result of the channel footprint shifting to the north. The area on the north bank would be primarily comprised of rowcrop which provides little vegetative buffer. V_6 is anticipated to remain the same as existing conditions, a CIR of 0.50. As a result of shifting the channel footprint north, more rowcrop is on the northern bank assessment area and less mowed turf grass. However, the difference is negligible and not enough to increase or decrease the CIR for this variable. The overall SCI for DP6 would decrease from a baseline of 0.46 to 0.28. This is due to the loss of in-channel function as a result of armoring and lining the channel bed with rock riprap and the bankline with gabion as well as the removal of the mature trees and shrubs along the stream. The riparian area slightly increases, from 874 sq. ft. to 960 sq. ft. at this cross section of DP6.

6.1.7 Data Point 7

Hydraulic conveyance and sediment dynamics (V_1) would retain the baseline assigned CIR of 0.10. This assumption is based on the replacement of the concrete mattress with rock riprap and replacement of gabion along the bankline. Once the channel is widened to a bottom width of 20 feet, and an additional 12 feet on either bank side with a 1:3 slope, the streambed will be hardened and the gabion lining reset along the 1:3 slope. No increase in sediment transport would exist and sediment dynamics would still be out of equilibrium. No in-channel benefits such as point-bar formation or riffle/pool networks would be able to form with the hardened lining. Engineering techniques that "improve" capacity of channels to convey surface water downstream impact natural sediment equilibrium.

In-stream habitat/available cover, V_2, would also retain the existing baseline CIR of 0.10. As noted previously, in-channel benefits would not be gained as a result of the proposed alternative. The channel bed will remain flat, banks will be completely armored and habitat features such as riffle/pools, vegetation and woody debris would not be present or have the ability to form.

Floodplain interaction-connectivity, V_3, would improve from the baseline condition with an expected CIR of 0.25. Severe geomorphic modification of the floodprone area would continue to restrict channel movement, thus continuing to limit the ability of Deadmans Run to interact with its floodplain at this location. However, by lowering the banks and widening the channel area, the bankfull channel would have a slightly increased ability to move across the fluvial system landscape.

V_{4a} is anticipated to increase to a CIR of 0.25 as a result of planting native grasses on the turf mat above the floodprone area as described in Section 8. V_{4b} is anticipated to increase significantly, to an assigned CIR of 0.25, as a result of the 25 foot buffer strip designated for native plantings. A modified wet-mesic prairie seed mix with would be utilized for the area which would increase the percent concurrence of the identified diagnostic species in NESCAP as indicated in Section 8**Error! Reference source not found.**.

V_5 is anticipated to remain the same as baseline conditions, a CIR of 0.10. The assessment area for this variable is an artificial convention of 100 feet laterally from the top of each bank; both the east and west bank have little to no continuity and width as the area is primarily parking lots. V_6, landuse, would remain the same, a CIR of 0.25. The overall SCI for DP7 would increase from a baseline of 0.12 to 0.19. In addition, the riparian area also increases, from 160 sq. ft. to 960 sq. ft. at this cross section of DP7.

6.1.8 Data Point 8

No change from existing, baseline conditions. See Section 4.1.8.

6.1.9 Data Point 9

No change from existing, baseline conditions. See Section 4.1.9.

6.1.10 Data Point 10

No change from existing, baseline conditions. See Section 4.1.10.

6.2 Variation II.a. and Variation II.b.- Removal of Trees on One Bank Only

In order to minimize impacts, the PDT assessed the potential to shift the centerline of the channel north through the East Campus area to keep the south bank of trees (Variation II.a.) or replace the 38th Street Bridge (through optimization) to maintain the north bank of trees (Variation II.b.). For Variation II.a., trees were simulated in the HEC-RAS model (see Appendix I- Hydraulic) by increasing the roughness on either or both the right and left bank. Results of the modeling indicated that despite how much the channel was expanded into the right bank, the slower flows induced by an expanding channel, and a higher roughness of leaving the trees in the channel, caused the waters to rise approximately two feet higher at the 38th Street Bridge and leaving trees on both or either bank in the upstream channel would cause overbank flooding at higher flood frequencies such as the 100-year event and potentially the 50-year event. Thus, during optimization of the plan formulation process, the replacement of the 38th Street Bridge with a wider span was assessed (Variation II.b.). It was determined that If the 38th Street Bridge is removed (or widened/replaced), a stage up to 4 feet lower than existing conditions would be possible at the current bridge location and as such, the north (right) bank of trees could remain and only the south bank (2.34 acres) would be required to be removed. Both Variations II.a. and II.b. are assumed to have the same impacts to Deadmans Run in the NESCAP model as reflected in DP’s 5 and 6.

By removing only one bank of mature tree stands at East Campus and armoring the channel with gabions and riprap, the SCI average remained consistent from 0.26 baseline condition to an overall average of 0.26 (see Table 15). When utilizing the NESCAP model, the SCI is a multiplier of total area. Units in this scenario multiplied the descending bank length by the width of the channel bottom. Approximately 507 “units” (SCI-area) of riparian habitat measured by the six variables is being added as a result of channel widening. The SCI-area is driven by the increase in length of bank gained as a result of widening the channel footprint. However, this does not necessarily designate an increase in quality units, as indicated by the static SCI from baseline to with-project conditions.

SCI-value is gained in Data Points 3, 4 and 7 is gained, while lost in Data Points 5 and 6. Reasons for this loss stem from hardening the stream bed, where not previously hardened, thus impacting sediment dynamics and removing the mature tree stands which impacts both in-stream habitat and available cover (woody debris, leaf litter and shade) and riparian vegetation composition. However, Variation II.a. and II.b. are not as impactful to these variables as Variation I was which removed both banks. Some value is retained by maintaining one bank of trees which will still provide benefits of stream shading, habitat availability and woody debris and detritus inputs.

Table 16. CIR assignments for the six defined variables for five of the 10 established data points along Deadmans Run. Note the decrease in Stream Condition Index rating for DP 5 and DP 6, and slight increase in DP 3, DP 4 and DP 7 and overall increase in area from the existing condition to the proposed Variation II.a. or Variation II.b. alignment.

	VARIATION II (a and b)	RR_2		RR_3		RR_4
Variable	**Post Project (PROPOSED)**	DP_3	DP_4	DP_5	DP_6	DP_7
1	Hydraulic Conveyance and Sediment Dynamic	0.10	0.10	0.10	0.10	0.10
2	In-stream Habitat/Available Cover	0.10	0.10	0.25	0.25	0.10
3	Floodplain Interaction-Connectivity	0.25	0.25	0.25	0.25	0.25
4a	Riparian Vegetation Composition	0.25	0.25	0.25	0.25	0.25
4b	Riparian Vegetation Composition	0.25	0.25	0.50	0.50	0.25
5	Buffer continuity & Width	0.10	0.50	0.50	0.50	0.10
6	Land use adjacent to Active Flood plain zone	0.25	0.50	0.50	0.50	0.25
Stream Condition Index		0.19	0.28	0.34	0.34	0.19

6.2.1 Data Point 1

No change from existing, baseline conditions. See Section 4.1.1.

6.2.2 Data Point 2

No change from existing, baseline conditions. See Section 4.1.2.

6.2.3 Data Point 3

Hydraulic conveyance and sediment dynamics (V_1) would retain the baseline assigned CIR of 0.10. This assumption is based on the replacement of the concrete mattress with rock riprap and replacement of gabion along the bankline. Once the channel is widened to a bottom width of 20 feet, and an additional 12 feet on either bank side with a 1:3 slope, the streambed will be hardened and the gabion lining reset along the 1:3 slope. No increase in sediment transport would exist and sediment dynamics would still be out of equilibrium. No in-channel benefits such as point-bar formation or riffle/pool networks would be able to form with the hardened lining. Engineering techniques that increase capacity of channels to convey surface water downstream impact natural sediment equilibrium. Engineering techniques reduce Manning's "n" which occurs from channel substrate, vegetation, woody debris and other objects in the channel, thus minimizing the wetted perimeter. For a data point to be assigned a 0.10 value, sediment dynamics within the channel must be seriously disrupted, no significant storage or recruitment of sediment occurs and reaches are actively incising.

In-stream habitat/available cover, V_2, would also retain the existing baseline CIR of 0.10. As noted previously, in-channel benefits would not be gained as a result of the proposed alternative. The channel bed will remain flat, banks will be completely armored and habitat features such as riffle/pools, vegetation and woody debris would not be present or have the ability to form.

Floodplain interaction-connectivity, V_3, would improve from the baseline condition with an expected CIR of 0.25. Geomorphic modification of the floodprone area would continue to restrict channel movement, thus continuing to limit the ability of Deadmans Run to interact with its floodplain at this location. However, by lowering the banks and widening the channel area, the bankfull channel would have a slightly increased ability to move across the fluvial system landscape.

Riparian vegetation composition above the floodprone area (V_{4a}) is anticipated to improve with a native seed mix on the turf mat areas. The *Nebraska Department of Roads* (NDOR) *Roadside Vegetation Establishment and Management handbook* (2014) and the *Guide to Prairie and Wetland Restoration in Eastern Nebraska* (Steinauer et al., 2003) were consulted for seed mix recommendations (see Section 8). The expected CIR would be 0.25 as the percent concurrence of dominant diagnostic species is anticipated to be between 25- and 50-percent, though the riparian habitat would still be degraded and preservation and improvements would still require a significant management effort. Native vegetation would be localized to the assessment area and disturbance through natural fluvial process would not be evident.

V_{4b} is anticipated to increase to an assigned CIR of 0.25, as a result of the 25 foot buffer strip designated for native plantings. A modified wet-mesic prairie seed mix with would be utilized for the area which would increase the percent concurrence of the identified diagnostic species in NESCAP. Within the 25 foot cross section, the soil topography would be constructed to undulate to capture pools of water. Again, utilizing the NDOR's guidebook (2014) and the *Guide to Prairie and Wetland Restoration in Eastern Nebraska* (Steinauer et al., 2003) as well as cross-referencing preferable plant species with Appendix B-1 and B-2 of NESCAP, the native seed mix would be utilized within the buffer below the floodprone zone.

The gabion walls would be erected at DP3, however it is anticipated that due to the flashy nature of Deadmans Run, water would likely top these gabions on a bi-annual basis at a minimum. If flows are not deep enough to cross the top of the gabion, water would still leach through to a degree and interact with the native planting buffer. It is assumed the percent concurrence of dominant plants would be greater than 50-percent, but less than 75-percent, the existing riparian area would still remain somewhat degraded and the preservation of such improvement would require a significant management effort to maintain the environmental improvements. It is anticipated that some invasive or ruderal (weedy) species would still be prevalent as the adjacent areas in the corridor would likely be managed turf areas and woody vegetation would be prevented from growing due to O&M efforts of the non-federal sponsor.

V_5 is anticipated to remain the same as baseline conditions, a CIR of 0.10. The assessment area for this variable is an artificial convention of 100 feet laterally from the top of each bank; both the east and west bank have little to no continuity and width as the area is primarily parking lots. V_6, landuse, would remain the same, a CIR of 0.25. The overall SCI for DP3 would increase from a baseline of 0.12 to 0.19. In addition, the channel area also increases, from 594 sq. ft. to 960 sq. ft. at this cross section of DP3 as the channel would be widened and the banks sloped.

6.2.4 Data Point 4

Both V_1 and V_2 would remain consistent with baseline conditions, a CIR of 0.10, each. As stated previously, the replacement of the concrete mattress with rock riprap and replacement of gabion along the bankline would be placed after the channel is widened and the bankline is re-shaped to a 1:3 slope. No increase in sediment transport would exist and sediment dynamics would still be out of equilibrium. Floodplain interaction-connectivity would slightly increase at DP4 as a result of the channel widening and gradual bank sloping, thereby increasing the CIR to 0.25.

V_{4a} would increase to a CIR of 0.25 as a result of planting the turf mat with native grasses. The percent concurrence of dominant diagnostic species would increase, though the riparian habitat would still be considered fairly degraded. V_{4b} would increase as a result of the designated buffer for native plantings. Within the 25 foot cross section, the soil topography would be constructed to undulate to capture pools of water. The gabion walls would be erected at DP4, however it is anticipated that due to the flashy nature of Deadmans Run, water would likely top these gabions on a bi-annual basis at a minimum. If flows are not deep enough to cross the top of the gabion, water would still leach through to a degree and interact with the native planting buffer. It is assumed the percent concurrence of dominant plants would be greater than 50-percent, but less than 75-percent, the existing riparian area would still remain somewhat degraded and the preservation of such improvement would require a significant management effort to maintain the environmental improvements. It is anticipated that some invasive or ruderal species would still be prevalent as the adjacent areas in the corridor would likely be managed turf areas and woody vegetation would be prevented from growing due to O&M efforts of the non-federal sponsor.

V_5 would increase to a CIR of 0.50 as the assessment area from the artificial convention of 100 feet from the top of each newly constructed bank would include approximately 24 feet of perennial vegetation and 76 feet of row crop on the north bank and approximately 100 feet of perennial vegetation on the south bank (UNL's arboretum). V_6 would remain the same as baseline conditions, a CIR of 0.50. The overall SCI for DP4 would increase from a baseline of 0.18 to 0.28. In addition, the riparian area also increases, from 91 sq. ft. to 960 sq. ft. at this cross section of DP4 as a result of widening the channel.

6.2.5 Data Point 5

At DP5, V_1 and V_2 both will decrease from baseline conditions to a CIR of 0.10, as a result of lining the channel bed with rock riprap and installing gabions along the bankline. This further reduces the stability and equilibrium of sediment dynamics and the ability for sediment storage and recruitment. Additionally, habitat features would be lacking and the channel bottom will be completely flattened. All in-channel, aquatic benefits would be reduced as a result of armoring. V_3 is anticipated to remain the same as existing conditions, a CIR or 0.25. DP5 had an existing Class IV condition (see Figure 1), but would change to a Class II condition as a result of the channel shaping and armoring. However, it is anticipated that some overbank flooding would still occur, despite the complete geomorphic modification of the floodprone area.

V_{4a} would increase as a result of planting native grasses on the turf mat to a CIR of 0.25 and V_{4b} would decrease from baseline conditions to a CIR of 0.25. Variation II assumes that only one bank of mature trees would be completely removed. Because the model does not take into account that one stratum layer is more optimal than another, it was assumed that the trees at the UNL East Campus area do have a higher environmental benefit than the herbaceous or shrub layer, and therefore would require a greater loss of benefits and a higher mitigation rate should the trees be removed. This assumption was made based on the current environmental setting of Deadmans Run as well as taking into account nearby streams, such as Salt Creek and Antelope Creek. This general area is highly urbanized, with little riparian buffer consisting of mature trees surrounding these streams in the City of Lincoln. Therefore, it was assumed that this habitat type is generally lacking in these urbanized areas. Additionally, historic conditions prior to armoring and stabilizing Deadmans Run did consist of an eastern riparian forest vegetative community, and this area provides some semblance of such a vegetative community. Other reasons for elevating a stratum composed of trees as higher vegetative quality is also discussed in Section 2.3. As stated previously, under Variation II.a. or II.b., only one bank of trees would be required to be removed. A portion of the removed trees could be replaced in the upper extents of the ROW along the cleared bank. Prefereable tree and shrub species were selected by cross-referencing species with Appendix B-1 and B-2 of NESCAP, and is further discussed in Section 8.

V_5 and V_6 would remain consistent with baseline conditions, a CIR of 0.50 assigned to each variable. Buffer continuity and width slightly changes with the second variation, moving the footprint more northerly (Variation II.a.), however, the difference is negligible and overall does not elevate or decrease the CIR of V_5 from baseline conditions. No changes to buffer continuity and width would occur with Variation II.b. which leaves the centerline of the channel consistent to existing conditions but replaces the 38th Street Bridge. The same is true with landuse, by shifting the footprint or replacing the 38th Street Bridge, the assessment area for V_6 includes less mowed turf grasses and more row crops and more perennial cover. The overall weighted score was higher with the project condition, however, is still rated in the same CIR category. The overall SCI for DP5 would slightly decrease from a baseline of 0.41 to 0.34. This decrease is a result in removal of both banks of mature trees and due to the loss of in-channel function as a result of armoring and lining the channel bed with rock riprap and the bankline with gabion. The riparian area increases, from 608 sq. ft. to 960 sq. ft. at this cross section of DP5.

6.2.6 Data Point 6

At DP6, V_1 and V_2 both will decrease from baseline conditions to a CIR or 0.10 for both, as a result of lining the channel bed with rock riprap and installing gabions along the bankline. This further reduces the stability and equilibrium of sediment dynamics and the ability for sediment storage and recruitment. Additionally, habitat features would be lacking and the channel bottom will be completely flattened. All in-channel benefits would be reduced as a result of armoring. V_3 is anticipated to remain the same as existing conditions, a CIR or 0.25. V_{4a} would also retain the same CIR, 0.25, as baseline conditions. The turf mat areas above the floodprone zone would be planted with species listed in Section 8. V_{4b} would decrease from baseline conditions to a CIR of 0.50. The vegetative composition would change, as trees on one bank would be completely removed, however, this is not as impactful as Variation I which would remove all benefits provided by the mature trees adjacent to Deadmans Run. Stabilizing native grasses would be seeded on the upland turf mats and a wet-mesic native prairie mix would be placed in the native buffer would be the species reflected in Section 8. As was true with DP5, it was assumed that the trees at the UNL East Campus area do have a higher environmental benefit than the herbaceous or shrub layer, and therefore would require a greater loss of benefits and a higher mitigation rate should the trees be removed. This was decided based on the current environmental setting of Deadmans Run as well as taking into account nearby streams, such as Salt Creek and Antelope Creek. This general area is highly urbanized, with little riparian buffer consisting of mature trees surrounding these streams in the City of Lincoln. Therefore, it was assumed that this habitat type is generally lacking in these urbanized areas. Additionally, historic conditions prior to armoring and stabilizing Deadmans Run, did consist of an eastern riparian forest vegetative community, and this area provides some semblance of such a vegetative community. V_5 would slightly decrease to a CIR of 0.50 as a result of the channel footprint shifting to the north (Variation II.a.) as the area on the north bank would be primarily comprised of rowcrop which provides little vegetative buffer. It would also slight decreases to a CIR of 0.50 as a result of removing one bank of trees, removing the benefits of the mature tree stand cover and converting it to an herbaceous layer with native grasses. V_6 is anticipated to remain the same as existing conditions, a CIR of 0.50. The overall SCI for DP6 would decrease from a baseline of 0.46 to 0.34. This is due to the loss of in-channel function as a result of armoring and lining the channel bed with rock riprap and the bankline with gabion as well as the removal of the mature trees and shrubs along the stream. The riparian area slightly increases, from 874 sq. ft. to 960 sq. ft. at this cross section of DP6.

6.2.7 Data Point 7

Hydraulic conveyance and sediment dynamics (V_1) would retain the baseline assigned CIR of 0.10. This assumption is based on the replacement of the concrete mattress with rock riprap and replacement of gabion along the bankline. Once the channel is widened to a bottom width of 20 feet, and an additional 12 feet on either bank side with a 1:3 slope, the streambed will be hardened and the gabion lining reset along the 1:3 slope. No increase in sediment transport would exist and sediment dynamics would still be out of equilibrium. No in-channel benefits such as point-bar formation or riffle/pool networks would be able to form with the hardened lining. Engineering techniques that "improve" capacity of channels to convey surface water downstream impact natural sediment equilibrium.

In-stream habitat/available cover, V_2, would also retain the existing baseline CIR of 0.10. As noted previously, in-channel benefits would not be gained as a result of the proposed alternative.

The channel bed will remain flat, banks will be completely armored and habitat features such as riffle/pools, vegetation and woody debris would not be present or have the ability to form.

Floodplain interaction-connectivity, V_3, would improve from the baseline condition with an expected CIR of 0.25. Severe geomorphic modification of the floodprone area would continue to restrict channel movement, thus continuing to limit the ability of Deadmans Run to interact with its floodplain at this location. However, by lowering the banks and widening the channel area, the bankfull channel would have a slightly increased ability to move across the fluvial system landscape.

V_{4a} is anticipated to increase to a CIR of 0.25 as a result of planting native grasses on the turf mat above the floodprone area as described in Section 8. V_{4b} is anticipated to increase significantly, to an assigned CIR of 0.25, as a result of the 25 foot buffer strip designated for native plantings. A modified wet-mesic prairie seed mix with would be utilized for the area which would increase the percent concurrence of the identified diagnostic species in NESCAP as indicated in Section 8.

V_5 is anticipated to remain the same as baseline conditions, a CIR of 0.10. The assessment area for this variable is an artificial convention of 100 feet laterally from the top of each bank; both the east and west bank have little to no continuity and width as the area is primarily parking lots. V_6, landuse, would remain the same, a CIR of 0.25. The overall SCI for DP7 would increase from a baseline of 0.12 to 0.19. In addition, the riparian area also increases, from 160 sq. ft. to 960 sq. ft. at this cross section of DP7.

6.2.8 Data Point 8

No change from existing, baseline conditions. See Section 4.1.8.

6.2.9 Data Point 9

No change from existing, baseline conditions. See Section 4.1.9.

6.2.10 Data Point 10

No change from existing, baseline conditions. See Section 4.1.10..

7 Discussion

According to the analysis discussed in this report, implementation of the recommended optimized plan, the overall total SCI remains the same as existing conditions. Multiplying the total SCI by area gained as a result of channel widening accounts for the spatial unit. As noted, the structural alternative impacts and optimized recommended plan both result in net gains of indexed area but only the optimized recommended plan results in no net impact to the total SCI (Table 17).

Table 17. Comparison table of alternative impacts to existing conditions. Note that the stream condition index area increases with action as a result of widening the stream

	Existing Conditions	Structural Alternative Impacts	Optimized Reccommended Plan
Total Stream Condition Index Rating	0.26	0.24	0.26
Stream Condition Index Area (sqft)	761.14	1,158.86	1,268.57

Under the alternative impacts and the variations assessed, some individual variables gain functionality, while others slightly lose functionality. Overall, as noted above, the total CIR for the widened channel alignments of DP3, DP4, and DP7 show a net increase in overall SCI and total CIR for DP5 and DP6 show a net decrease in overall SCI (see Table 18). Increases in DP3, DP4 and DP7 are a result of increasing the overall channel width and sloping the bank which slightly increases floodplain connectivity (V_3) by allowing limited but occasional inundation and placing native indicator species in the 25-foot buffer area along Deadmans Run and the native stabilizing grass species in the upland turf mats. These activities increase the riparian vegetation composition variables (V_{4a} and V_{4b}). DP5 and DP6 notably lost in-channel benefits (V_1 and V_2) as a result of hardening the channel bed which disrupts sediment dynamics as well as eliminates possible existing habitat features of the natural channel bed. Furthermore, riparian vegetation composition is anticipated to decrease as a result of removing one or both banks of trees, to varying degrees. Prior to urbanization, the historic landscape at the project site was considered an Eastern Riparian Forest community. This community has a state rank of S3. This rank, as defined by the National Heritage Program, is “State Vulnerable”, due to a restricted range and relatively few populations, recent and widespread declines and other factors make this community vulnerable to extirpation (Rolfsmeier and Steinauer, 2010). Thereby, it is reasonable to assume for this urbanized project site, that mature stands of native trees would have an increased weight in the model compared to other vegetative stratum.

Landuse generally remains the same. Deadmans Run will still exist in a highly urbanized setting, though area vegetated with native species and floodplain interaction and connectivity is anticipated to generally slightly increase as a result of widening the channel, re-seeding with native seed mixes and sloping the banks to a 1:3 gradient.

Table 18. Change from baseline to post project for Variation I (top graphic) and Variation II (bottom graphic). Note that bold black shows a positive increase where bold red shows a decrease

	VARIATION I	RR_2		RR_3		RR_4
Variable	**Post Project (PROPOSED)**	DP_3	DP_4	DP_5	DP_6	DP_7
1	Hydraulic Conveyance and Sediment Dynamics	0.00	0.00	**-0.15**	**-0.15**	0.00
2	In-stream Habitat/Available Cover	0.00	0.00	**-0.40**	**-0.40**	0.00
3	Floodplain Interaction-Connectivity	**0.15**	**0.15**	0.00	0.00	**0.15**
4a	Riparian Vegetation Composition	**0.15**	**0.15**	**0.15**	0.00	**0.15**
4b	Riparian Vegetation Composition	**0.15**	0.00	**-0.50**	**-0.50**	**0.15**
5	Buffer continuity & Width	0.00	**0.40**	0.00	**-0.25**	0.00
6	Land use adjacent to Active Flood plain zone	0.00	0.00	0.00	0.00	0.00
Change in Stream Condition Index		**0.07**	**0.10**	**-0.13**	**-0.18**	**0.07**

	VARIATION II (a and b)	RR_2		RR_3		RR_4
Variable	**Post Project (PROPOSED)**	DP_3	DP_4	DP_5	DP_6	DP_7
1	Hydraulic Conveyance and Sediment Dynamic	0.00	0.00	**-0.15**	**-0.15**	0.00
2	In-stream Habitat/Available Cover	0.00	0.00	**-0.25**	**-0.25**	0.00
3	Floodplain Interaction-Connectivity	**0.15**	**0.15**	0.00	0.00	**0.15**
4a	Riparian Vegetation Composition	**0.15**	**0.15**	**0.15**	0.00	**0.15**
4b	Riparian Vegetation Composition	**0.15**	0.00	**-0.25**	**-0.25**	**0.15**
5	Buffer continuity & Width	0.00	**0.40**	0.00	**-0.25**	0.00
6	Land use adjacent to Active Flood plain zone	0.00	0.00	0.00	0.00	0.00
Change in Stream Condition Index		**0.07**	**0.10**	**-0.07**	**-0.13**	**0.07**

7.1 Significance of Resources Impacted

The significance of ecological resources shall be based upon both their monetary (NED) and non-monetary (EQ) values. Appropriate coordination, studies and analyses throughout the planning process have been conducted to determine the significance of ecological resources likely to be affected by alternative plans and the significance of these effects.

As noted in Section 2.3, Deadmans Run is located in a highly urbanized setting with little ecological resources immediately within the project footprint. The majority of the stream is lined with gabions, reducing access to its floodplain, armored with concrete matting which limits natural sediment dynamics and aquatic resources, surrounded by residential and industrial areas with the majority of the vegetation in the riparian area being comprised of turf grasses and invasive species. The area within the project footprint that has the highest biodiversity and ecological value is the portion of the stream adjacent to the East Campus area of UNL. Existing conditions of this area included a natural stream bed (no concrete matting), no gabion or rock riprap along the bankline, and vegetation reminiscent of the historic conditions (Eastern Riparian Forest community). This community has a state rank of S3. This rank, as defined by the National Heritage Program, is "State Vulnerable", due to a restricted range and relatively few populations, recent and widespread declines and other factors make this community vulnerable to extirpation

(Rolfsmeier and Steinauer, 2010). Early on in the Feasibility Study process, this area was noted as the highest ecologically-functioning portion of the project area.

Because the stream is situated in a highly urbanized setting, indicator species and expected riparian communities are not overly present within or adjacent to the project area. Within riparian zones, hydrological, geomorphological and ecological process interact strongly, generating a dynamic landscape that is characterized by a mosaic of habitat. There are important feedbacks between standing vegetation and fluvial process, which have an impact on the character and dynamics of the riparian habitat mosaic. Thus, naturally functioning riparian systems show high biodiversity and production, act as important ecological corridors that provide refugia and dispersal pathways for fauna, attenuate floods and moderate water balances by retaining runoff and increasing rates of infiltration and evapotranspiration. Naturally functioning riparian zones are highly heterogeneous and disturbed environments, and as such, vary greatly in time and space. This inherently provides a challenging environment for plant colonization, and of the wide range of plants that grow in riparian zones, riparian shrub and tree species are particularly important for river morphodynamics. Large wood (living and dead) plays an important role in protecting river banks, reinforcing floodplains and creating and stabilizing landforms on which new woody vegetation can form (Camporeale et al., 2013). Trees and shrubs have been shown to play an important role in providing microclimate modifications and shading, streambank stabilization, inputs of organic litter and woody debris to aquatic systems, water and nutrient runoff cycling, wildlife habitat and general foodweb support for a wide range of both aquatic and terrestrial organisms (Sweeney, 1992).

8 Recommendation

As defined in ER-1105-200-1 and in accordance with 40 CFR 1580.20, protection of the Nation's environment from adverse effects of each alternative plan, in missions other than ecosystem restoration, such as the flood risk reduction Feasibility Study at Deadmans Run, is to be provided by mitigation of those effects. Each alternative plan shall include mitigation as determined appropriate. Mitigation should be addressed in consultation with the federal and state fish and wildlife agencies and in accordance with the Fish and Wildlife Coordination Act and other applicable laws, regulations and Executive Orders.

When practical, mitigation measures determined appropriate should be planned for concurrent implementation with other major project features. Cost of mitigation measures are part of total project costs and are included in the benefit-cost analysis of alternative plans. For mitigation, "benefits" are interpreted as being the same as "losses prevented or replaced".

Mitigation includes, 1) avoid, 2) minimize and 3) rectify. Mitigation planning objectives are clearly written statements that prescribe specific actions to be taken to avoid and minimize adverse impacts as well as identify specific amounts of compensation required.

District commanders shall ensure that project-caused adverse impacts to ecological resources have been avoided or minimized to the extent practicable and that remaining, unavoidable impacts have been compensated to the extent justified. The recommended plan and the NED plan, if not the same, shall contain sufficient mitigation to ensure that either plan selected will not have more than negligible adverse impacts on ecological resources, as defined in WRDA 86, Section 906 (d). Any such mitigation measures will be fully justified. Justification of mitigation features recommended for inclusion in projects shall be based upon analyses that demonstrate the combined monetary and non-monetary values of the last increment of losses prevented, reduced or replaced is at least equal to the combined cost of the last added increment so as to reasonably maximize overall project benefits. In addition, an incremental cost analysis, to the level of detail appropriate, will be used to demonstrate the most cost effective mitigation measures have been selected.

During the alternative analysis of the plan formulation process, channel widening throughout the area was included in all structural alternative plans. In order to reduce impacts of widening throughout the East Campus area, alignment variations were analyzed (see Section 6.1 and 6.2). The first variation (Variation I) included the removal of all mature trees and shrubs on both the north (right) (2.48 acres) and south (left) bank (2.34 acres), totaling 4.82 acres of trees, whereas Variation II.a. shifted the channel footprint and would require only the removal of the north bank of trees (2.48 acres) and Variation II.b. retained the existing centerline of the stream but improved conveyance by removing only the south bank (2.34 acres) of trees due to the City replacing the 38th Street Bridge.

These variations were analyzed to avoid and minimize impacts from the recommended plan. Through optimization it was determined that Variation II.b. would be a feasible option in order to address the flood risk problem while being the least impactful option to the environment. A conceptual mitigation plan has been developed to minimize the impacts of the proposed project with Variation II.b. and ensure the proposed alternative has no net adverse impact on Deadmans Run. Impacts would be associated with the proposed removal of mature trees along Deadmans Run near East Campus (see Figure 25).

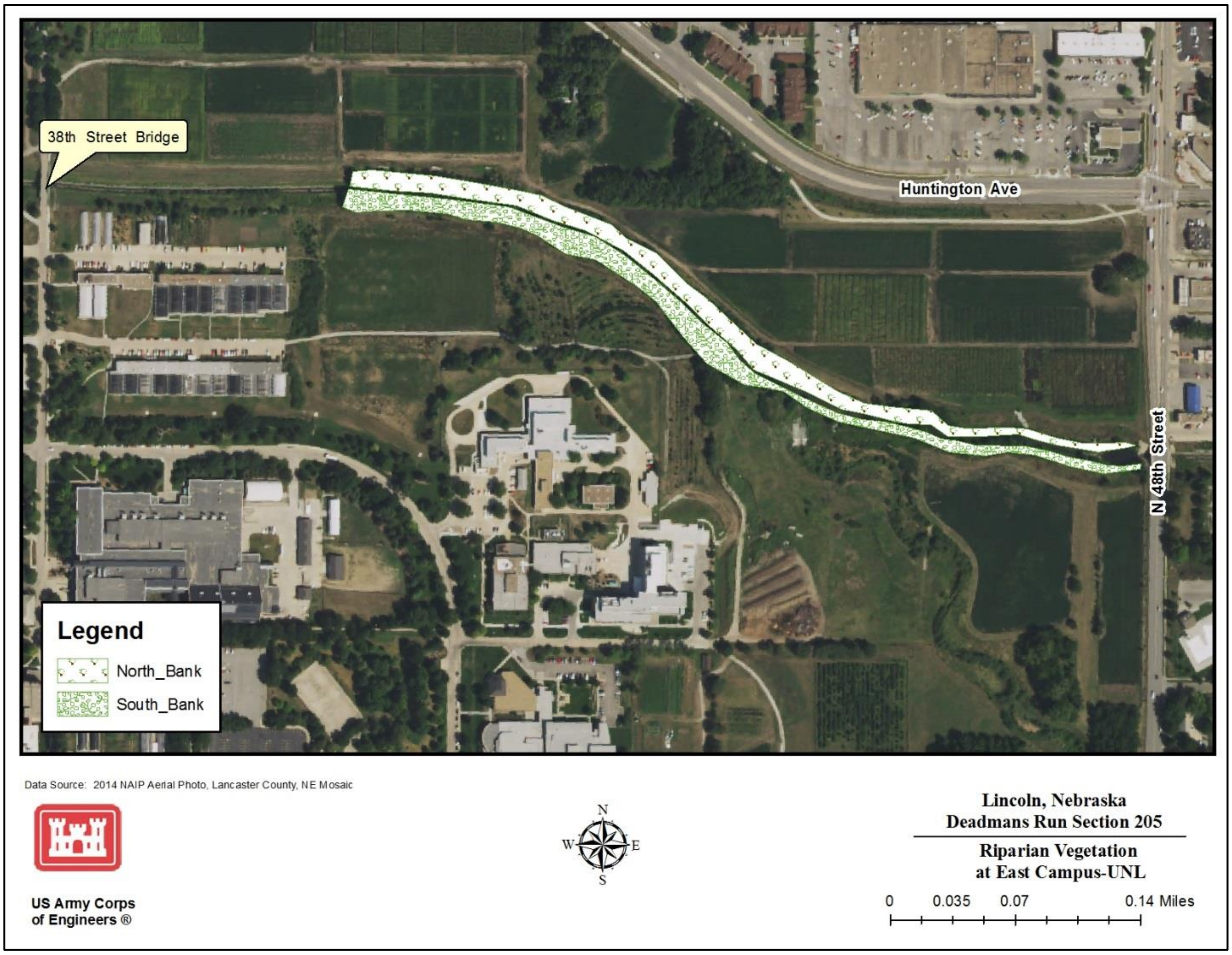


Figure 25. North and South Bank of an Eastern Riparian Forest Community near East Campus-UNL at Deadmans Run

8.1 Integrated Environmental Mitigation

8.1.1 Vegetation Mitigation at East Campus

As shown in the typical cross section for East Campus (Figure 26), tree plantings would be replaced in the upland right-of-way of the channel footprint throughout East Campus on the south bank. Replacing trees along this area would result in approximately 1 acre of tree plantings (this was calculated by taking the length of the stream impacted, approximately 2,600 feet, by the area, 16 feet, of the proposed tree plantings) (Figure 27). These trees would be placed in the upland zone of the new channel footprint and hydraulic modeling indicated that these tree plantings would not negatively impact conveyance.

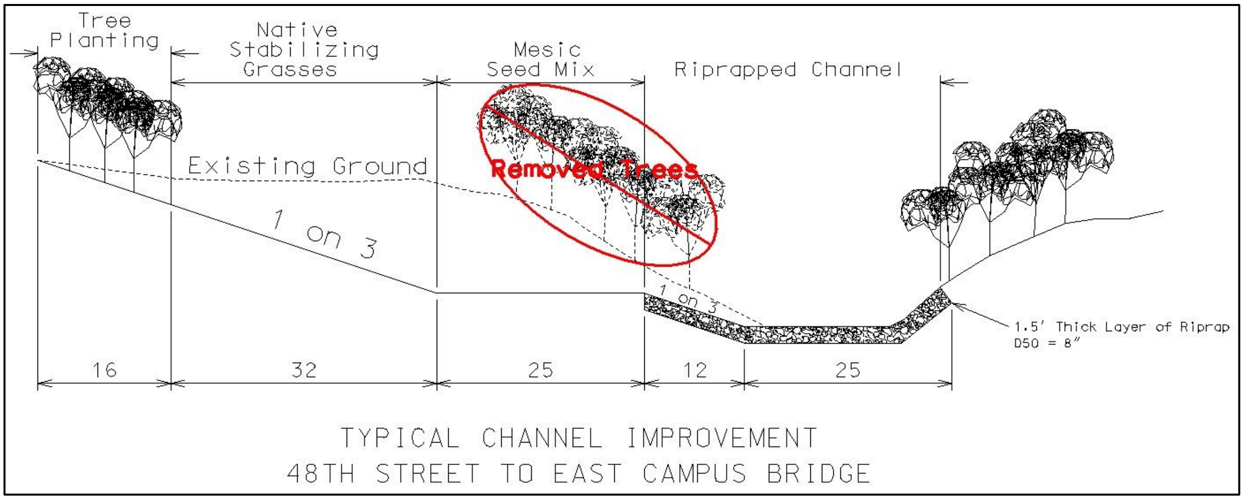


Figure 26. Typical cross section through East Campus, note the tree plantings on the upper banks of the channel footprint on the south bank, native stabilizing grasses placed on the reinforced turf mat, the mesic seed mix immediately adjacent to the channel and the undisturbed trees on the north bank.

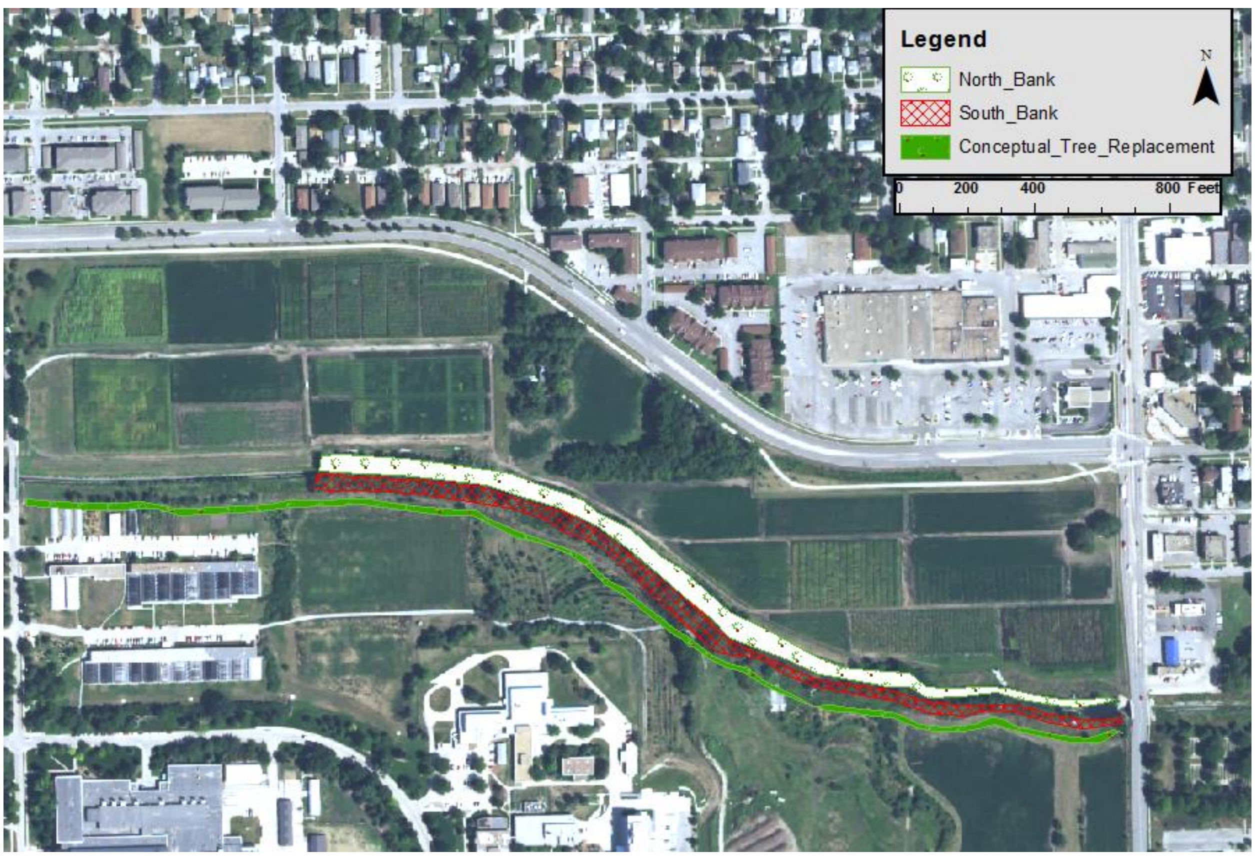


Figure 27. Conceptual plantings of riparian corridor on the upper extents of the new widened channel (green) to replace habitat function lost as a result from removing the riparian habitat on the south bank (red cross hatch) while retaining the north bank (white).

The recommended plan for the Deadmans Run flood risk mitigation feasibility study, as noted in the Feasibility Report, has been designed to improve flow conveyance and alleviate flooding.

Based on the hydraulic analysis it is not possible to replace trees below the floodprone zone without inducing overbank flooding during higher frequency events. Due to this constraint, in-kind, on-site mitigation can still be achieved, however, species composition would vary based on replacing trees in the upland areas verses immediately adjacent to the stream.

Species within the eastern riparian forest community that occur in facultative (FAC), facultative-upland (FACU) and upland (UPL) were selected for replacement of impacted trees. These species are recognized as occurring in both wetlands and uplands to varying degrees based on the hydrology of the site. No obligate (OBL) or facultative-wet (FACW) species were selected as water would not inundate these upland slopes on a frequent enough basis, nor would hydric soils be present, to support such hydrophytic communities. Ash species (*Fraxinus* spp.) were not selected for proposed plantings as emerald ash borer (*Agrilus planipennis*), an invasive insect detrimental to ash trees has been recently recorded in eastern Nebraska and is anticipated to continue to spread. As such, the Nebraska Forest Service does not recommend planting ash species. The species listed in Table 19 below are generally rapid-growing with a moderate to long life span.

Table 19. Eastern Riparian Forest community tree and shrub species selected for planting in the upper extent of the south bank. These species were cross-referenced with Appendix B-1 and B-2 of NESCAP.

Scientific Name	Common Name	Wetness	Mature Height (ft)	Mature Spread (ft)	Shade Tolerant?
Acer negundo	Box Elder	FAC	30	40	N
Cornus drummondii	Rough-leaf Dogwood (shrub)*	FAC	15	15	Y
Ulmus americana	American Elm*	FAC	60	80	N
Populus deltoides	Cottonwood*	FAC	100	75	N
Celtis occidentalis	Hackberry*	FACU	50	50	Y
Amorpha canescens	Leadplant (shrub)	UPL	4	4	Y
Rhus glabra	Smooth Sumac (Shrub)	UPL	10	10	Y

*Indicates NESCAP diagnostic plant species

The planting plan for the shrubs and trees may be based off of a Natural Resource Conservation Services (NRCS) Technical Note (Ogle et al., 2012) which recommend a 65% or more density planting plan when the objective is for habitat and wildlife. This would require a planting plan with a minimum of two rows with a maximum of up to eight rows of planted trees and shrubs. High density planting is recommended, with shrubs being spaced 3 to 5 feet, low broadleafs being spaced 6 to 10 feet and tall broadleafs being spaced 8 to 14 feet.

Furthermore, riparian vegetation composition above the floodprone area is anticipated to improve with a native seed mix on the turf mat areas. On both banks immediately adjacent to proposed tree plantings, native stabilizing grasses would be placed on the reinforced turf mats (see Table 20). This would create approximately 4 acres along the East Campus area of native grasses that would contribute to riparian corridor. The *Nebraska Department of Roads* (NDOR) *Roadside Vegetation Establishment and Management Handbook* (2014) and the *Guide to Prairie and Wetland Restoration in Eastern Nebraska* (Steinauer et al., 2003) were consulted for seed mix recommendations. These native grasses would assist in bank stabilization.

Table 20. Stabilizing grass mix for upland reinforced turf mats. Derived and modified from NDOR.

Scientific Name	Common Name
Lolium perenne	Perennial Ryegrass
Elymus trachycaulus	Slender Wheatgrass*
Pascopyrum smithii	Western Wheatgrass*
Schizachyrium scoparium	Little Bluestem*
Buckloe dactyloides	Buffalograss
Bouteloua curtipendula	Sideoats Grama
Sporobolus cryptandrus	Sand Dropseed*
Elymus canadensis	Canada Wildrye*

*Indicates NESCAP diagnostic plant species

A modified wet-mesic prairie seed mix with would be utilized for the area which would increase the percent concurrence of the identified diagnostic species in NESCAP. Within the 25 foot cross section, the soil topography would be constructed to undulate to capture pools of water. Throughout the East Campus area, this would add approximately 1.4 acres of a modified wet-mesic prairie seed mix which further contributes the continuity of the riparian corridor along Deadmans Run. Again, utilizing the NDOR's guidebook (2014) and the *Guide to Prairie and Wetland Restoration in Eastern Nebraska* (Steinauer et al., 2003) as well as cross-referencing preferable plant species with Appendix B-1 and B-2 of NESCAP, the native seed mix (Table 211), would be utilized within the buffer below the floodprone zone.

Table 21. Native seed mix for vegetative buffer below floodprone zone. Derived and modified from NDOR, the Guide to Prairie and Wetland Restoration in Eastern Nebraska, and NESCAP.

Scientific Name	Common Name	Scientific Name	Common Name
Asclepias incarnata	Swamp Milkweed	*Viola spp.*	Violet*
Calamagrostis canadensis	Blue Joint*	*Elymus canadensis*	Canada Wildrye*
Carex vulpinoidea	Fox Sedge*	*Elymus virginicus*	Virginia Wildrye*
Sorghastrum nutans	Indiangrass	*Coreopsis tinctoria*	Plains Coreopsis*
Panicum virgatum	Switchgrass*	*Solidago canadensis*	Canada Goldenrod*
Andropogen gerardii	Big Bluestem	*Helianthus grosseserratus*	Sawtooth Sunflower
Schizachyrium scoparium	Little Bluestem*	*Ratibida pinnata*	Grayhead Coneflower
Bouteloua curtipendula	Sideoats Grama	*Helianthus maximilianii*	Maximillian Sunflower
Desmanthus illinoensis	Illinois Bundleflower	*Pascopyrum smithii*	Western Wheatgrass*
Rudbeckia hirta	Black-eyed Susan	*Elymus trachycaulus*	Slender Wheatgrass*
Vitis riparia	Riverbank Grape*	Urtica dioica	Stinging Nettle*

*Indicates NESCAP diagnostic plant species

8.1.2 Vegetation Enhancement along Deadmans Run

In addition to the mitigation at East Campus, the remainder of Deadmans Run within the project footprint would also feature ecosystem enhancement opportunities of greater floristic quality vegetation than existing conditions. A typical cross section (Figure 28) for enhancement along Deadmans Run represents conceptual plantings from the BNSF Railroad upstream to 52nd Street with the exception of the East Campus area which has been previously discussed.

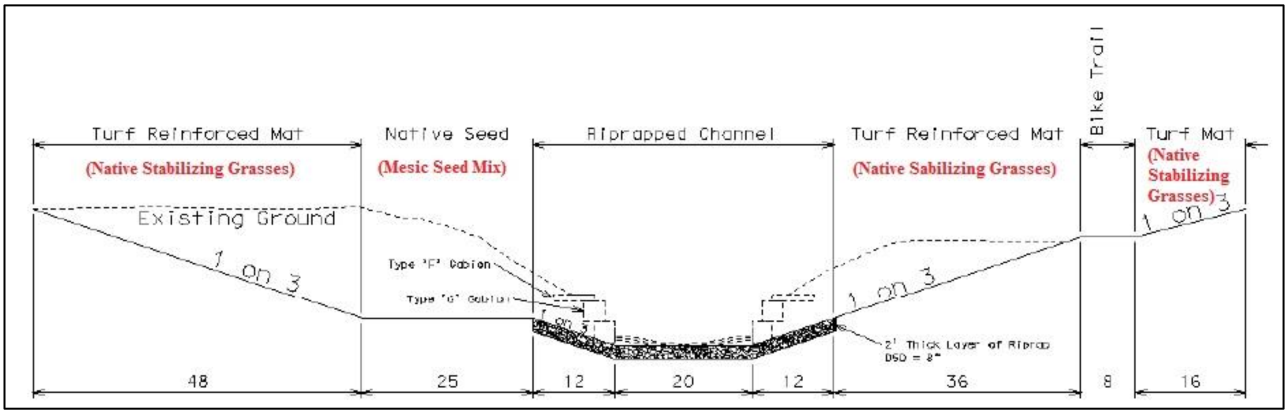


Figure 28. Typical cross section of mitigating actions along the impacted channel footprint of Deadmans Run, note the native stabilizing grasses placed on the reinforced turf mat and the mesic seed mix immediately adjacent to the channel.

The 25-foot buffer adjacent to the channel would be planted with the native mesic seed mix outlined in Table 21 above. Throughout the entire channel, this would add an additional 3.6 acres of a modified wet-mesic prairie seed mix which further contributes the continuity of the riparian corridor along Deadmans Run. The native turf mats would be planted with the native stabilizing grasses identified in Table 20, resulting in an additional 15 acres of native grasses that would contribute to riparian corridor.

9 Conclusion

Based on the analysis of potential impacts to the environment of Deadmans Run utilizing NESCAP, it was determined that long-term and minor impacts to a portion of the project area through the East Campus area would occur by armoring the streambed with rock riprap where it has not been previously hardened. This will have minor impacts on localized sediment transport of the immediate project area, and further reduces the stability and equilibrium of sediment dynamics in this already degraded system. Armoring the channel where it has not been previously armored, and replacing the concrete mattress with rock riprap in portions of the stream where it already was lined will continue to impact the ability for sediment storage and recruitment. Additionally, within the East Campus area where the channel would be hardened, the streambed would become completely flattened, lending to a decrease in habitat features.

It was also determined, that overall floodplain connectivity would slightly improve at Deadmans Run as a result of widening the channel, and lowering the bank and shaping it with 1:3 slopes.

This will allow a slight ability for Deadmans Run to access the native mesic plantings and on occasion the native stabilizing grasses. Land use and the adjacent riparian buffer variables generally remain unchanged as a result of implementing of the channel improvement project.

Most notably, riparian vegetation, both above and below the floodprone zone is anticipated to improve as a result of the channel improvement project with the implementation of the mitigative measures outlined in Section 8 above. Overall, 17.5 total acres of the 39.5 acre impacted riparian footprint would increase in quality and diversity as a result of planting native stabilizing grasses. An additional 5 acres of a wetland-mesic seed mix would be planted adjacent to the channel to enhance the habitat within the localized area and an additional acre of trees would be re-planted to replace the 2.34 acres of trees removed on the south bank. All these measures together as assessed in the NESCAP model and resulted in no net adverse impacts. Appendix A: Section V contains the monitoring protocol for this integrated mitigation plan, as well as the Adaptive Management and Operation and Maintenance of these features.

10 Literature Cited

Camporeale, C., E. Perucca, L. Ridolfi and A.M. Gurnell. 2013. Modeling the Interactions Between River Morphodynamics and Riparian Vegetation. Reviews of Geophysics. 51: 379-414.

NDOR (Nebraska Department of Roads). 2014. NDOR Roadside Vegetation Establishment and Management.

Natural Resources Conservation Service. 2010. Understanding Fluvial Systems: Wetlands, Streams and Floodplains. Technical Note No. 4. United States Department of Agriculture. Washington, D.C.

Ogle, D., L. St. John, C. Strange and D. Tilley. 2012. Tree and Shrub Planting, Care and Management. TN Plant Materials No. 43. USDA-NRCS.

Rolfsmeier, S.B. and G. Steinauer. 2010. Terrestrial Ecological Systems and Natural Communities of Nebraska (Version IV- March 9, 2010). Nebraska Natural Heritage Program and the Nebraska Game and Parks Commission, Lincoln, Nebraska.

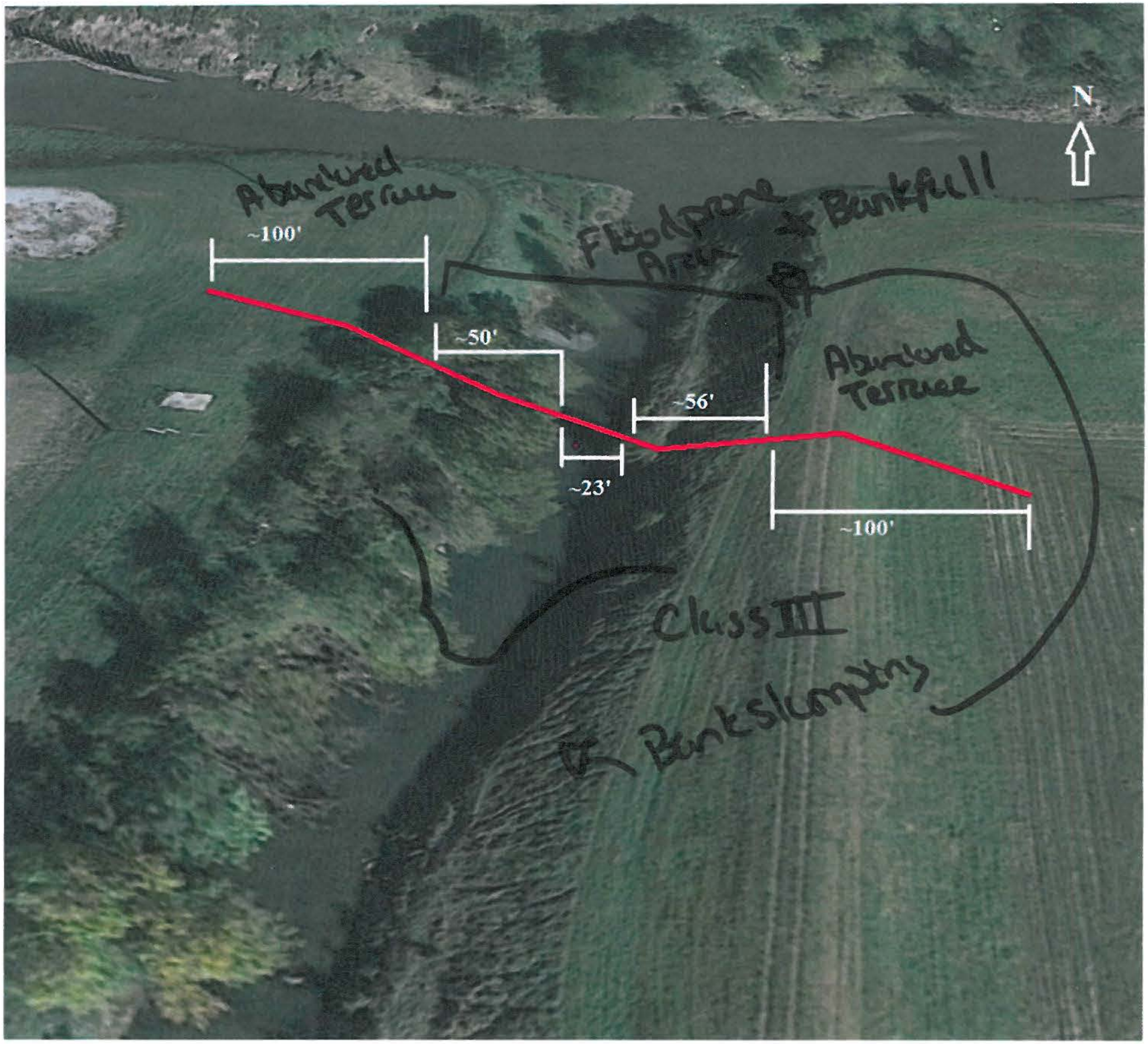
Simon, A. 1989. A Model of Channel Response in Disturbed Alluvial Channels. Identification and Approaches for Engineering Management. Earth Surface Processes and Landforms. 20:611-628.

Steinauer, G., B. Whitney, K. Adams, M. Bullerman and C. Helzer. 2003. A Guide to Prairie and Wetland Restoration in Eastern Nebraska. Joint Publication of Prairie Plains Resource Institute and Nebraska Game and Parks Commission.

Sweeney, B.W. 1992. Streamside Forests and the Physical, Chemical, and Trophic Characteristics of Piedmont Streams in Eastern North America. Water and Science Technology 29:2653-2673.

USACE (U.S. Army Corps of Engineers) 2010a. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region (Version 2.0), ed. J.S. Wakeley, R.W. Lichvar and C.V. Noble. ERDC/EL TR-10-1. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

USACE. 2010b. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (Version 2.0), ed. J.S. Wakeley, R.W. Lichvar and C.V. Noble. ERDC/EL TR-10-16. Vicksburg, MS: U.S. Army Engineer Research and Development Center.



Approximate cross section of DP1. Imagery from GoogleEarth® 2016.

DP 1 - Existing Conditions

V_1 Hydraulic Conveyance and Sediment Dynamics

User notes: Hydraulic conveyance and sediment dynamics addresses fluvial processes for the active channel within the RR. This indicator is assessed by narrative criteria or measured as a percent of the length of mainstem channel in a riparian reach with (AHC). Aerial photography and field observations are used to estimate the Condition Index Rating of this metric. For impact or mitigation evaluations, **the Condition Index Rating is zero when a stream is converted to a lacustrine system.**

Assessment Area: below bankfull width

Condition Index Rating	Indicator Score or Description of Condition
1.00	__Movement of sediment in the channel is in equilibrium in terms of supply, erosion, and deposition processes. __**On most streams** there are alternating point bars; bank erosion occurs, but is stabilized and moderated by vegetation; and channel width, form, and floodplain area is consistent through the reach. __**In some streams**, some of these indicators may not be apparent, but overall bank and hill slope erosion is moderated by vegetation and there are no apparent culturally induced catastrophic failures. __The channel is stable, no active down-cutting occurring, or; old down-cutting apparent but a new, stable riparian area has formed within the incised channel, OR; __≤5% of active channel within the riparian reach with altered hydraulic conveyance (AHC).
0.75	__Movement of sediment in the channel is in equilibrium with the current hydrologic regime, as opposed to a culturally unaltered condition, and exhibits an overall balance in terms of erosion and deposition processes. __**On most streams** there are alternating point bars; bank erosion occurs, but is stabilized and moderated by vegetation; and channel width, form, and floodplain area are consistent through the reach. __**In some streams**, some of these indicators may not be apparent, but overall bank and hill slope erosion is moderated by vegetation and no culturally induced catastrophic failures are apparent. __The channel has evidence of old down-cutting that has begun stabilizing, vegetation is beginning to establish, even at the base of the falling banks, soil disturbance is evident, OR; __>5 and ≤15% of riparian reach with AHC.
0.50	__Sediment disequilibrium is minor and localized within the reach. __This includes small, localized areas of bank protection, slumping, or encroachment on the floodplain and channel. __This condition class includes previously disrupted reaches on a recovery trajectory, such as deeply entrenched streams where down-cutting has been arrested by structural grade control, and there is sufficient room for lateral channel migration and establishment of a functional floodplain within the incised channel. __Head cuts in early stage are present. Immediate action may prevent further degradation, OR; ✓>15 and ≤30% of riparian reach with AHC.
0.25 ✓	✓Sediment erosion and deposition out of equilibrium. ✓Water inflow is sediment rich, poor or accelerated bank erosion exists. Channel not actively incising but extensive disequilibrium is evident. __Typical indicators include extensive bank slumping (erosion events that exceed any moderating influence of native vegetation), active gullies feeding into the reach from adjacent hill slopes, or shoaling of sediments rather than deposition in sorted lateral and mid-channel bars. __Apparently stable channels should be placed in this category if there is evidence of regular mechanical disruption, such as bulldozing of the channel bottom and clearing of riparian vegetation to improve flood conveyance. ✓Channel with some widening, but limiting new floodplain development; the existing floodplain is not well vegetated. ✓The vegetation that is present is mainly pioneer species. Bank failure is common, OR; __>30 and ≤50% of riparian reach with AHC.
0.10	__Sediment dynamics within most of the reach are seriously disrupted. __This includes reaches where no significant storage or recruitment of sediment occurs (i.e., reaches in underground tunnels/culverts, and reaches hardened with rock or concrete). __It also includes reaches that are either actively incising or functioning as sediment traps (e.g., sediment basins). __This also includes reaches that have been subject to recent changes likely to induce severe disequilibrium, such as extensive floodplain filling, change in slope, channel straightening, or other changes that are likely to cause channel down-cutting during future high-flow events. __The channel is deeply incised, resembling a gully, little or no riparian area development, or active down-cutting is clearly occurring. Only occasional or rare flood events access the flood plain. __Tributaries will also exhibit signs of down-cutting, OR; > __50% of riparian reach with AHC.

Field Notes:

AHC = Altered Hydraulic Conveyance

degree to which techniques to "improve" conveyance (reduce Manning's "n")

V_2 In-Stream Habitat/Available Cover

User Notes: The biological components of riparian ecosystems have adapted to episodic cycles of disturbance and developed a variety of mechanisms that make it possible to survive and flourish where other organisms cannot. This variable is evaluated below the floodprone area. For impact or mitigation evaluations, the Condition Index Rating is zero when a stream is converted to a lacustrine system.

Assessment Area: Below the estimated floodprone area

Condition Index Rating	Indicator or Description of Conditions
1.00	__Within the flood prone area, there is greater than >50% coverage by diverse habitat features favorable for stream faunal colonization and maintenance of vegetation dynamics for recruitment. __Features may include snags, submerged logs, undercut banks, roots, cobble, rocks, persistent leaf packs, pools and glides, or other stable habitat at a stage to allow colonization. __No barriers to faunal movement.
0.75	__ Within the flood prone area there is >30% and ≤50% coverage by habitat features favorable for stream faunal colonization and/or cover. __Many habitat features are not transient. Adequate habitat for maintenance of populations is evident. __Seasonal water withdrawals inhibit faunal movement within the reach.
0.50 ✓	✓Within the flood prone area, there is >10 and ≤30% coverage by habitat features favorable for stream faunal colonization and cover; ✓habitat availability may be less than desirable; ✓substrate may be frequently disturbed. __Drop structures, culverts, dams, or diversions are present within the reach, but with minimal effect to the channel gradient or __faunal movement. Some channel deepening is noticeable.
0.25	__ Within the flood prone area, there is ≤10% coverage of habitat features present; lack of habitat is obvious; substrate unstable or lacking; concrete lined channels are present within portions of the stream. __Habitat features and pools buried or lacking, channel bottom may be flat. __Drop structures, culverts, dams, or diversions are present within the reach with noticeable effects to the channel gradient (deepening) or inhibition of faunal movement.
0.10	__Habitat features and pools are buried or lacking, channel bottom may be flat. __Channels banks are completely armored or concrete lined.

Field Notes:

West bank - overhang vegetation provides shade

Some LWD

Substrate clay/gravel

minnow/carp observed

V_3 Floodplain Interaction–Connectivity

User Notes: Floodplain Interaction–Connectivity indicates of the degree to which the hydrologic interaction between the bankfull channel and the active floodplain and terraces of the riparian ecosystem remains intact. In assigning the Condition Index Rating, the channel evolution concepts previously presented should be consulted. Previous observations for V1 Hydraulic Conveyance and Sediment dynamics variable and including channel cross-section observations should be used to assign this Condition Index Rating. The assessment area for this variable is the floodprone area and abandoned floodplain/terraces.

Assessment Area: Floodprone area and abandoned floodplain/terraces

Condition Index Rating	Indicator or Description of Conditions
1.00	__The floodplain has not been physically manipulated. __No surface alterations (such as constructed channels, dams, dikes, diversions, dugouts, or fill) or subsurface alterations (such as tile drainage) are present. __Natural geomorphic features occur within the floodplain as evidenced by irregular, uneven surfaces (undulating conditions from meander scars, sediment bars, or hummocks). __The current stage of the channel would indicate an equilibrium channel corresponding to a Class I condition (sinuous, pre-modified channel).
0.75	__Few changes to the floodplain surface. __Observable changes in elevation are restricted to only farm roads or bridges with culverts. __The current stage of the channel would indicate quasi-equilibrium corresponding to a Class VI condition.
0.50	__Multiple geomorphic modifications to the floodplain surface to control flood energy, often with bank control structures, but still permitting flow access via culverts. __The current stage of the channel would indicate aggradations and widening, corresponding to a Class V condition.
0.25	__Complete geomorphic modification BUT still permits flow access via culverts and occasional overbank flooding. __The current stage of the channel would indicate degradation and widening corresponding to a Class IV condition.
✓ 0.10	✓Complete geomorphic modification to the floodprone area. Bank control structures (dikes, etc) are in a continuous structure preventing channel movement and also preventing overbank flow. ✓The current stage of the channel would indicate channelization and/or active bed degradation corresponding to a Class II or III condition.

Field Notes:

Class III condition
Geo mod
Abandoned terrace
disconnects floodplain

V_4 Riparian Condition & Vegetation Composition

User Notes: Riparian Vegetation Composition is a response variable to both natural and anthropogenic disturbance. Scoring of this variable is determined by comparing the dominant species observed in cross-sections within the RR assessment area to a list of diagnostic and most abundant species. Field sheets on following page.

Assessment Area: V_{4a} above the floodprone area with an artificial convention of 100' from the top of each bank; and, V_{4b} below the floodprone area.

Condition Index Rating	4a	4b	Indicator or Description of Conditions
1.00			__The percent concurrence of dominant plants observed with diagnostic species is ≥ 95 %. __Existing riparian habitat is of high caliber; if this site were to be preserved, minimal management would be necessary due to natural processes still being in effect. __Vegetation represents the reference standard condition with no chronic anthropogenic disturbances; or, __the site has recovered from historical anthropogenic disturbance.
0.75			__The percent concurrence of dominant plants observed with diagnostic species is ≥75 and < 95%. __Existing riparian habitat is only slightly degraded; preservation and/or improvement are likely with moderate management effort. __Native vegetation is on a recovery trajectory with compatible management practices that mimic natural disturbances (i.e., low intensity grazing). __Presences of areas disturbed through natural processes (i.e., fire and flood) are still evident.
0.50			__ The percent concurrence of dominant plants observed with diagnostic species is ≥50% and < 75%. __Existing riparian habitat somewhat degraded; preservation and/or improvement possible but would require significant management effort. __Native vegetation present for some representative communities, but invasive or ruderal species are prevalent. __ Disturbance is largely anthropogenic and natural processes influencing the plant community are rare.
0.25			__ The percent concurrence of dominant plants observed with diagnostic species is ≥ 25% or < 50%. __ Existing riparian habitat degraded; preservation not desirable or attainable; improvements are not likely or would require significant and costly management effort. __ Native vegetation is localized within the assessment area. __ Presence of areas disturbed through natural processes is not evident. __ Vegetation composition is dominated by invasive or ruderal species.
0.10			__ The percent concurrence of dominant plants observed with diagnostic species is ≥ 5% or < 25%. __ Existing riparian habitat is severely degraded. __ Native vegetation is largely absent, area is hardened (i.e., paved, urban, etc.) or graded.

Field Notes:

Reed canary/Japanese brome dominate

4a + 4b

4b has more diversity

V_5 Riparian Buffer Continuity and Width

User Notes: Riparian ecosystems typically form a relatively continuous corridor along the stream channel and floodplain. This variable is measured perpendicular from the top of the bank for a distance laterally of 100'. Both banks of the stream channel are measured and then averaged for determination of the summary rating and subsequent Condition Index Score assignment. Aerial photography can be used for estimation of this variable but should be verified in the field.

Assessment area: An artificial convention of 100' from the top of each bank

	Continuity (%)	100	80-99	60-79	40-59	20-39	5-19	<5
Width(ft)	≥100	1.00	0.90	0.70	0.50	0.30	0.15	0.00
	75-99	0.80	0.75	0.60	0.40	0.25	0.10	0.00
	50-74	0.60	0.50	0.50	0.30	0.20	0.10	0.00
	25-49	0.40	0.30	0.30	0.20	0.15	0.05	0.00
	10-24	0.20	0.20	0.15	0.10	0.10	0.05	0.00
	5-9	0.10	0.10	0.10	0.05	0.05	0.01	0.00
	<5	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Corresponding Summary Rating with Variable score:

If summary rating is between :	Assign the following Condition Index Score:
0.80 - 1.00	1.00
0.60 - 0.79	0.75
0.40 - 0.59	0.50
0.20 - 0.39	0.25
0.01 - 0.19	0.10

0.0 - OR No buffer of permanent vegetation is present = 0

Field Notes:

L Descending (west)

100' f/ top of bank

Japanese brome fescue

100% veg mowed grass

Permanent vegetation

East bank

100% mowed grass

Assign .50 because 1.0 would be pristine condition

V_6 Riparian Land Use

User Notes: Land use indicates the way in which a tract of land is utilized, has been developed, or the type of vegetation present

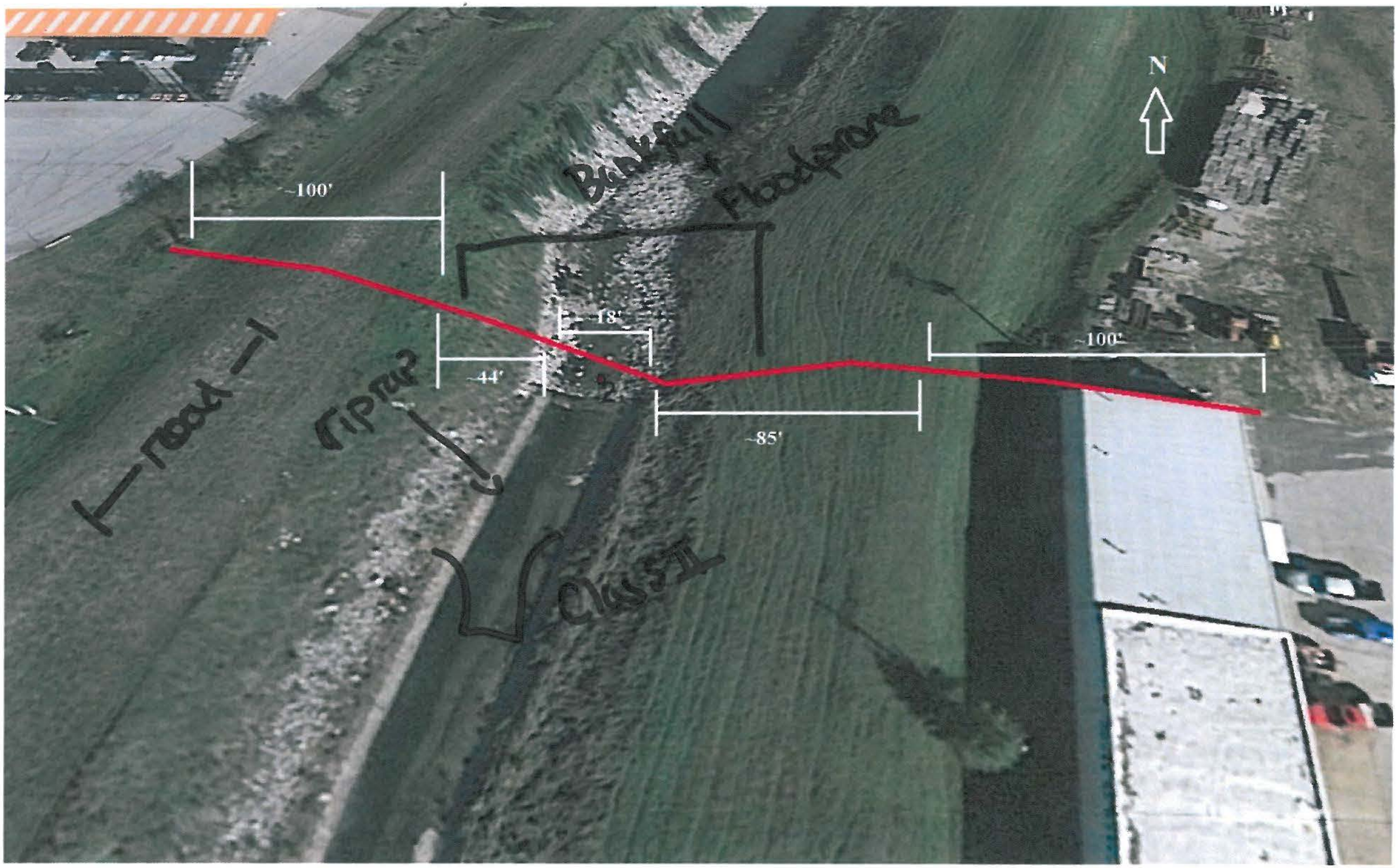
Assessment area: An artificial convention of 100' from the top of each bank. For land use assessment in stream to reservoir conversions, the assessment area is defined as 100' from the lateral extent of the floodpool. This boundary convention is considered synonymous with the upper extent of the floodprone area of stream systems.

Land Use Category	Land Use Weight		Area of Land Use		Weighted score (WS) for each land use category
Impermeable surface	1	X		=	
Feed lot	1	X		=	
Row crop or Small grain	3	X	20	=	60
Farmstead = pasture/mowed	6	X	180	=	1080
Woodlot/shelterbelt	6	X		=	
Perennial Cover of any type	8	X		=	
Managed for native vegetation cover and diversity	10	X		=	
			200 Total area	=	
*User notes: Σ WS is the sum of the Weighted Scores WA is the Weighted Average as defined by ΣWeighted Scores /Total area					Σ WS = 1140/200 WA = 5.7

If the Land Use Weighted Average is:	Assign the following Condition Index Score:
>8	1.00
7-8	0.75
5-6	0.50
2-4	0.25
< 1	0.10

Field Notes:

west bank = 100% mowed
east bank = 80% mowed



Approximate cross section of DP2. Imagery from GoogleEarth® 2016.

DP2 Existing Conditions

V_1 Hydraulic Conveyance and Sediment Dynamics

User notes: Hydraulic conveyance and sediment dynamics addresses fluvial processes for the active channel within the RR. This indicator is assessed by narrative criteria or measured as a percent of the length of mainstem channel in a riparian reach with (AHC). Aerial photography and field observations are used to estimate the Condition Index Rating of this metric. For impact or mitigation evaluations, **the Condition Index Rating is zero when a stream is converted to a lacustrine system.**

Assessment Area: below bankfull width

Condition Index Rating	Indicator Score or Description of Condition
1.00	__Movement of sediment in the channel is in equilibrium in terms of supply, erosion, and deposition processes. __**On most streams** there are alternating point bars; bank erosion occurs, but is stabilized and moderated by vegetation; and channel width, form, and floodplain area is consistent through the reach. __**In some streams**, some of these indicators may not be apparent, but overall bank and hill slope erosion is moderated by vegetation and there are no apparent culturally induced catastrophic failures. __The channel is stable, no active down-cutting occurring, or; old down-cutting apparent but a new, stable riparian area has formed within the incised channel, OR; __≤5% of active channel within the riparian reach with altered hydraulic conveyance (AHC).
0.75	__Movement of sediment in the channel is in equilibrium with the current hydrologic regime, as opposed to a culturally unaltered condition, and exhibits an overall balance in terms of erosion and deposition processes. __**On most streams** there are alternating point bars; bank erosion occurs, but is stabilized and moderated by vegetation; and channel width, form, and floodplain area are consistent through the reach. __**In some streams**, some of these indicators may not be apparent, but overall bank and hill slope erosion is moderated by vegetation and no culturally induced catastrophic failures are apparent. __The channel has evidence of old down-cutting that has begun stabilizing, vegetation is beginning to establish, even at the base of the falling banks, soil disturbance is evident, OR; __>5 and ≤15% of riparian reach with AHC.
0.50	__Sediment disequilibrium is minor and localized within the reach. __This includes small, localized areas of bank protection, slumping, or encroachment on the floodplain and channel. __This condition class includes previously disrupted reaches on a recovery trajectory, such as deeply entrenched streams where down-cutting has been arrested by structural grade control, and there is sufficient room for lateral channel migration and establishment of a functional floodplain within the incised channel. __Head cuts in early stage are present. Immediate action may prevent further degradation, OR; __ >15 and ≤30% of riparian reach with AHC.
0.25	__Sediment erosion and deposition out of equilibrium. __Water inflow is sediment rich, poor or accelerated bank erosion exists. Channel not actively incising but extensive disequilibrium is evident. __Typical indicators include extensive bank slumping (erosion events that exceed any moderating influence of native vegetation), active gullies feeding into the reach from adjacent hill slopes, or shoaling of sediments rather than deposition in sorted lateral and mid-channel bars. __Apparently stable channels should be placed in this category if there is evidence of regular mechanical disruption, such as bulldozing of the channel bottom and clearing of riparian vegetation to improve flood conveyance. __ Channel with some widening, but limiting new floodplain development; the existing floodplain is not well vegetated. __The vegetation that is present is mainly pioneer species. Bank failure is common, OR; ✓>30 and ≤50% of riparian reach with AHC.
0.10 ✓	__Sediment dynamics within most of the reach are seriously disrupted. __This includes reaches where no significant storage or recruitment of sediment occurs (i.e., reaches in underground tunnels/culverts, and reaches hardened with rock or concrete). __It also includes reaches that are either actively incising or functioning as sediment traps (e.g., sediment basins). __This also includes reaches that have been subject to recent changes likely to induce severe disequilibrium, such as extensive floodplain filling, change in slope, channel straightening, or other changes that are likely to cause channel down-cutting during future high-flow events. __The channel is deeply incised, resembling a gully, little or no riparian area development, or active down-cutting is clearly occurring. Only occasional or rare flood events access the flood plain. __Tributaries will also exhibit signs of down-cutting, OR; > __50% of riparian reach with AHC.

Field Notes:

V_2 In-Stream Habitat/Available Cover

User Notes: The biological components of riparian ecosystems have adapted to episodic cycles of disturbance and developed a variety of mechanisms that make it possible to survive and flourish where other organisms cannot. This variable is evaluated below the floodprone area. For impact or mitigation evaluations, the Condition Index Rating is zero when a stream is converted to a lacustrine system.

Assessment Area: Below the estimated floodprone area

Condition Index Rating	Indicator or Description of Conditions
1.00	__Within the flood prone area, there is greater than >50% coverage by diverse habitat features favorable for stream faunal colonization and maintenance of vegetation dynamics for recruitment. __Features may include snags, submerged logs, undercut banks, roots, cobble, rocks, persistent leaf packs, pools and glides, or other stable habitat at a stage to allow colonization. __No barriers to faunal movement.
0.75	__ Within the flood prone area there is >30% and ≤50% coverage by habitat features favorable for stream faunal colonization and/or cover. __Many habitat features are not transient. Adequate habitat for maintenance of populations is evident. __Seasonal water withdrawals inhibit faunal movement within the reach.
0.50	__ Within the flood prone area, there is >10 and ≤30% coverage by habitat features favorable for stream faunal colonization and cover; __habitat availability may be less than desirable; __substrate may be frequently disturbed. __Drop structures, culverts, dams, or diversions are present within the reach, but with minimal effect to the channel gradient or __faunal movement. Some channel deepening is noticeable.
0.25	✓Within the flood prone area, there is ≤10% coverage of habitat features present; lack of habitat is obvious; substrate unstable or lacking; concrete lined channels are present within portions of the stream. __Habitat features and pools buried or lacking, channel bottom may be flat. __Drop structures, culverts, dams, or diversions are present within the reach with noticeable effects to the channel gradient (deepening) or inhibition of faunal movement.
0.10 ✓	✓Habitat features and pools are buried or lacking, channel bottom may be flat. __Channels banks are completely armored or concrete lined.

Field Notes:

V_3 Floodplain Interaction–Connectivity

User Notes: Floodplain Interaction–Connectivity indicates of the degree to which the hydrologic interaction between the bankfull channel and the active floodplain and terraces of the riparian ecosystem remains intact. In assigning the Condition Index Rating, the channel evolution concepts previously presented should be consulted. Previous observations for V1 Hydraulic Conveyance and Sediment dynamics variable and including channel cross-section observations should be used to assign this Condition Index Rating. The assessment area for this variable is the floodprone area and abandoned floodplain/terraces.

Assessment Area: Floodprone area and abandoned floodplain/terraces

Condition Index Rating	Indicator or Description of Conditions
1.00	__The floodplain has not been physically manipulated. __No surface alterations (such as constructed channels, dams, dikes, diversions, dugouts, or fill) or subsurface alterations (such as tile drainage) are present. __Natural geomorphic features occur within the floodplain as evidenced by irregular, uneven surfaces (undulating conditions from meander scars, sediment bars, or hummocks). __The current stage of the channel would indicate an equilibrium channel corresponding to a Class I condition (sinuous, pre-modified channel).
0.75	__Few changes to the floodplain surface. __Observable changes in elevation are restricted to only farm roads or bridges with culverts. __The current stage of the channel would indicate quasi-equilibrium corresponding to a Class VI condition.
0.50	__Multiple geomorphic modifications to the floodplain surface to control flood energy, often with bank control structures, but still permitting flow access via culverts. __The current stage of the channel would indicate aggradations and widening, corresponding to a Class V condition.
0.25	__Complete geomorphic modification BUT still permits flow access via culverts and occasional overbank flooding. __The current stage of the channel would indicate degradation and widening corresponding to a Class IV condition.
0.10	✓ Complete geomorphic modification to the floodprone area. Bank control structures (dikes, etc) are in a continuous structure preventing channel movement and also preventing overbank flow. ✓ The current stage of the channel would indicate channelization and/or active bed degradation corresponding to a Class II or III condition.

Field Notes:

V_4 Riparian Condition & Vegetation Composition

User Notes: Riparian Vegetation Composition is a response variable to both natural and anthropogenic disturbance. Scoring of this variable is determined by comparing the dominant species observed in cross-sections within the RR assessment area to a list of diagnostic and most abundant species. Field sheets on following page.

Assessment Area: V_{4a} above the floodprone area with an artificial convention of 100' from the top of each bank; and, V_{4b} below the floodprone area.

Condition Index Rating	4a	4b	Indicator or Description of Conditions
1.00			__The percent concurrence of dominant plants observed with diagnostic species is ≥ 95 %. __Existing riparian habitat is of high caliber; if this site were to be preserved, minimal management would be necessary due to natural processes still being in effect. __Vegetation represents the reference standard condition with no chronic anthropogenic disturbances; or, __the site has recovered from historical anthropogenic disturbance.
0.75			__The percent concurrence of dominant plants observed with diagnostic species is ≥75 and < 95%. __Existing riparian habitat is only slightly degraded; preservation and/or improvement are likely with moderate management effort. __Native vegetation is on a recovery trajectory with compatible management practices that mimic natural disturbances (i.e., low intensity grazing). __Presences of areas disturbed through natural processes (i.e., fire and flood) are still evident.
0.50			__ The percent concurrence of dominant plants observed with diagnostic species is ≥50% and < 75%. __Existing riparian habitat somewhat degraded; preservation and/or improvement possible but would require significant management effort. __Native vegetation present for some representative communities, but invasive or ruderal species are prevalent. __ Disturbance is largely anthropogenic and natural processes influencing the plant community are rare.
0.25			✓ The percent concurrence of dominant plants observed with diagnostic species is ≥ 25% or < 50%. ✓ Existing riparian habitat degraded; preservation not desirable or attainable; improvements are not likely or would require significant and costly management effort. __ Native vegetation is localized within the assessment area. ✓ Presence of areas disturbed through natural processes is not evident. ✓ Vegetation composition is dominated by invasive or ruderal species.
0.10			✓ The percent concurrence of dominant plants observed with diagnostic species is ≥ 5% or < 25%. ✓ Existing riparian habitat is severely degraded. ✓ Native vegetation is largely absent, area is hardened (i.e., paved, urban, etc.) or graded.

Field Notes:

4a = mowed grass area over gravel road on west bank

4b = Japanese brome, dominants = milkweed smartweed + indigo bush =

65/181 = 36%

V_5 Riparian Buffer Continuity and Width

User Notes: Riparian ecosystems typically form a relatively continuous corridor along the stream channel and floodplain. This variable is measured perpendicular from the top of the bank for a distance laterally of 100'. Both banks of the stream channel are measured and then averaged for determination of the summary rating and subsequent Condition Index Score assignment. Aerial photography can be used for estimation of this variable but should be verified in the field.

Assessment area: An artificial convention of 100' from the top of each bank

	Continuity (%)	100	80-99	60-79	40-59	20-39	5-19	<5
Width(ft)	≥100	1.00	0.90	0.70	0.50	0.30	0.15	0.00
	75-99	0.80	0.75	0.60	0.40	0.25	0.10	0.00
	50-74	0.60	0.50	0.50	0.30	0.20	0.10	0.00
	25-49	0.40	0.30	0.30	0.20	0.15	0.05	0.00
	10-24	0.20	0.20	0.15	0.10	0.10	0.05	0.00
	5-9	0.10	0.10	0.10	0.05	0.05	0.01	0.00
	<5	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Corresponding Summary Rating with Variable score:

If summary rating is between :	Assign the following Condition Index Score:
0.80 - 1.00	1.00
0.60 - 0.79	0.75
0.40 - 0.59	0.50
0.20 - 0.39	0.25
0.01 - 0.19	0.10

0.0 - OR No buffer of permanent vegetation is present = 0

.1
.2
.3/2 = .15

Field Notes:

West =
40% veg
for 20 ft (gravel road on bank)

east = 40% veg
40 feet (building/parking lot)

V_6 Riparian Land Use

User Notes: Land use indicates the way in which a tract of land is utilized, has been developed, or the type of vegetation present

Assessment area: An artificial convention of 100' from the top of each bank. For land use assessment in stream to reservoir conversions, the assessment area is defined as 100' from the lateral extent of the floodpool. This boundary convention is considered synonymous with the upper extent of the floodprone area of stream systems.

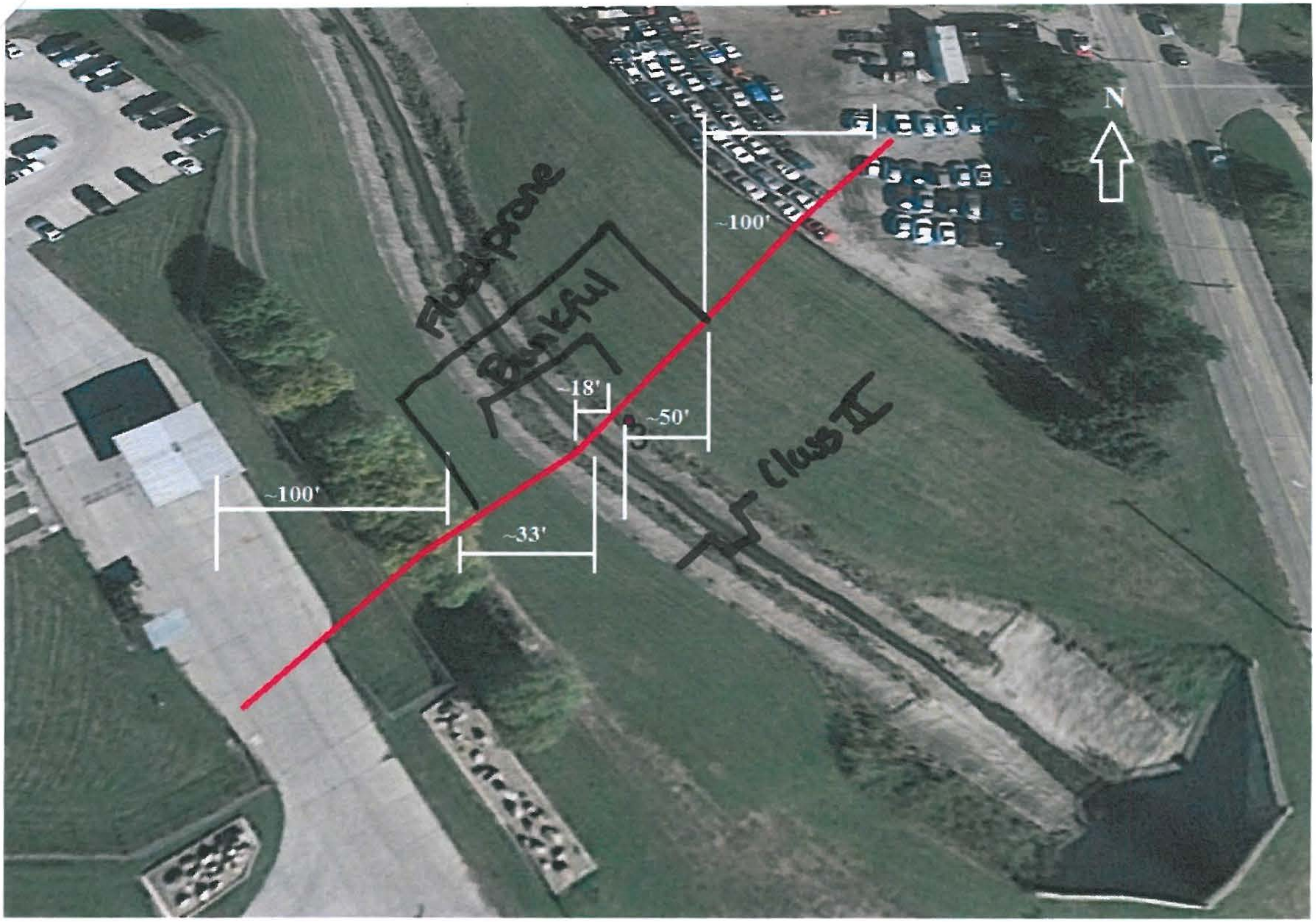
Land Use Category	Land Use Weight		Area of Land Use		Weighted score (WS) for each land use category
Impermeable surface	1	X	60+50	=	110
Feed lot	1	X		=	
Row crop or Small grain	3	X		=	
Farmstead (grass)	6	X	40+50	=	540
Woodlot/shelterbelt	6	X		=	
Perennial Cover of any type	8	X		=	
Managed for native vegetation cover and diversity	10	X		=	
			200 Total area	=	
*User notes: Σ WS is the sum of the Weighted Scores WA is the Weighted Average as defined by ΣWeighted Scores /Total area					Σ WS = 650/200 WA = = 3.25

If the Land Use Weighted Average is:	Assign the following Condition Index Score:
>8	1.00
7-8	0.75
5-6	0.50
2-4	0.25
< 1	0.10

Field Notes:

East bank = 60 ft impervious
40 ft mowed grass

west bank = 100 ft mowed grass (on top of gravel road)
So 50 feet made imperviousness + 50 ft mowed



Approximate cross section of DP3. Imagery from GoogleEarth® 2016.

DP3 Existing Condition

V_1 Hydraulic Conveyance and Sediment Dynamics

User notes: Hydraulic conveyance and sediment dynamics addresses fluvial processes for the active channel within the RR. This indicator is assessed by narrative criteria or measured as a percent of the length of mainstem channel in a riparian reach with (AHC). Aerial photography and field observations are used to estimate the Condition Index Rating of this metric. For impact or mitigation evaluations, **the Condition Index Rating is zero when a stream is converted to a lacustrine system.**

Assessment Area: below bankfull width

Condition Index Rating	Indicator Score or Description of Condition
1.00	__Movement of sediment in the channel is in equilibrium in terms of supply, erosion, and deposition processes. __**On most streams** there are alternating point bars; bank erosion occurs, but is stabilized and moderated by vegetation; and channel width, form, and floodplain area is consistent through the reach. __**In some streams**, some of these indicators may not be apparent, but overall bank and hill slope erosion is moderated by vegetation and there are no apparent culturally induced catastrophic failures. __The channel is stable, no active down-cutting occurring, or; old down-cutting apparent but a new, stable riparian area has formed within the incised channel, OR; __≤5% of active channel within the riparian reach with altered hydraulic conveyance (AHC).
0.75	__Movement of sediment in the channel is in equilibrium with the current hydrologic regime, as opposed to a culturally unaltered condition, and exhibits an overall balance in terms of erosion and deposition processes. __**On most streams** there are alternating point bars; bank erosion occurs, but is stabilized and moderated by vegetation; and channel width, form, and floodplain area are consistent through the reach. __**In some streams**, some of these indicators may not be apparent, but overall bank and hill slope erosion is moderated by vegetation and no culturally induced catastrophic failures are apparent. __The channel has evidence of old down-cutting that has begun stabilizing, vegetation is beginning to establish, even at the base of the falling banks, soil disturbance is evident, OR; __>5 and ≤15% of riparian reach with AHC.
0.50	__Sediment disequilibrium is minor and localized within the reach. __This includes small, localized areas of bank protection, slumping, or encroachment on the floodplain and channel. __This condition class includes previously disrupted reaches on a recovery trajectory, such as deeply entrenched streams where down-cutting has been arrested by structural grade control, and there is sufficient room for lateral channel migration and establishment of a functional floodplain within the incised channel. __Head cuts in early stage are present. Immediate action may prevent further degradation, OR; __ >15 and ≤30% of riparian reach with AHC.
0.25	__Sediment erosion and deposition out of equilibrium. __Water inflow is sediment rich, poor or accelerated bank erosion exists. Channel not actively incising but extensive disequilibrium is evident. __Typical indicators include extensive bank slumping (erosion events that exceed any moderating influence of native vegetation), active gullies feeding into the reach from adjacent hill slopes, or shoaling of sediments rather than deposition in sorted lateral and mid-channel bars. __Apparently stable channels should be placed in this category if there is evidence of regular mechanical disruption, such as bulldozing of the channel bottom and clearing of riparian vegetation to improve flood conveyance. __ Channel with some widening, but limiting new floodplain development; the existing floodplain is not well vegetated. __The vegetation that is present is mainly pioneer species. Bank failure is common, OR; __ >30 and ≤50% of riparian reach with AHC.
✓ 0.10	✓Sediment dynamics within most of the reach are seriously disrupted. ✓This includes reaches where no significant storage or recruitment of sediment occurs (i.e., reaches in underground tunnels/culverts, and reaches hardened with rock or concrete). __It also includes reaches that are either actively incising or functioning as sediment traps (e.g., sediment basins). ✓This also includes reaches that have been subject to recent changes likely to induce severe disequilibrium, such as extensive floodplain filling, change in slope, channel straightening, or other changes that are likely to cause channel down-cutting during future high-flow events. __The channel is deeply incised, resembling a gully, little or no riparian area development, or active down-cutting is clearly occurring. Only occasional or rare flood events access the flood plain. __Tributaries will also exhibit signs of down-cutting, OR; > ✓50% of riparian reach with AHC.

Field Notes:

V_2 In-Stream Habitat/Available Cover

User Notes: The biological components of riparian ecosystems have adapted to episodic cycles of disturbance and developed a variety of mechanisms that make it possible to survive and flourish where other organisms cannot. This variable is evaluated below the floodprone area. For impact or mitigation evaluations, the Condition Index Rating is zero when a stream is converted to a lacustrine system.

Assessment Area: Below the estimated floodprone area

Condition Index Rating	Indicator or Description of Conditions
1.00	__Within the flood prone area, there is greater than >50% coverage by diverse habitat features favorable for stream faunal colonization and maintenance of vegetation dynamics for recruitment. __Features may include snags, submerged logs, undercut banks, roots, cobble, rocks, persistent leaf packs, pools and glides, or other stable habitat at a stage to allow colonization. __No barriers to faunal movement.
0.75	__ Within the flood prone area there is >30% and ≤50% coverage by habitat features favorable for stream faunal colonization and/or cover. __Many habitat features are not transient. Adequate habitat for maintenance of populations is evident. __Seasonal water withdrawals inhibit faunal movement within the reach.
0.50	__ Within the flood prone area, there is >10 and ≤30% coverage by habitat features favorable for stream faunal colonization and cover; __habitat availability may be less than desirable; __substrate may be frequently disturbed. __Drop structures, culverts, dams, or diversions are present within the reach, but with minimal effect to the channel gradient or __faunal movement. Some channel deepening is noticeable.
0.25	__ Within the flood prone area, there is ≤10% coverage of habitat features present; lack of habitat is obvious; substrate unstable or lacking; concrete lined channels are present within portions of the stream. __Habitat features and pools buried or lacking, channel bottom may be flat. __Drop structures, culverts, dams, or diversions are present within the reach with noticeable effects to the channel gradient (deepening) or inhibition of faunal movement.
✓ 0.10	✓Habitat features and pools are buried or lacking, channel bottom may be flat. ✓Channels banks are completely armored or concrete lined.

Field Notes:

V_3 Floodplain Interaction–Connectivity

User Notes: Floodplain Interaction–Connectivity indicates of the degree to which the hydrologic interaction between the bankfull channel and the active floodplain and terraces of the riparian ecosystem remains intact. In assigning the Condition Index Rating, the channel evolution concepts previously presented should be consulted. Previous observations for V1 Hydraulic Conveyance and Sediment dynamics variable and including channel cross-section observations should be used to assign this Condition Index Rating. The assessment area for this variable is the floodprone area and abandoned floodplain/terraces.

Assessment Area: Floodprone area and abandoned floodplain/terraces

Condition Index Rating	Indicator or Description of Conditions
1.00	__The floodplain has not been physically manipulated. __No surface alterations (such as constructed channels, dams, dikes, diversions, dugouts, or fill) or subsurface alterations (such as tile drainage) are present. __Natural geomorphic features occur within the floodplain as evidenced by irregular, uneven surfaces (undulating conditions from meander scars, sediment bars, or hummocks). __The current stage of the channel would indicate an equilibrium channel corresponding to a Class I condition (sinuous, pre-modified channel).
0.75	__Few changes to the floodplain surface. __Observable changes in elevation are restricted to only farm roads or bridges with culverts. __The current stage of the channel would indicate quasi-equilibrium corresponding to a Class VI condition.
0.50	__Multiple geomorphic modifications to the floodplain surface to control flood energy, often with bank control structures, but still permitting flow access via culverts. __The current stage of the channel would indicate aggradations and widening, corresponding to a Class V condition.
0.25	__Complete geomorphic modification BUT still permits flow access via culverts and occasional overbank flooding. __The current stage of the channel would indicate degradation and widening corresponding to a Class IV condition.
✓ 0.10	✓ Complete geomorphic modification to the floodprone area. Bank control structures (dikes, etc) are in a continuous structure preventing channel movement and also preventing overbank flow. ✓ The current stage of the channel would indicate channelization and/or active bed degradation corresponding to a Class II or III condition.

Field Notes:

V_4 Riparian Condition & Vegetation Composition

User Notes: Riparian Vegetation Composition is a response variable to both natural and anthropogenic disturbance. Scoring of this variable is determined by comparing the dominant species observed in cross-sections within the RR assessment area to a list of diagnostic and most abundant species. Field sheets on following page.

Assessment Area: V_{4a} above the floodprone area with an artificial convention of 100' from the top of each bank; and, V_{4b} below the floodprone area.

Condition Index Rating	4a	4b	Indicator or Description of Conditions
1.00			__The percent concurrence of dominant plants observed with diagnostic species is ≥ 95 %. __Existing riparian habitat is of high caliber; if this site were to be preserved, minimal management would be necessary due to natural processes still being in effect. __Vegetation represents the reference standard condition with no chronic anthropogenic disturbances; or, __the site has recovered from historical anthropogenic disturbance.
0.75			__The percent concurrence of dominant plants observed with diagnostic species is ≥75 and < 95%. __Existing riparian habitat is only slightly degraded; preservation and/or improvement are likely with moderate management effort. __Native vegetation is on a recovery trajectory with compatible management practices that mimic natural disturbances (i.e., low intensity grazing). __Presences of areas disturbed through natural processes (i.e., fire and flood) are still evident.
0.50			__ The percent concurrence of dominant plants observed with diagnostic species is ≥50% and < 75%. __Existing riparian habitat somewhat degraded; preservation and/or improvement possible but would require significant management effort. __Native vegetation present for some representative communities, but invasive or ruderal species are prevalent. __ Disturbance is largely anthropogenic and natural processes influencing the plant community are rare.
0.25			__ The percent concurrence of dominant plants observed with diagnostic species is ≥ 25% or < 50%. __ Existing riparian habitat degraded; preservation not desirable or attainable; improvements are not likely or would require significant and costly management effort. __ Native vegetation is localized within the assessment area. __ Presence of areas disturbed through natural processes is not evident. __ Vegetation composition is dominated by invasive or ruderal species.
0.10			✓ The percent concurrence of dominant plants observed with diagnostic species is ≥ 5% or < 25%. ✓ Existing riparian habitat is severely degraded. ✓ Native vegetation is largely absent, area is hardened (i.e., paved, urban, etc.) or graded.

Field Notes: 4a
above - primary mowed turfgrass

below 4b

Sunflower + lambsear

The species found are more fac → UPL species below bankfull

V_5 Riparian Buffer Continuity and Width

User Notes: Riparian ecosystems typically form a relatively continuous corridor along the stream channel and floodplain. This variable is measured perpendicular from the top of the bank for a distance laterally of 100'. Both banks of the stream channel are measured and then averaged for determination of the summary rating and subsequent Condition Index Score assignment. Aerial photography can be used for estimation of this variable but should be verified in the field.

Assessment area: An artificial convention of 100' from the top of each bank

	Continuity (%)	100	80-99	60-79	40-59	20-39	5-19	<5
Width (ft)	≥100	1.00	0.90	0.70	0.50	0.30	0.15	0.00
	75-99	0.80	0.75	0.60	0.40	0.25	0.10	0.00
	50-74	0.60	0.50	0.50	0.30	0.20	0.10	0.00
	25-49	0.40	0.30	0.30	0.20	0.15	0.05	0.00
	10-24	0.20	0.20	0.15	0.10	0.10	0.05	0.00
	5-9	0.10	0.10	0.10	0.05	0.05	0.01	0.00
	<5	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Corresponding Summary Rating with Variable score:

If summary rating is between :	Assign the following Condition Index Score:
0.80 - 1.00	1.00
0.60 - 0.79	0.75
0.40 - 0.59	0.50
0.20 - 0.39	0.25
0.01 - 0.19	0.10

0.0 - OR No buffer of permanent vegetation is present = 0

Field Notes:

West bank = 60%
for 60 ft

50 % veg for 50 ft

This measure doesn't state what kind of vegetation — all vegetation is mowed grass - continuity + width cannot be as high as a 0.75 rating

V_6 Riparian Land Use

User Notes: Land use indicates the way in which a tract of land is utilized, has been developed, or the type of vegetation present

Assessment area: An artificial convention of 100' from the top of each bank. For land use assessment in stream to reservoir conversions, the assessment area is defined as 100' from the lateral extent of the floodpool. This boundary convention is considered synonymous with the upper extent of the floodprone area of stream systems.

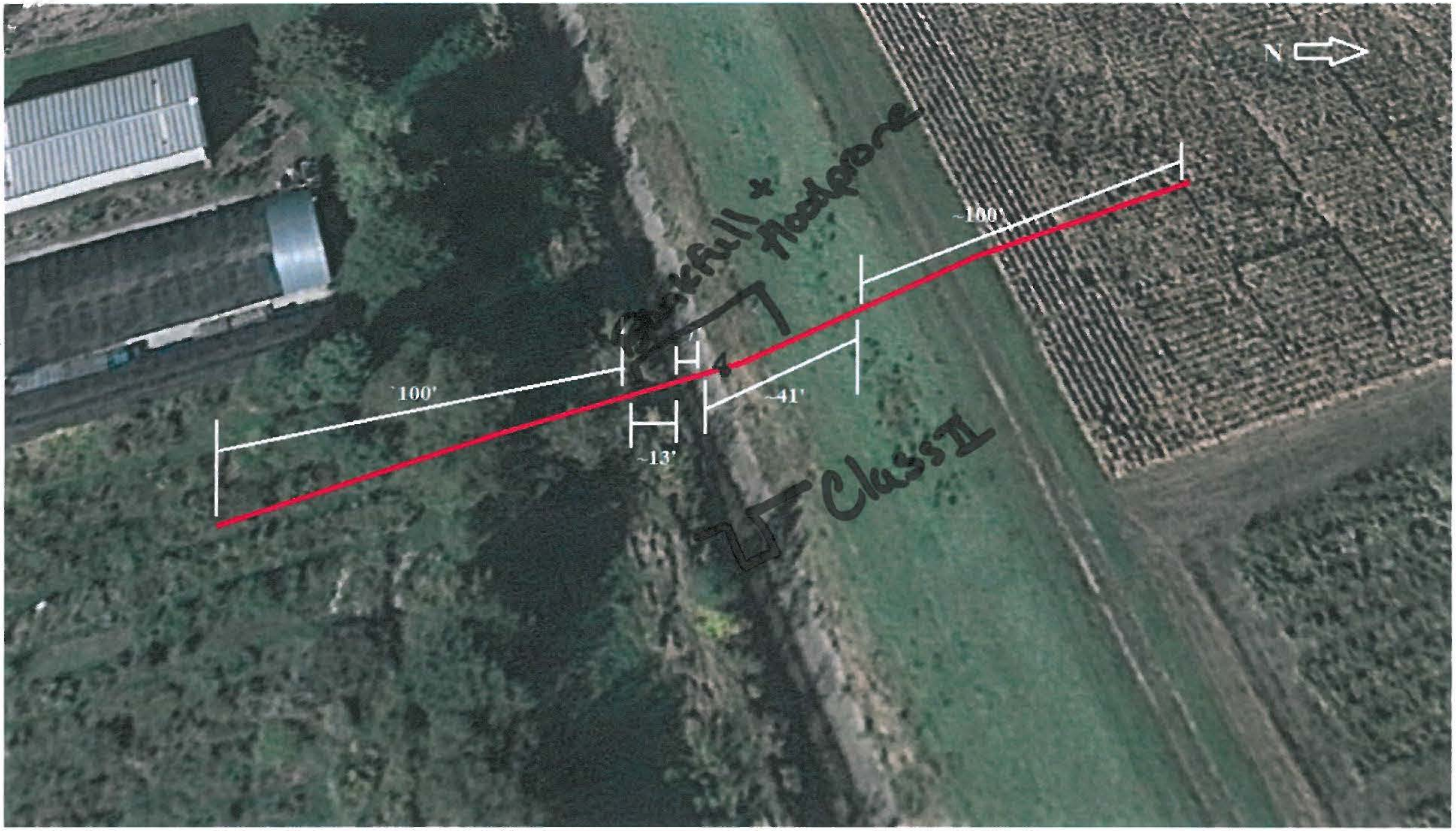
Land Use Category	Land Use Weight		Area of Land Use		Weighted score (WS) for each land use category
Impermeable surface	1	X	35+50	=	85
Feed lot	1	X		=	
Row crop or Small grain	3	X		=	
Farmstead	6	X	115	=	690
Woodlot/shelterbelt	6	X	10	=	60
Perennial Cover of any type	8	X		=	
Managed for native vegetation cover and diversity	10	X		=	
			200 Total area	=	
*User notes: Σ WS is the sum of the Weighted Scores WA is the Weighted Average as defined by ΣWeighted Scores /Total area					Σ WS = 835/ WA = /200 = 4.1

If the Land Use Weighted Average is:	Assign the following Condition Index Score:
≥8	1.00
7-8	0.75
5-6	0.50
2-4	0.25 ←
< 1	0.10

Field Notes:

West Bank = 35 ft parking lot
10 ft wood lot
65 ft mowed grass

east bank = 50 ft mowed grass
50 ft parking lot



Approximate cross section of DP4. Imagery from GoogleEarth® 2016.

DP 4 Existing

V_1 Hydraulic Conveyance and Sediment Dynamics

User notes: Hydraulic conveyance and sediment dynamics addresses fluvial processes for the active channel within the RR. This indicator is assessed by narrative criteria or measured as a percent of the length of mainstem channel in a riparian reach with (AHC). Aerial photography and field observations are used to estimate the Condition Index Rating of this metric. For impact or mitigation evaluations, **the Condition Index Rating is zero when a stream is converted to a lacustrine system.**

Assessment Area: below bankfull width

Condition Index Rating	Indicator Score or Description of Condition
1.00	__Movement of sediment in the channel is in equilibrium in terms of supply, erosion, and deposition processes. __**On most streams** there are alternating point bars; bank erosion occurs, but is stabilized and moderated by vegetation; and channel width, form, and floodplain area is consistent through the reach. __**In some streams**, some of these indicators may not be apparent, but overall bank and hill slope erosion is moderated by vegetation and there are no apparent culturally induced catastrophic failures. __The channel is stable, no active down-cutting occurring, or; old down-cutting apparent but a new, stable riparian area has formed within the incised channel, OR; __≤5% of active channel within the riparian reach with altered hydraulic conveyance (AHC).
0.75	__Movement of sediment in the channel is in equilibrium with the current hydrologic regime, as opposed to a culturally unaltered condition, and exhibits an overall balance in terms of erosion and deposition processes. __**On most streams** there are alternating point bars; bank erosion occurs, but is stabilized and moderated by vegetation; and channel width, form, and floodplain area are consistent through the reach. __**In some streams**, some of these indicators may not be apparent, but overall bank and hill slope erosion is moderated by vegetation and no culturally induced catastrophic failures are apparent. __The channel has evidence of old down-cutting that has begun stabilizing, vegetation is beginning to establish, even at the base of the falling banks, soil disturbance is evident, OR; __>5 and ≤15% of riparian reach with AHC.
0.50	__Sediment disequilibrium is minor and localized within the reach. __This includes small, localized areas of bank protection, slumping, or encroachment on the floodplain and channel. __This condition class includes previously disrupted reaches on a recovery trajectory, such as deeply entrenched streams where down-cutting has been arrested by structural grade control, and there is sufficient room for lateral channel migration and establishment of a functional floodplain within the incised channel. __Head cuts in early stage are present. Immediate action may prevent further degradation, OR; __ >15 and ≤30% of riparian reach with AHC.
0.25	__Sediment erosion and deposition out of equilibrium. __Water inflow is sediment rich, poor or accelerated bank erosion exists. Channel not actively incising but extensive disequilibrium is evident. __Typical indicators include extensive bank slumping (erosion events that exceed any moderating influence of native vegetation), active gullies feeding into the reach from adjacent hill slopes, or shoaling of sediments rather than deposition in sorted lateral and mid-channel bars. __Apparently stable channels should be placed in this category if there is evidence of regular mechanical disruption, such as bulldozing of the channel bottom and clearing of riparian vegetation to improve flood conveyance. __ Channel with some widening, but limiting new floodplain development; the existing floodplain is not well vegetated. __The vegetation that is present is mainly pioneer species. Bank failure is common, OR; __ >30 and ≤50% of riparian reach with AHC.
✓ 0.10	✓Sediment dynamics within most of the reach are seriously disrupted. ✓This includes reaches where no significant storage or recruitment of sediment occurs (i.e., reaches in underground tunnels/culverts, and reaches hardened with rock or concrete). __It also includes reaches that are either actively incising or functioning as sediment traps (e.g., sediment basins). ✓This also includes reaches that have been subject to recent changes likely to induce severe disequilibrium, such as extensive floodplain filling, change in slope, channel straightening, or other changes that are likely to cause channel down-cutting during future high-flow events. __The channel is deeply incised, resembling a gully, little or no riparian area development, or active down-cutting is clearly occurring. Only occasional or rare flood events access the flood plain. __Tributaries will also exhibit signs of down-cutting, OR; > ✓50% of riparian reach with AHC.

Field Notes:

East Bank (or north) is more gradual then west

V_2 In-Stream Habitat/Available Cover

User Notes: The biological components of riparian ecosystems have adapted to episodic cycles of disturbance and developed a variety of mechanisms that make it possible to survive and flourish where other organisms cannot. This variable is evaluated below the floodprone area. For impact or mitigation evaluations, the Condition Index Rating is zero when a stream is converted to a lacustrine system.

Assessment Area: Below the estimated floodprone area

Condition Index Rating	Indicator or Description of Conditions
1.00	__Within the flood prone area, there is greater than >50% coverage by diverse habitat features favorable for stream faunal colonization and maintenance of vegetation dynamics for recruitment. __Features may include snags, submerged logs, undercut banks, roots, cobble, rocks, persistent leaf packs, pools and glides, or other stable habitat at a stage to allow colonization. __No barriers to faunal movement.
0.75	__ Within the flood prone area there is >30% and ≤50% coverage by habitat features favorable for stream faunal colonization and/or cover. __Many habitat features are not transient. Adequate habitat for maintenance of populations is evident. __Seasonal water withdrawals inhibit faunal movement within the reach.
0.50	__ Within the flood prone area, there is >10 and ≤30% coverage by habitat features favorable for stream faunal colonization and cover; __habitat availability may be less than desirable; __substrate may be frequently disturbed. __Drop structures, culverts, dams, or diversions are present within the reach, but with minimal effect to the channel gradient or __faunal movement. Some channel deepening is noticeable.
0.25	__ Within the flood prone area, there is ≤10% coverage of habitat features present; lack of habitat is obvious; substrate unstable or lacking; concrete lined channels are present within portions of the stream. __Habitat features and pools buried or lacking, channel bottom may be flat. __Drop structures, culverts, dams, or diversions are present within the reach with noticeable effects to the channel gradient (deepening) or inhibition of faunal movement.
✓ 0.10	✓ Habitat features and pools are buried or lacking, channel bottom may be flat. ✓ Channels banks are completely armored or concrete lined.

Field Notes:

V_3 Floodplain Interaction–Connectivity

User Notes: Floodplain Interaction–Connectivity indicates of the degree to which the hydrologic interaction between the bankfull channel and the active floodplain and terraces of the riparian ecosystem remains intact. In assigning the Condition Index Rating, the channel evolution concepts previously presented should be consulted. Previous observations for V1 Hydraulic Conveyance and Sediment dynamics variable and including channel cross-section observations should be used to assign this Condition Index Rating. The assessment area for this variable is the floodprone area and abandoned floodplain/terraces.

Assessment Area: Floodprone area and abandoned floodplain/terraces

Condition Index Rating	Indicator or Description of Conditions
1.00	__The floodplain has not been physically manipulated. __No surface alterations (such as constructed channels, dams, dikes, diversions, dugouts, or fill) or subsurface alterations (such as tile drainage) are present. __Natural geomorphic features occur within the floodplain as evidenced by irregular, uneven surfaces (undulating conditions from meander scars, sediment bars, or hummocks). __The current stage of the channel would indicate an equilibrium channel corresponding to a Class I condition (sinuous, pre-modified channel).
0.75	__Few changes to the floodplain surface. __Observable changes in elevation are restricted to only farm roads or bridges with culverts. __The current stage of the channel would indicate quasi-equilibrium corresponding to a Class VI condition.
0.50	__Multiple geomorphic modifications to the floodplain surface to control flood energy, often with bank control structures, but still permitting flow access via culverts. __The current stage of the channel would indicate aggradations and widening, corresponding to a Class V condition.
0.25	__Complete geomorphic modification BUT still permits flow access via culverts and occasional overbank flooding. __The current stage of the channel would indicate degradation and widening corresponding to a Class IV condition.
0.10	✓Complete geomorphic modification to the floodprone area. Bank control structures (dikes, etc) are in a continuous structure preventing channel movement and also preventing overbank flow. ✓The current stage of the channel would indicate channelization and/or active bed degradation corresponding to a Class II or III condition.

Field Notes:

V_4 Riparian Condition & Vegetation Composition

User Notes: Riparian Vegetation Composition is a response variable to both natural and anthropogenic disturbance. Scoring of this variable is determined by comparing the dominant species observed in cross-sections within the RR assessment area to a list of diagnostic and most abundant species. Field sheets on following page.

Assessment Area: V_{4a} above the floodprone area with an artificial convention of 100' from the top of each bank; and, V_{4b} below the floodprone area.

Condition Index Rating	4a	4b	Indicator or Description of Conditions
1.00			__The percent concurrence of dominant plants observed with diagnostic species is ≥ 95 %. __Existing riparian habitat is of high caliber; if this site were to be preserved, minimal management would be necessary due to natural processes still being in effect. __Vegetation represents the reference standard condition with no chronic anthropogenic disturbances; or, __the site has recovered from historical anthropogenic disturbance.
0.75			__The percent concurrence of dominant plants observed with diagnostic species is ≥75 and < 95%. __Existing riparian habitat is only slightly degraded; preservation and/or improvement are likely with moderate management effort. __Native vegetation is on a recovery trajectory with compatible management practices that mimic natural disturbances (i.e., low intensity grazing). __Presences of areas disturbed through natural processes (i.e., fire and flood) are still evident.
0.50			__ The percent concurrence of dominant plants observed with diagnostic species is ≥50% and < 75%. __Existing riparian habitat somewhat degraded; preservation and/or improvement possible but would require significant management effort. __Native vegetation present for some representative communities, but invasive or ruderal species are prevalent. __ Disturbance is largely anthropogenic and natural processes influencing the plant community are rare.
0.25			✓The percent concurrence of dominant plants observed with diagnostic species is ≥ 25% or < 50%. ✓Existing riparian habitat degraded; preservation not desirable or attainable; improvements are not likely or would require significant and costly management effort. ✓Native vegetation is localized within the assessment area. ✓Presence of areas disturbed through natural processes is not evident. ✓Vegetation composition is dominated by invasive or ruderal species.
0.10			✓The percent concurrence of dominant plants observed with diagnostic species is ≥ 5% or < 25%. ✓Existing riparian habitat is severely degraded. ✓Native vegetation is largely absent, area is hardened (i.e., paved, urban, etc.) or graded.

Field Notes:

Above

Japanese brome + crown vetch dominant

Below - Indigobush = 53% - Indicator Diagnostic

V_5 Riparian Buffer Continuity and Width

User Notes: Riparian ecosystems typically form a relatively continuous corridor along the stream channel and floodplain. This variable is measured perpendicular from the top of the bank for a distance laterally of 100'. Both banks of the stream channel are measured and then averaged for determination of the summary rating and subsequent Condition Index Score assignment. Aerial photography can be used for estimation of this variable but should be verified in the field.

Assessment area: An artificial convention of 100' from the top of each bank

Width(ft)	Continuity (%)	100	80-99	60-79	40-59	20-39	5-19	<5
	≥100	1.00	0.90	0.70	0.50	0.30	0.15	0.00
	75-99	0.80	0.75	0.60	0.40	0.25	0.10	0.00
	50-74	0.60	0.50	0.50	0.30	0.20	0.10	0.00
	25-49	0.40	0.30	0.30	0.20	0.15	0.05	0.00
	10-24	0.20	0.20	0.15	0.10	0.10	0.05	0.00
	5-9	0.10	0.10	0.10	0.05	0.05	0.01	0.00
	<5	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Corresponding Summary Rating with Variable score:

If summary rating is between :	Assign the following Condition Index Score:
0.80 - 1.00	1.00
0.60 - 0.79	0.75
0.40 - 0.59	0.50
0.20 - 0.39	0.25
0.01 - 0.19	0.10
0.0 - OR No buffer of permanent vegetation is present = 0	

1.2/2= .6

Field Notes:

100% for 100 feet on west (south bank)

40% for 30 feet on east (road w/ gravel on embankment and row crop)

V_6 Riparian Land Use

User Notes: Land use indicates the way in which a tract of land is utilized, has been developed, or the type of vegetation present

Assessment area: An artificial convention of 100' from the top of each bank. For land use assessment in stream to reservoir conversions, the assessment area is defined as 100' from the lateral extent of the floodpool. This boundary convention is considered synonymous with the upper extent of the floodprone area of stream systems.

Land Use Category	Land Use Weight		Area of Land Use		Weighted score (WS) for each land use category
Impermeable surface	1	X	10	=	10
Feed lot	1	X		=	
Row crop or Small grain	3	X	60	=	180
Farmstead	6	X	30	=	180
Woodlot/shelterbelt	6	X	30	=	180
Perennial Cover of any type	8	X	70	=	560
Managed for native vegetation cover and diversity	10	X		=	
			200 Total area	=	
*User notes: Σ WS is the sum of the Weighted Scores WA is the Weighted Average as defined by ΣWeighted Scores /Total area					Σ WS = 1110/ WA = /200 = 5.5

If the Land Use Weighted Average is:	Assign the following Condition Index Score:
>8	1.00
7-8	0.75
5-6	0.50
2-4	0.25
< 1	0.10

Field Notes:

10 feet impervious (gravel trail)
30 feet mowed grass
60 feet row crop
on East/North bank

West Bank =
30 feet woodlot/shelter
70 perennial cover
(arboretum)

Approximate cross section of DP5. Imagery from GoogleEarth® 2016.

DP5 Existing Conditions

V$_1$ Hydraulic Conveyance and Sediment Dynamics

User notes: Hydraulic conveyance and sediment dynamics addresses fluvial processes for the active channel within the RR. This indicator is assessed by narrative criteria or measured as a percent of the length of mainstem channel in a riparian reach with (AHC). Aerial photography and field observations are used to estimate the Condition Index Rating of this metric. For impact or mitigation evaluations, **the Condition Index Rating is zero when a stream is converted to a lacustrine system.**

Assessment Area: below bankfull width

Condition Index Rating	Indicator Score or Description of Condition
1.00	__Movement of sediment in the channel is in equilibrium in terms of supply, erosion, and deposition processes. __**On most streams** there are alternating point bars; bank erosion occurs, but is stabilized and moderated by vegetation; and channel width, form, and floodplain area is consistent through the reach. __**In some streams**, some of these indicators may not be apparent, but overall bank and hill slope erosion is moderated by vegetation and there are no apparent culturally induced catastrophic failures. __The channel is stable, no active down-cutting occurring, or; old down-cutting apparent but a new, stable riparian area has formed within the incised channel, OR; __≤5% of active channel within the riparian reach with altered hydraulic conveyance (AHC).
0.75	__Movement of sediment in the channel is in equilibrium with the current hydrologic regime, as opposed to a culturally unaltered condition, and exhibits an overall balance in terms of erosion and deposition processes. __**On most streams** there are alternating point bars; bank erosion occurs, but is stabilized and moderated by vegetation; and channel width, form, and floodplain area are consistent through the reach. __**In some streams**, some of these indicators may not be apparent, but overall bank and hill slope erosion is moderated by vegetation and no culturally induced catastrophic failures are apparent. __The channel has evidence of old down-cutting that has begun stabilizing, vegetation is beginning to establish, even at the base of the falling banks, soil disturbance is evident, OR; __>5 and ≤15% of riparian reach with AHC.
0.50	__Sediment disequilibrium is minor and localized within the reach. __This includes small, localized areas of bank protection, slumping, or encroachment on the floodplain and channel. __This condition class includes previously disrupted reaches on a recovery trajectory, such as deeply entrenched streams where down-cutting has been arrested by structural grade control, and there is sufficient room for lateral channel migration and establishment of a functional floodplain within the incised channel. __Head cuts in early stage are present. Immediate action may prevent further degradation, OR; ✓ >15 and ≤30% of riparian reach with AHC.
✓ 0.25	✓Sediment erosion and deposition out of equilibrium. ✓Water inflow is sediment rich, poor or accelerated bank erosion exists. Channel not actively incising but extensive disequilibrium is evident. __Typical indicators include extensive bank slumping (erosion events that exceed any moderating influence of native vegetation), active gullies feeding into the reach from adjacent hill slopes, or shoaling of sediments rather than deposition in sorted lateral and mid-channel bars. __Apparently stable channels should be placed in this category if there is evidence of regular mechanical disruption, such as bulldozing of the channel bottom and clearing of riparian vegetation to improve flood conveyance. ✓Channel with some widening, but limiting new floodplain development; the existing floodplain is not well vegetated. ← Invasive __The vegetation that is present is mainly pioneer species. Bank failure is common, OR; Severe erosion __ >30 and ≤50% of riparian reach with AHC. + sloughing
0.10	__Sediment dynamics within most of the reach are seriously disrupted. __This includes reaches where no significant storage or recruitment of sediment occurs (i.e., reaches in underground tunnels/culverts, and reaches hardened with rock or concrete). ✓It also includes reaches that are either actively incising or functioning as sediment traps (e.g., sediment basins). ✓This also includes reaches that have been subject to recent changes likely to induce severe disequilibrium, such as extensive floodplain filling, change in slope, channel straightening, or other changes that are likely to cause channel down-cutting during future high-flow events. __The channel is deeply incised, resembling a gully, little or no riparian area development, or active down-cutting is clearly occurring. Only occasional or rare flood events access the flood plain. __Tributaries will also exhibit signs of down-cutting, OR; > __50% of riparian reach with AHC.

Field Notes:

Bankfull @ East Campus about ½ way up bank (Mark Nelson discuss frequency of hydrology)

Assigned 0.25 - while it is highly degraded - likely somewhat better than concrete + flat bottom

V_2 In-Stream Habitat/Available Cover

User Notes: The biological components of riparian ecosystems have adapted to episodic cycles of disturbance and developed a variety of mechanisms that make it possible to survive and flourish where other organisms cannot. This variable is evaluated below the floodprone area. For impact or mitigation evaluations, the Condition Index Rating is zero when a stream is converted to a lacustrine system.

Assessment Area: Below the estimated floodprone area

Condition Index Rating	Indicator or Description of Conditions
1.00	__Within the flood prone area, there is greater than >50% coverage by diverse habitat features favorable for stream faunal colonization and maintenance of vegetation dynamics for recruitment. __Features may include snags, submerged logs, undercut banks, roots, cobble, rocks, persistent leaf packs, pools and glides, or other stable habitat at a stage to allow colonization. __No barriers to faunal movement.
0.75	__ Within the flood prone area there is >30% and ≤50% coverage by habitat features favorable for stream faunal colonization and/or cover. __Many habitat features are not transient. Adequate habitat for maintenance of populations is evident. __Seasonal water withdrawals inhibit faunal movement within the reach.
✓ 0.50	✓ Within the flood prone area, there is >10 and ≤30% coverage by habitat features favorable for stream faunal colonization and cover; ✓ habitat availability may be less than desirable; ✓ substrate may be frequently disturbed. __Drop structures, culverts, dams, or diversions are present within the reach, but with minimal effect to the channel gradient or __faunal movement. Some channel deepening is noticeable.
0.25	__ Within the flood prone area, there is ≤10% coverage of habitat features present; lack of habitat is obvious; substrate unstable or lacking; concrete lined channels are present within portions of the stream. __Habitat features and pools buried or lacking, channel bottom may be flat. __Drop structures, culverts, dams, or diversions are present within the reach with noticeable effects to the channel gradient (deepening) or inhibition of faunal movement.
0.10	__Habitat features and pools are buried or lacking, channel bottom may be flat. __Channels banks are completely armored or concrete lined.

Field Notes:

V_3 Floodplain Interaction–Connectivity

User Notes: Floodplain Interaction–Connectivity indicates of the degree to which the hydrologic interaction between the bankfull channel and the active floodplain and terraces of the riparian ecosystem remains intact. In assigning the Condition Index Rating, the channel evolution concepts previously presented should be consulted. Previous observations for V1 Hydraulic Conveyance and Sediment dynamics variable and including channel cross-section observations should be used to assign this Condition Index Rating. The assessment area for this variable is the floodprone area and abandoned floodplain/terraces.

Assessment Area: Floodprone area and abandoned floodplain/terraces

Condition Index Rating	Indicator or Description of Conditions
1.00	__The floodplain has not been physically manipulated. __No surface alterations (such as constructed channels, dams, dikes, diversions, dugouts, or fill) or subsurface alterations (such as tile drainage) are present. __Natural geomorphic features occur within the floodplain as evidenced by irregular, uneven surfaces (undulating conditions from meander scars, sediment bars, or hummocks). __The current stage of the channel would indicate an equilibrium channel corresponding to a Class I condition (sinuous, pre-modified channel).
0.75	__Few changes to the floodplain surface. __Observable changes in elevation are restricted to only farm roads or bridges with culverts. __The current stage of the channel would indicate quasi-equilibrium corresponding to a Class VI condition.
0.50	__Multiple geomorphic modifications to the floodplain surface to control flood energy, often with bank control structures, but still permitting flow access via culverts. __The current stage of the channel would indicate aggradations and widening, corresponding to a Class V condition.
✓ 0.25	✓_Complete geomorphic modification BUT still permits flow access via culverts and occasional overbank flooding. _✓The current stage of the channel would indicate degradation and widening corresponding to a Class IV condition.
0.10	__Complete geomorphic modification to the floodprone area. Bank control structures (dikes, etc) are in a continuous structure preventing channel movement and also preventing overbank flow. __The current stage of the channel would indicate channelization and/or active bed degradation corresponding to a Class II or III condition.

Field Notes:

V_4 Riparian Condition & Vegetation Composition

User Notes: Riparian Vegetation Composition is a response variable to both natural and anthropogenic disturbance. Scoring of this variable is determined by comparing the dominant species observed in cross-sections within the RR assessment area to a list of diagnostic and most abundant species. Field sheets on following page.

Assessment Area: V_{4a} above the floodprone area with an artificial convention of 100' from the top of each bank; and, V_{4b} below the floodprone area.

Condition Index Rating	4a	4b	Indicator or Description of Conditions
1.00			__The percent concurrence of dominant plants observed with diagnostic species is ≥ 95 %. __Existing riparian habitat is of high caliber; if this site were to be preserved, minimal management would be necessary due to natural processes still being in effect. __Vegetation represents the reference standard condition with no chronic anthropogenic disturbances; or, __the site has recovered from historical anthropogenic disturbance.
0.75			__The percent concurrence of dominant plants observed with diagnostic species is ≥75 and < 95%. __Existing riparian habitat is only slightly degraded; preservation and/or improvement are likely with moderate management effort. __Native vegetation is on a recovery trajectory with compatible management practices that mimic natural disturbances (i.e., low intensity grazing). __Presences of areas disturbed through natural processes (i.e., fire and flood) are still evident.
0.50			__The percent concurrence of dominant plants observed with diagnostic species is ≥50% and < 75%. ✓Existing riparian habitat somewhat degraded; preservation and/or improvement possible but would require significant management effort. ✓Native vegetation present for some representative communities, but invasive or ruderal species are prevalent. __ Disturbance is largely anthropogenic and natural processes influencing the plant community are rare.
0.25			✓The percent concurrence of dominant plants observed with diagnostic species is ≥ 25% or < 50%. __ Existing riparian habitat degraded; preservation not desirable or attainable; improvements are not likely or would require significant and costly management effort. ✓Native vegetation is localized within the assessment area. __ Presence of areas disturbed through natural processes is not evident. __ Vegetation composition is dominated by invasive or ruderal species.
0.10			✓The percent concurrence of dominant plants observed with diagnostic species is ≥ 5% or < 25%. ✓Existing riparian habitat is severely degraded. ✓Native vegetation is largely absent, area is hardened (i.e., paved, urban, etc.) or graded.

Field Notes:

Below floodprone area

Green ash + sugar maple = 65/178 = 36%

Above = turfgrasses on west (south) bank + cropland on East

V_5 Riparian Buffer Continuity and Width

User Notes: Riparian ecosystems typically form a relatively continuous corridor along the stream channel and floodplain. This variable is measured perpendicular from the top of the bank for a distance laterally of 100'. Both banks of the stream channel are measured and then averaged for determination of the summary rating and subsequent Condition Index Score assignment. Aerial photography can be used for estimation of this variable but should be verified in the field.

Assessment area: An artificial convention of 100' from ~~the top of~~ each bank

	Continuity (%)	100	80-99	60-79	40-59	20-39	5-19	<5
Width(ft)	≥100	1.00	0.90	0.70	0.50	0.30	0.15	0.00
	75-99	0.80	0.75	0.60	0.40	0.25	0.10	0.00
	50-74	0.60	0.50	0.50	0.30	0.20	0.10	0.00
	25-49	0.40	0.30	0.30	0.20	0.15	0.05	0.00
	10-24	0.20	0.20	0.15	0.10	0.10	0.05	0.00
	5-9	0.10	0.10	0.10	0.05	0.05	0.01	0.00
	<5	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Corresponding Summary Rating with Variable score:

If summary rating is between :	Assign the following Condition Index Score:
0.80 - 1.00	1.00
0.60 - 0.79	0.75
0.40 - 0.59	0.50
0.20 - 0.39	0.25
0.01 - 0.19	0.10

0.0 - OR No buffer of permanent vegetation is present = 0

1.15/2 = .575

Field Notes:

east bank = 60% for 20 feet (mostly row crop + gravel path)

west bank = mowed turf grass/field 100% for 100 feet

V_6 Riparian Land Use

User Notes: Land use indicates the way in which a tract of land is utilized, has been developed, or the type of vegetation present

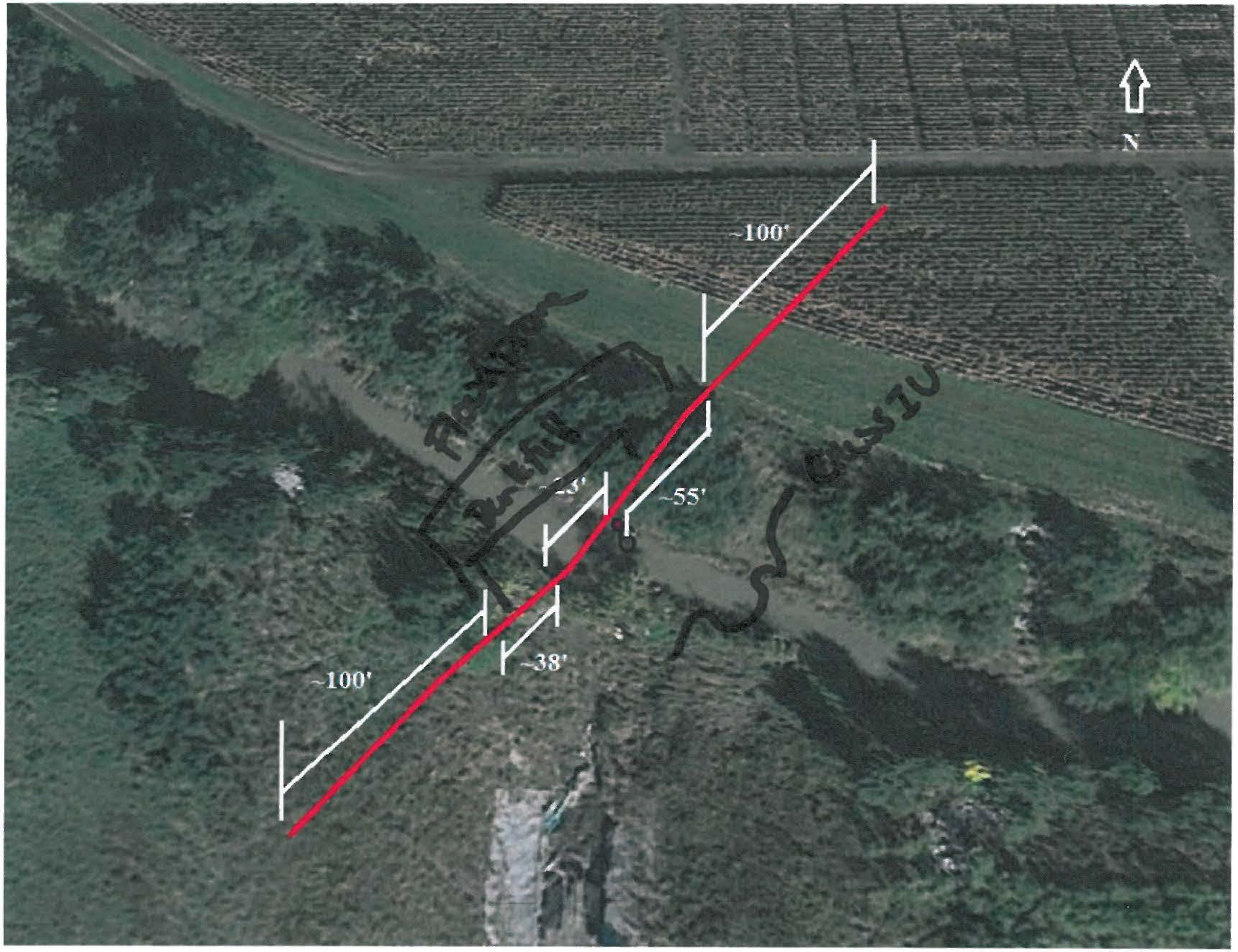
Assessment area: An artificial convention of 100' from the top of each bank. For land use assessment in stream to reservoir conversions, the assessment area is defined as 100' from the lateral extent of the floodpool. This boundary convention is considered synonymous with the upper extent of the floodprone area of stream systems.

Land Use Category	Land Use Weight		Area of Land Use		Weighted score (WS) for each land use category
Impermeable surface	1	X	10	=	10
Feed lot	1	X		=	
Row crop or Small grain	3	X	65	=	195
Farmstead	6	X	25+75	=	600
Woodlot/shelterbelt	6	X		=	
Perennial Cover of any type	8	X	25	=	200
Managed for native vegetation cover and diversity	10	X		=	
			200 Total area	=	
*User notes: Σ WS is the sum of the Weighted Scores WA is the Weighted Average as defined by ΣWeighted Scores /Total area					Σ WS = 1005/ WA = 200 = 5

If the Land Use Weighted Average is:	Assign the following Condition Index Score:
≥8	1.00
7-8	0.75
5-6	0.50
2-4	0.25
< 1	0.10

Field Notes:

west bank = small buffer
~25 ft - cover of any type (Bup Brome) mostly
75 ft mowed grass
east bank = 10 ft impervious surface (trail)
65 ft row crop
25 ft mowed grass



Approximate cross section of DP6. Imagery from GoogleEarth® 2016.

DP6 Existing Conditions

V_1 Hydraulic Conveyance and Sediment Dynamics

User notes: Hydraulic conveyance and sediment dynamics addresses fluvial processes for the active channel within the RR. This indicator is assessed by narrative criteria or measured as a percent of the length of mainstem channel in a riparian reach with (AHC). Aerial photography and field observations are used to estimate the Condition Index Rating of this metric. For impact or mitigation evaluations, **the Condition Index Rating is zero when a stream is converted to a lacustrine system.**

Assessment Area: below bankfull width

Condition Index Rating	Indicator Score or Description of Condition
1.00	__Movement of sediment in the channel is in equilibrium in terms of supply, erosion, and deposition processes. __**On most streams** there are alternating point bars; bank erosion occurs, but is stabilized and moderated by vegetation; and channel width, form, and floodplain area is consistent through the reach. __**In some streams**, some of these indicators may not be apparent, but overall bank and hill slope erosion is moderated by vegetation and there are no apparent culturally induced catastrophic failures. __The channel is stable, no active down-cutting occurring, or; old down-cutting apparent but a new, stable riparian area has formed within the incised channel, OR; __≤5% of active channel within the riparian reach with altered hydraulic conveyance (AHC).
0.75	__Movement of sediment in the channel is in equilibrium with the current hydrologic regime, as opposed to a culturally unaltered condition, and exhibits an overall balance in terms of erosion and deposition processes. __**On most streams** there are alternating point bars; bank erosion occurs, but is stabilized and moderated by vegetation; and channel width, form, and floodplain area are consistent through the reach. __**In some streams**, some of these indicators may not be apparent, but overall bank and hill slope erosion is moderated by vegetation and no culturally induced catastrophic failures are apparent. __The channel has evidence of old down-cutting that has begun stabilizing, vegetation is beginning to establish, even at the base of the falling banks, soil disturbance is evident, OR; __>5 and ≤15% of riparian reach with AHC.
0.50	__Sediment disequilibrium is minor and localized within the reach. __This includes small, localized areas of bank protection, slumping, or encroachment on the floodplain and channel. __This condition class includes previously disrupted reaches on a recovery trajectory, such as deeply entrenched streams where down-cutting has been arrested by structural grade control, and there is sufficient room for lateral channel migration and establishment of a functional floodplain within the incised channel. ✓Head cuts in early stage are present. Immediate action may prevent further degradation, OR; ✓ >15 and ≤30% of riparian reach with AHC.
0.25	✓Sediment erosion and deposition out of equilibrium. ✓Water inflow is sediment rich, poor or accelerated bank erosion exists. Channel not actively incising but extensive disequilibrium is evident. __Typical indicators include extensive bank slumping (erosion events that exceed any moderating influence of native vegetation), active gullies feeding into the reach from adjacent hill slopes, or shoaling of sediments rather than deposition in sorted lateral and mid-channel bars. __Apparently stable channels should be placed in this category if there is evidence of regular mechanical disruption, such as bulldozing of the channel bottom and clearing of riparian vegetation to improve flood conveyance. ✓Channel with some widening, but limiting new floodplain development; the existing floodplain is not well vegetated. ✓The vegetation that is present is mainly pioneer species. Bank failure is common, OR; __ >30 and ≤50% of riparian reach with AHC.
0.10	__Sediment dynamics within most of the reach are seriously disrupted. __This includes reaches where no significant storage or recruitment of sediment occurs (i.e., reaches in underground tunnels/culverts, and reaches hardened with rock or concrete). __It also includes reaches that are either actively incising or functioning as sediment traps (e.g., sediment basins). __This also includes reaches that have been subject to recent changes likely to induce severe disequilibrium, such as extensive floodplain filling, change in slope, channel straightening, or other changes that are likely to cause channel down-cutting during future high-flow events. __The channel is deeply incised, resembling a gully, little or no riparian area development, or active down-cutting is clearly occurring. Only occasional or rare flood events access the flood plain. __Tributaries will also exhibit signs of down-cutting, OR; > __50% of riparian reach with AHC.

Field Notes:

Channel widening
Highly erosive
& sloughing

V_2 In-Stream Habitat/Available Cover

User Notes: The biological components of riparian ecosystems have adapted to episodic cycles of disturbance and developed a variety of mechanisms that make it possible to survive and flourish where other organisms cannot. This variable is evaluated below the floodprone area. For impact or mitigation evaluations, the Condition Index Rating is zero when a stream is converted to a lacustrine system.

Assessment Area: Below the estimated floodprone area

Condition Index Rating	Indicator or Description of Conditions
1.00	__Within the flood prone area, there is greater than >50% coverage by diverse habitat features favorable for stream faunal colonization and maintenance of vegetation dynamics for recruitment. __Features may include snags, submerged logs, undercut banks, roots, cobble, rocks, persistent leaf packs, pools and glides, or other stable habitat at a stage to allow colonization. __No barriers to faunal movement.
0.75	__ Within the flood prone area there is >30% and ≤50% coverage by habitat features favorable for stream faunal colonization and/or cover. __Many habitat features are not transient. Adequate habitat for maintenance of populations is evident. __Seasonal water withdrawals inhibit faunal movement within the reach.
0.50	__Within the flood prone area, there is >10 and ≤30% coverage by habitat features favorable for stream faunal colonization and cover; __habitat availability may be less than desirable; __substrate may be frequently disturbed. __Drop structures, culverts, dams, or diversions are present within the reach, but with minimal effect to the channel gradient or __faunal movement. Some channel deepening is noticeable.
0.25	__ Within the flood prone area, there is ≤10% coverage of habitat features present; lack of habitat is obvious; substrate unstable or lacking; concrete lined channels are present within portions of the stream. __Habitat features and pools buried or lacking, channel bottom may be flat. __Drop structures, culverts, dams, or diversions are present within the reach with noticeable effects to the channel gradient (deepening) or inhibition of faunal movement.
0.10	__Habitat features and pools are buried or lacking, channel bottom may be flat. __Channels banks are completely armored or concrete lined.

Field Notes:

V_3 Floodplain Interaction–Connectivity

User Notes: Floodplain Interaction–Connectivity indicates of the degree to which the hydrologic interaction between the bankfull channel and the active floodplain and terraces of the riparian ecosystem remains intact. In assigning the Condition Index Rating, the channel evolution concepts previously presented should be consulted. Previous observations for V1 Hydraulic Conveyance and Sediment dynamics variable and including channel cross-section observations should be used to assign this Condition Index Rating. The assessment area for this variable is the floodprone area and abandoned floodplain/terraces.

Assessment Area: Floodprone area and abandoned floodplain/terraces

Condition Index Rating	Indicator or Description of Conditions
1.00	__The floodplain has not been physically manipulated. __No surface alterations (such as constructed channels, dams, dikes, diversions, dugouts, or fill) or subsurface alterations (such as tile drainage) are present. __Natural geomorphic features occur within the floodplain as evidenced by irregular, uneven surfaces (undulating conditions from meander scars, sediment bars, or hummocks). __The current stage of the channel would indicate an equilibrium channel corresponding to a Class I condition (sinuous, pre-modified channel).
0.75	__Few changes to the floodplain surface. __Observable changes in elevation are restricted to only farm roads or bridges with culverts. __The current stage of the channel would indicate quasi-equilibrium corresponding to a Class VI condition.
0.50	__Multiple geomorphic modifications to the floodplain surface to control flood energy, often with bank control structures, but still permitting flow access via culverts. __The current stage of the channel would indicate aggradations and widening, corresponding to a Class V condition.
0.25 ✓	✓Complete geomorphic modification BUT still permits flow access via culverts and occasional overbank flooding. ✓The current stage of the channel would indicate degradation and widening corresponding to a Class IV condition.
0.10	__Complete geomorphic modification to the floodprone area. Bank control structures (dikes, etc) are in a continuous structure preventing channel movement and also preventing overbank flow. __The current stage of the channel would indicate channelization and/or active bed degradation corresponding to a Class II or III condition.

Field Notes:

V_4 Riparian Condition & Vegetation Composition

User Notes: Riparian Vegetation Composition is a response variable to both natural and anthropogenic disturbance. Scoring of this variable is determined by comparing the dominant species observed in cross-sections within the RR assessment area to a list of diagnostic and most abundant species. Field sheets on following page.

Assessment Area: V_{4a} above the floodprone area with an artificial convention of 100' from the top of each bank; and, V_{4b} below the floodprone area.

Condition Index Rating	4a	4b	Indicator or Description of Conditions
1.00			__The percent concurrence of dominant plants observed with diagnostic species is ≥ 95 %. __Existing riparian habitat is of high caliber; if this site were to be preserved, minimal management would be necessary due to natural processes still being in effect. __Vegetation represents the reference standard condition with no chronic anthropogenic disturbances; or, __the site has recovered from historical anthropogenic disturbance.
0.75			✓The percent concurrence of dominant plants observed with diagnostic species is ≥75 and < 95%. __Existing riparian habitat is only slightly degraded; preservation and/or improvement are likely with moderate management effort. __Native vegetation is on a recovery trajectory with compatible management practices that mimic natural disturbances (i.e., low intensity grazing). __Presences of areas disturbed through natural processes (i.e., fire and flood) are still evident.
0.50			__ The percent concurrence of dominant plants observed with diagnostic species is ≥50% and < 75%. ✓Existing riparian habitat somewhat degraded; preservation and/or improvement possible but would require significant management effort. ✓Native vegetation present for some representative communities, but invasive or ruderal species are prevalent. ✓Disturbance is largely anthropogenic and natural processes influencing the plant community are rare.
0.25 ✓			__ The percent concurrence of dominant plants observed with diagnostic species is ≥ 25% or < 50%. ✓Existing riparian habitat degraded; preservation not desirable or attainable; improvements are not likely or would require significant and costly management effort. __ Native vegetation is localized within the assessment area. ✓Presence of areas disturbed through natural processes is not evident. ✓Vegetation composition is dominated by invasive or ruderal species.
0.10			__ The percent concurrence of dominant plants observed with diagnostic species is ≥ 5% or < 25%. __ Existing riparian habitat is severely degraded. __ Native vegetation is largely absent, area is hardened (i.e., paved, urban, etc.) or graded.

Field Notes:

Above - west bank
some desireable species
(Illinois bundleflower)
east bank all turfgrass

Below - desirable tree
species
(green ash, sugar
maple)
Much bullrush
and Illinois bundleflower

V_5 Riparian Buffer Continuity and Width

User Notes: Riparian ecosystems typically form a relatively continuous corridor along the stream channel and floodplain. This variable is measured perpendicular from the top of the bank for a distance laterally of 100'. Both banks of the stream channel are measured and then averaged for determination of the summary rating and subsequent Condition Index Score assignment. Aerial photography can be used for estimation of this variable but should be verified in the field.

Assessment area: An artificial convention of 100' from the top of each bank

	Continuity (%)	100	80-99	60-79	40-59	20-39	5-19	<5
Width(ft)	≥100	1.00	0.90	0.70	0.50	0.30	0.15	0.00
	75-99	0.80	0.75	0.60	0.40	0.25	0.10	0.00
	50-74	0.60	0.50	0.50	0.30	0.20	0.10	0.00
	25-49	0.40	0.30	0.30	0.20	0.15	0.05	0.00
	10-24	0.20	0.20	0.15	0.10	0.10	0.05	0.00
	5-9	0.10	0.10	0.10	0.05	0.05	0.01	0.00
	<5	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Corresponding Summary Rating with Variable score:

If summary rating is between :	Assign the following Condition Index Score:
0.80 - 1.00	1.00
0.60 - 0.79	0.75
0.40 - 0.59	0.50
0.20 - 0.39	0.25
0.01 - 0.19	0.10
0.0 - OR No buffer of permanent vegetation is present = 0	

1.3/2= .65
= .75 → west bank improves area

Field Notes:

- west (south bank)
  perennial cover
  near no name trib
  some trees - 100%, for 100 feet
- all row crop or mowed grass on east bank
  75% for 35 feet mowed grass

V_6 Riparian Land Use

User Notes: Land use indicates the way in which a tract of land is utilized, has been developed, or the type of vegetation present

Assessment area: An artificial convention of 100' from the top of each bank. For land use assessment in stream to reservoir conversions, the assessment area is defined as 100' from the lateral extent of the floodpool. This boundary convention is considered synonymous with the upper extent of the floodprone area of stream systems.

Land Use Category	Land Use Weight		Area of Land Use		Weighted score (WS) for each land use category
Impermeable surface	1	X		=	
Feed lot	1	X		=	
Row crop or Small grain	3	X	65	=	195
Farmstead	6	X	35	=	210
Woodlot/shelterbelt	6	X		=	
Perennial Cover of any type	8	X	100	=	800
Managed for native vegetation cover and diversity	10	X		=	
			200 Total area	=	
*User notes: $\sum$ WS is the sum of the Weighted Scores WA is the Weighted Average as defined by $\sum$Weighted Scores /Total area					$\sum$ WS = 1205 / WA = 200 .60

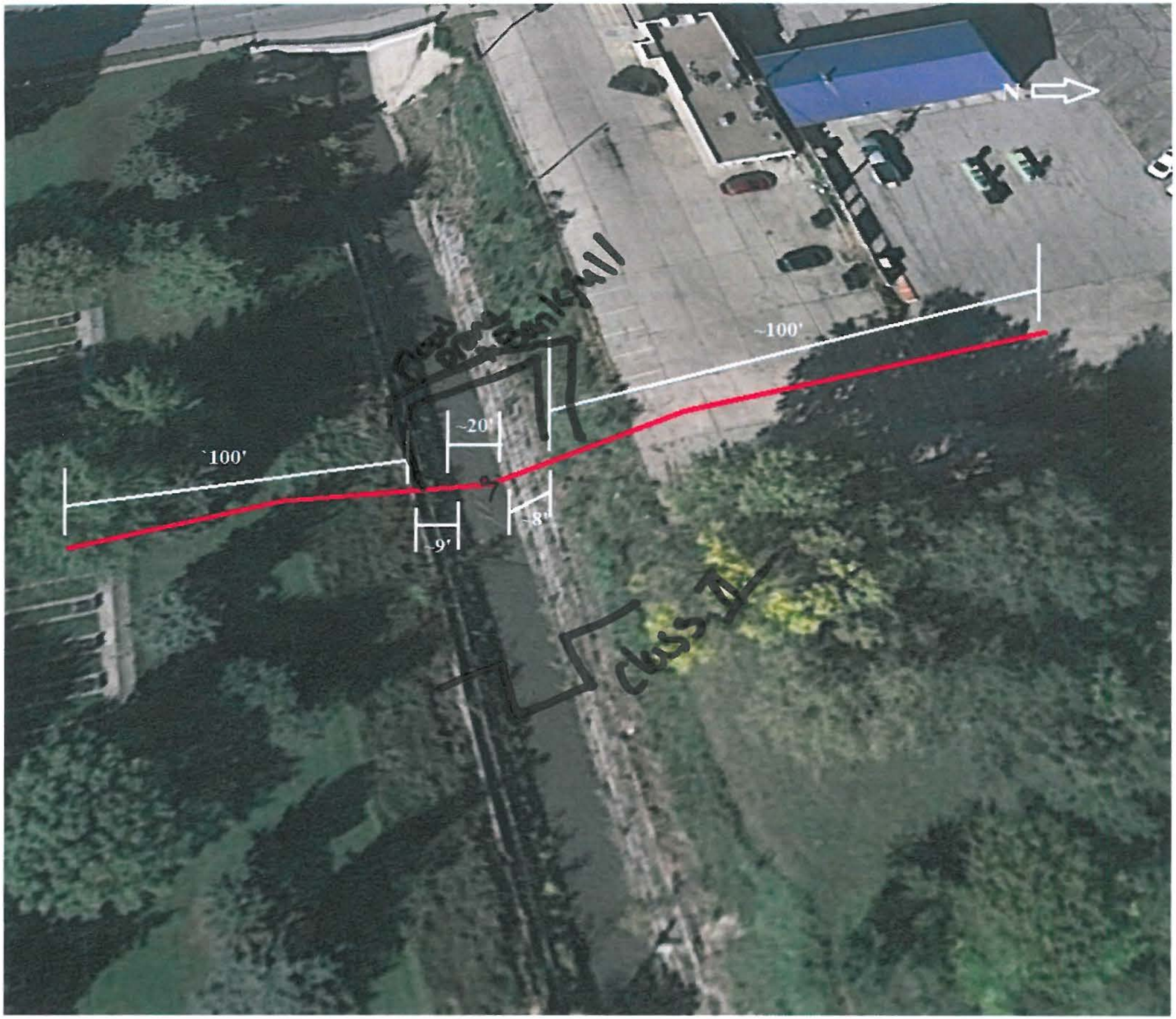
If the Land Use Weighted Average is:	Assign the following Condition Index Score:
≥ 8	1.00
7-8	0.75
5-6	0.50 ←
2-4	0.25
< 1	0.10

Field Notes: East / North

65 feet row crop

35 grass

100 ~~ft~~ perennial cover



Approximate cross section of DP7. Imagery from GoogleEarth® 2016.

DP7 existing Conditions

V_1 Hydraulic Conveyance and Sediment Dynamics

User notes: Hydraulic conveyance and sediment dynamics addresses fluvial processes for the active channel within the RR. This indicator is assessed by narrative criteria or measured as a percent of the length of mainstem channel in a riparian reach with (AHC). Aerial photography and field observations are used to estimate the Condition Index Rating of this metric. For impact or mitigation evaluations, **the Condition Index Rating is zero when a stream is converted to a lacustrine system.**

Assessment Area: below bankfull width

Condition Index Rating	Indicator Score or Description of Condition
1.00	__Movement of sediment in the channel is in equilibrium in terms of supply, erosion, and deposition processes. __**On most streams** there are alternating point bars; bank erosion occurs, but is stabilized and moderated by vegetation; and channel width, form, and floodplain area is consistent through the reach. __**In some streams**, some of these indicators may not be apparent, but overall bank and hill slope erosion is moderated by vegetation and there are no apparent culturally induced catastrophic failures. __The channel is stable, no active down-cutting occurring, or; old down-cutting apparent but a new, stable riparian area has formed within the incised channel, OR; __≤5% of active channel within the riparian reach with altered hydraulic conveyance (AHC).
0.75	__Movement of sediment in the channel is in equilibrium with the current hydrologic regime, as opposed to a culturally unaltered condition, and exhibits an overall balance in terms of erosion and deposition processes. __**On most streams** there are alternating point bars; bank erosion occurs, but is stabilized and moderated by vegetation; and channel width, form, and floodplain area are consistent through the reach. __**In some streams**, some of these indicators may not be apparent, but overall bank and hill slope erosion is moderated by vegetation and no culturally induced catastrophic failures are apparent. __The channel has evidence of old down-cutting that has begun stabilizing, vegetation is beginning to establish, even at the base of the falling banks, soil disturbance is evident, OR; __>5 and ≤15% of riparian reach with AHC.
0.50	__Sediment disequilibrium is minor and localized within the reach. __This includes small, localized areas of bank protection, slumping, or encroachment on the floodplain and channel. __This condition class includes previously disrupted reaches on a recovery trajectory, such as deeply entrenched streams where down-cutting has been arrested by structural grade control, and there is sufficient room for lateral channel migration and establishment of a functional floodplain within the incised channel. __Head cuts in early stage are present. Immediate action may prevent further degradation, OR; __ >15 and ≤30% of riparian reach with AHC.
0.25	__Sediment erosion and deposition out of equilibrium. __Water inflow is sediment rich, poor or accelerated bank erosion exists. Channel not actively incising but extensive disequilibrium is evident. __Typical indicators include extensive bank slumping (erosion events that exceed any moderating influence of native vegetation), active gullies feeding into the reach from adjacent hill slopes, or shoaling of sediments rather than deposition in sorted lateral and mid-channel bars. __Apparently stable channels should be placed in this category if there is evidence of regular mechanical disruption, such as bulldozing of the channel bottom and clearing of riparian vegetation to improve flood conveyance. __ Channel with some widening, but limiting new floodplain development; the existing floodplain is not well vegetated. __The vegetation that is present is mainly pioneer species. Bank failure is common, OR; __ >30 and ≤50% of riparian reach with AHC.
✓ 0.10	✓Sediment dynamics within most of the reach are seriously disrupted. ✓This includes reaches where no significant storage or recruitment of sediment occurs (i.e., reaches in underground tunnels/culverts, and reaches hardened with rock or concrete). __It also includes reaches that are either actively incising or functioning as sediment traps (e.g., sediment basins). ✓This also includes reaches that have been subject to recent changes likely to induce severe disequilibrium, such as extensive floodplain filling, change in slope, channel straightening, or other changes that are likely to cause channel down-cutting during future high-flow events. ✓The channel is deeply incised, resembling a gully, little or no riparian area development, or active down-cutting is clearly occurring. Only occasional or rare flood events access the flood plain. __Tributaries will also exhibit signs of down-cutting, OR; > ✓50% of riparian reach with AHC.

Field Notes:

V_2 In-Stream Habitat/Available Cover

User Notes: The biological components of riparian ecosystems have adapted to episodic cycles of disturbance and developed a variety of mechanisms that make it possible to survive and flourish where other organisms cannot. This variable is evaluated below the floodprone area. For impact or mitigation evaluations, the Condition Index Rating is zero when a stream is converted to a lacustrine system.

Assessment Area: Below the estimated floodprone area

Condition Index Rating	Indicator or Description of Conditions
1.00	__Within the flood prone area, there is greater than >50% coverage by diverse habitat features favorable for stream faunal colonization and maintenance of vegetation dynamics for recruitment. __Features may include snags, submerged logs, undercut banks, roots, cobble, rocks, persistent leaf packs, pools and glides, or other stable habitat at a stage to allow colonization. __No barriers to faunal movement.
0.75	__ Within the flood prone area there is >30% and ≤50% coverage by habitat features favorable for stream faunal colonization and/or cover. __Many habitat features are not transient. Adequate habitat for maintenance of populations is evident. __Seasonal water withdrawals inhibit faunal movement within the reach.
0.50	__ Within the flood prone area, there is >10 and ≤30% coverage by habitat features favorable for stream faunal colonization and cover; __habitat availability may be less than desirable; __substrate may be frequently disturbed. __Drop structures, culverts, dams, or diversions are present within the reach, but with minimal effect to the channel gradient or __faunal movement. Some channel deepening is noticeable.
0.25	__ Within the flood prone area, there is ≤10% coverage of habitat features present; lack of habitat is obvious; substrate unstable or lacking; concrete lined channels are present within portions of the stream. __Habitat features and pools buried or lacking, channel bottom may be flat. __Drop structures, culverts, dams, or diversions are present within the reach with noticeable effects to the channel gradient (deepening) or inhibition of faunal movement.
0.10	✓__Habitat features and pools are buried or lacking, channel bottom may be flat. ✓Channels banks are completely armored or concrete lined.

Field Notes:

V_3 Floodplain Interaction–Connectivity

User Notes: Floodplain Interaction–Connectivity indicates of the degree to which the hydrologic interaction between the bankfull channel and the active floodplain and terraces of the riparian ecosystem remains intact. In assigning the Condition Index Rating, the channel evolution concepts previously presented should be consulted. Previous observations for V1 Hydraulic Conveyance and Sediment dynamics variable and including channel cross-section observations should be used to assign this Condition Index Rating. The assessment area for this variable is the floodprone area and abandoned floodplain/terraces.

Assessment Area: Floodprone area and abandoned floodplain/terraces

Condition Index Rating	Indicator or Description of Conditions
1.00	__The floodplain has not been physically manipulated. __No surface alterations (such as constructed channels, dams, dikes, diversions, dugouts, or fill) or subsurface alterations (such as tile drainage) are present. __Natural geomorphic features occur within the floodplain as evidenced by irregular, uneven surfaces (undulating conditions from meander scars, sediment bars, or hummocks). __The current stage of the channel would indicate an equilibrium channel corresponding to a Class I condition (sinuous, pre-modified channel).
0.75	__Few changes to the floodplain surface. __Observable changes in elevation are restricted to only farm roads or bridges with culverts. __The current stage of the channel would indicate quasi-equilibrium corresponding to a Class VI condition.
0.50	__Multiple geomorphic modifications to the floodplain surface to control flood energy, often with bank control structures, but still permitting flow access via culverts. __The current stage of the channel would indicate aggradations and widening, corresponding to a Class V condition.
0.25	__Complete geomorphic modification BUT still permits flow access via culverts and occasional overbank flooding. __The current stage of the channel would indicate degradation and widening corresponding to a Class IV condition.
0.10	✓Complete geomorphic modification to the floodprone area. Bank control structures (dikes, etc) are in a continuous structure preventing channel movement and also preventing overbank flow. ✓The current stage of the channel would indicate channelization and/or active bed degradation corresponding to a Class II or III condition.

Field Notes:

V_4 Riparian Condition & Vegetation Composition

User Notes: Riparian Vegetation Composition is a response variable to both natural and anthropogenic disturbance. Scoring of this variable is determined by comparing the dominant species observed in cross-sections within the RR assessment area to a list of diagnostic and most abundant species. Field sheets on following page.

Assessment Area: V_{4a} above the floodprone area with an artificial convention of 100' from the top of each bank; and, V_{4b} below the floodprone area.

Condition Index Rating	4a	4b	Indicator or Description of Conditions
1.00			__The percent concurrence of dominant plants observed with diagnostic species is ≥ 95 %. __Existing riparian habitat is of high caliber; if this site were to be preserved, minimal management would be necessary due to natural processes still being in effect. __Vegetation represents the reference standard condition with no chronic anthropogenic disturbances; or, __the site has recovered from historical anthropogenic disturbance.
0.75			__The percent concurrence of dominant plants observed with diagnostic species is ≥75 and < 95%. __Existing riparian habitat is only slightly degraded; preservation and/or improvement are likely with moderate management effort. __Native vegetation is on a recovery trajectory with compatible management practices that mimic natural disturbances (i.e., low intensity grazing). __Presences of areas disturbed through natural processes (i.e., fire and flood) are still evident.
0.50			__ The percent concurrence of dominant plants observed with diagnostic species is ≥50% and < 75%. __Existing riparian habitat somewhat degraded; preservation and/or improvement possible but would require significant management effort. __Native vegetation present for some representative communities, but invasive or ruderal species are prevalent. __ Disturbance is largely anthropogenic and natural processes influencing the plant community are rare.
0.25			✓ The percent concurrence of dominant plants observed with diagnostic species is ≥ 25% or < 50%. __ Existing riparian habitat degraded; preservation not desirable or attainable; improvements are not likely or would require significant and costly management effort. __ Native vegetation is localized within the assessment area. __ Presence of areas disturbed through natural processes is not evident. __ Vegetation composition is dominated by invasive or ruderal species.
0.10			✓ The percent concurrence of dominant plants observed with diagnostic species is ≥ 5% or < 25%. ✓ Existing riparian habitat is severely degraded. ✓ Native vegetation is largely absent, area is hardened (i.e., paved, urban, etc.) or graded.

Field Notes:

Below
37% rice cutgrass

Above

V_5 Riparian Buffer Continuity and Width

User Notes: Riparian ecosystems typically form a relatively continuous corridor along the stream channel and floodplain. This variable is measured perpendicular from the top of the bank for a distance laterally of 100'. Both banks of the stream channel are measured and then averaged for determination of the summary rating and subsequent Condition Index Score assignment. Aerial photography can be used for estimation of this variable but should be verified in the field.

Assessment area: An artificial convention of 100' from the top of each bank

	Continuity (%)	100	80-99	60-79	40-59	20-39	5-19	<5
Width(ft)	≥100	1.00	0.90	0.70	0.50	0.30	0.15	0.00
	75-99	0.80	0.75	0.60	0.40	0.25	0.10	0.00
	50-74	0.60	0.50	0.50	0.30	0.20	0.10	0.00
	25-49	0.40	0.30	0.30	0.20	0.15	0.05	0.00
	10-24	0.20	0.20	0.15	0.10	0.10	0.05	0.00
	5-9	0.10	0.10	0.10	0.05	0.05	0.01	0.00
	<5	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Corresponding Summary Rating with Variable score:

If summary rating is between :	Assign the following Condition Index Score:
0.80 - 1.00	1.00
0.60 - 0.79	0.75
0.40 - 0.59	0.50
0.20 - 0.39	0.25
0.01 - 0.19	0.10
0.0 - OR No buffer of permanent vegetation is present = 0	

.7/2 =
.35 → assigning a 0.10 — On

Field Notes:

100% for 10feet
On north (east)

75% for 80 feet on west

no riparian buffer exists
~~east~~ bank
low quality on west

V_6 Riparian Land Use

User Notes: Land use indicates the way in which a tract of land is utilized, has been developed, or the type of vegetation present

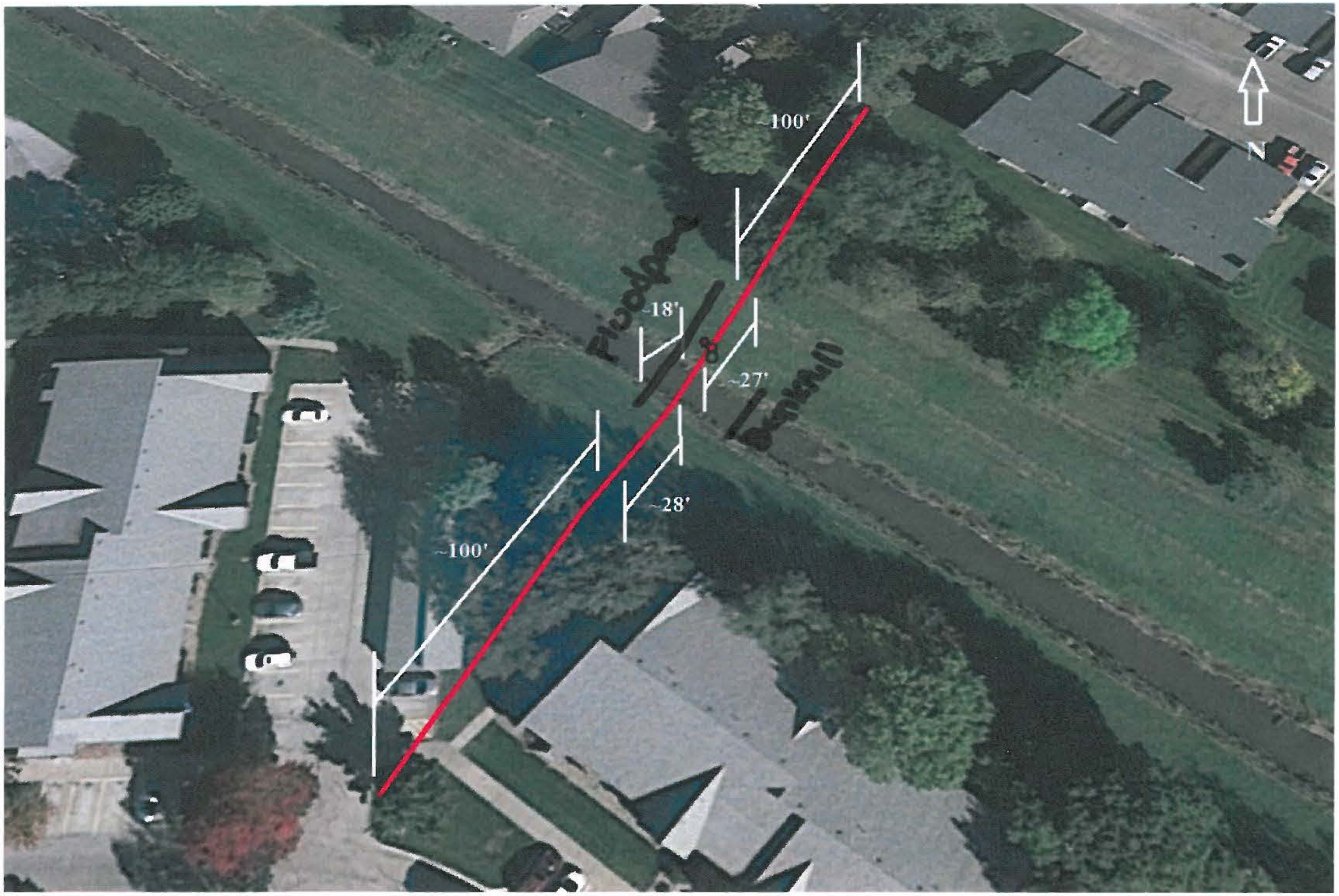
Assessment area: An artificial convention of 100' from the top of each bank. For land use assessment in stream to reservoir conversions, the assessment area is defined as 100' from the lateral extent of the floodpool. This boundary convention is considered synonymous with the upper extent of the floodprone area of stream systems.

Land Use Category	Land Use Weight		Area of Land Use		Weighted score (WS) for each land use category
Impermeable surface	1	X	90	=	90
Feed lot	1	X		=	
Row crop or Small grain	3	X		=	
Farmstead	6	X	10+100	=	660
Woodlot/shelterbelt	6	X		=	
Perennial Cover of any type	8	X		=	
Managed for native vegetation cover and diversity	10	X		=	
			200 Total area	=	
*User notes: Σ WS is the sum of the Weighted Scores WA is the Weighted Average as defined by ΣWeighted Scores /Total area					Σ WS = 750/ WA = 200 3.75

If the Land Use Weighted Average is:	Assign the following Condition Index Score:
>8	1.00
7-8	0.75
5-6	0.50
2-4	0.25
< 1	0.10

Field Notes:

90 feet hardened
110 mowed



Approximate cross section of DP8. Imagery from GoogleEarth® 2016.

DP8 Existing Conditions

V_1 Hydraulic Conveyance and Sediment Dynamics

User notes: Hydraulic conveyance and sediment dynamics addresses fluvial processes for the active channel within the RR. This indicator is assessed by narrative criteria or measured as a percent of the length of mainstem channel in a riparian reach with (AHC). Aerial photography and field observations are used to estimate the Condition Index Rating of this metric. For impact or mitigation evaluations, **the Condition Index Rating is zero when a stream is converted to a lacustrine system**.

Assessment Area: below bankfull width

Condition Index Rating	Indicator Score or Description of Condition
1.00	__Movement of sediment in the channel is in equilibrium in terms of supply, erosion, and deposition processes. __**On most streams** there are alternating point bars; bank erosion occurs, but is stabilized and moderated by vegetation; and channel width, form, and floodplain area is consistent through the reach. __**In some streams**, some of these indicators may not be apparent, but overall bank and hill slope erosion is moderated by vegetation and there are no apparent culturally induced catastrophic failures. __The channel is stable, no active down-cutting occurring, or; old down-cutting apparent but a new, stable riparian area has formed within the incised channel, OR; __≤5% of active channel within the riparian reach with altered hydraulic conveyance (AHC).
0.75	__Movement of sediment in the channel is in equilibrium with the current hydrologic regime, as opposed to a culturally unaltered condition, and exhibits an overall balance in terms of erosion and deposition processes. __**On most streams** there are alternating point bars; bank erosion occurs, but is stabilized and moderated by vegetation; and channel width, form, and floodplain area are consistent through the reach. __**In some streams**, some of these indicators may not be apparent, but overall bank and hill slope erosion is moderated by vegetation and no culturally induced catastrophic failures are apparent. __The channel has evidence of old down-cutting that has begun stabilizing, vegetation is beginning to establish, even at the base of the falling banks, soil disturbance is evident, OR; __>5 and ≤15% of riparian reach with AHC.
0.50	__Sediment disequilibrium is minor and localized within the reach. __This includes small, localized areas of bank protection, slumping, or encroachment on the floodplain and channel. __This condition class includes previously disrupted reaches on a recovery trajectory, such as deeply entrenched streams where down-cutting has been arrested by structural grade control, and there is sufficient room for lateral channel migration and establishment of a functional floodplain within the incised channel. __Head cuts in early stage are present. Immediate action may prevent further degradation, OR; __ >15 and ≤30% of riparian reach with AHC.
0.25	__Sediment erosion and deposition out of equilibrium. __Water inflow is sediment rich, poor or accelerated bank erosion exists. Channel not actively incising but extensive disequilibrium is evident. __Typical indicators include extensive bank slumping (erosion events that exceed any moderating influence of native vegetation), active gullies feeding into the reach from adjacent hill slopes, or shoaling of sediments rather than deposition in sorted lateral and mid-channel bars. __Apparently stable channels should be placed in this category if there is evidence of regular mechanical disruption, such as bulldozing of the channel bottom and clearing of riparian vegetation to improve flood conveyance. __ Channel with some widening, but limiting new floodplain development; the existing floodplain is not well vegetated. __The vegetation that is present is mainly pioneer species. Bank failure is common, OR; __ >30 and ≤50% of riparian reach with AHC.
✓ 0.10	_✓_Sediment dynamics within most of the reach are seriously disrupted. _✓_This includes reaches where no significant storage or recruitment of sediment occurs (i.e., reaches in underground tunnels/culverts, and reaches hardened with rock or concrete). __It also includes reaches that are either actively incising or functioning as sediment traps (e.g., sediment basins). _✓_This also includes reaches that have been subject to recent changes likely to induce severe disequilibrium, such as extensive floodplain filling, change in slope, channel straightening, or other changes that are likely to cause channel down-cutting during future high-flow events. __The channel is deeply incised, resembling a gully, little or no riparian area development, or active down-cutting is clearly occurring. Only occasional or rare flood events access the flood plain. __Tributaries will also exhibit signs of down-cutting, OR; > _✓_50% of riparian reach with AHC.

Field Notes:

V_2 In-Stream Habitat/Available Cover

User Notes: The biological components of riparian ecosystems have adapted to episodic cycles of disturbance and developed a variety of mechanisms that make it possible to survive and flourish where other organisms cannot. This variable is evaluated below the floodprone area. For impact or mitigation evaluations, the Condition Index Rating is zero when a stream is converted to a lacustrine system.

Assessment Area: Below the estimated floodprone area

Condition Index Rating	Indicator or Description of Conditions
1.00	__Within the flood prone area, there is greater than >50% coverage by diverse habitat features favorable for stream faunal colonization and maintenance of vegetation dynamics for recruitment. __Features may include snags, submerged logs, undercut banks, roots, cobble, rocks, persistent leaf packs, pools and glides, or other stable habitat at a stage to allow colonization. __No barriers to faunal movement.
0.75	__ Within the flood prone area there is >30% and ≤50% coverage by habitat features favorable for stream faunal colonization and/or cover. __Many habitat features are not transient. Adequate habitat for maintenance of populations is evident. __Seasonal water withdrawals inhibit faunal movement within the reach.
0.50	__ Within the flood prone area, there is >10 and ≤30% coverage by habitat features favorable for stream faunal colonization and cover; __habitat availability may be less than desirable; __substrate may be frequently disturbed. __Drop structures, culverts, dams, or diversions are present within the reach, but with minimal effect to the channel gradient or __faunal movement. Some channel deepening is noticeable.
0.25	__ Within the flood prone area, there is ≤10% coverage of habitat features present; lack of habitat is obvious; substrate unstable or lacking; concrete lined channels are present within portions of the stream. __Habitat features and pools buried or lacking, channel bottom may be flat. __Drop structures, culverts, dams, or diversions are present within the reach with noticeable effects to the channel gradient (deepening) or inhibition of faunal movement.
0.10	✓ Habitat features and pools are buried or lacking, channel bottom may be flat. ✓ Channels banks are completely armored or concrete lined.

Field Notes:

V_3 Floodplain Interaction–Connectivity

User Notes: Floodplain Interaction–Connectivity indicates of the degree to which the hydrologic interaction between the bankfull channel and the active floodplain and terraces of the riparian ecosystem remains intact. In assigning the Condition Index Rating, the channel evolution concepts previously presented should be consulted. Previous observations for V1 Hydraulic Conveyance and Sediment dynamics variable and including channel cross-section observations should be used to assign this Condition Index Rating. The assessment area for this variable is the floodprone area and abandoned floodplain/terraces.

Assessment Area: Floodprone area and abandoned floodplain/terraces

Condition Index Rating	Indicator or Description of Conditions
1.00	__The floodplain has not been physically manipulated. __No surface alterations (such as constructed channels, dams, dikes, diversions, dugouts, or fill) or subsurface alterations (such as tile drainage) are present. __Natural geomorphic features occur within the floodplain as evidenced by irregular, uneven surfaces (undulating conditions from meander scars, sediment bars, or hummocks). __The current stage of the channel would indicate an equilibrium channel corresponding to a Class I condition (sinuous, pre-modified channel).
0.75	__Few changes to the floodplain surface. __Observable changes in elevation are restricted to only farm roads or bridges with culverts. __The current stage of the channel would indicate quasi-equilibrium corresponding to a Class VI condition.
0.50	__Multiple geomorphic modifications to the floodplain surface to control flood energy, often with bank control structures, but still permitting flow access via culverts. __The current stage of the channel would indicate aggradations and widening, corresponding to a Class V condition.
0.25	__Complete geomorphic modification BUT still permits flow access via culverts and occasional overbank flooding. __The current stage of the channel would indicate degradation and widening corresponding to a Class IV condition.
✓ 0.10	✓Complete geomorphic modification to the floodprone area. Bank control structures (dikes, etc) are in a continuous structure preventing channel movement and also preventing overbank flow. ✓The current stage of the channel would indicate channelization and/or active bed degradation corresponding to a Class II or III condition.

Field Notes:

V_4 Riparian Condition & Vegetation Composition

User Notes: Riparian Vegetation Composition is a response variable to both natural and anthropogenic disturbance. Scoring of this variable is determined by comparing the dominant species observed in cross-sections within the RR assessment area to a list of diagnostic and most abundant species. Field sheets on following page.

Assessment Area: V_{4a} above the floodprone area with an artificial convention of 100' from the top of each bank; and, V_{4b} below the floodprone area.

Condition Index Rating	4a	4b	Indicator or Description of Conditions
1.00			__The percent concurrence of dominant plants observed with diagnostic species is ≥ 95 %. __Existing riparian habitat is of high caliber; if this site were to be preserved, minimal management would be necessary due to natural processes still being in effect. __Vegetation represents the reference standard condition with no chronic anthropogenic disturbances; or, __the site has recovered from historical anthropogenic disturbance.
0.75			__The percent concurrence of dominant plants observed with diagnostic species is ≥75 and < 95%. __Existing riparian habitat is only slightly degraded; preservation and/or improvement are likely with moderate management effort. __Native vegetation is on a recovery trajectory with compatible management practices that mimic natural disturbances (i.e., low intensity grazing). __Presences of areas disturbed through natural processes (i.e., fire and flood) are still evident.
0.50			__ The percent concurrence of dominant plants observed with diagnostic species is ≥50% and < 75%. __Existing riparian habitat somewhat degraded; preservation and/or improvement possible but would require significant management effort. __Native vegetation present for some representative communities, but invasive or ruderal species are prevalent. __ Disturbance is largely anthropogenic and natural processes influencing the plant community are rare.
0.25			__ The percent concurrence of dominant plants observed with diagnostic species is ≥ 25% or < 50%. __ Existing riparian habitat degraded; preservation not desirable or attainable; improvements are not likely or would require significant and costly management effort. __ Native vegetation is localized within the assessment area. __ Presence of areas disturbed through natural processes is not evident. __ Vegetation composition is dominated by invasive or ruderal species.
0.10			✓The percent concurrence of dominant plants observed with diagnostic species is ≥ 5% or < 25%. ✓Existing riparian habitat is severely degraded. ✓Native vegetation is largely absent, area is hardened (i.e., paved, urban, etc.) or graded.

Field Notes:

V_5 Riparian Buffer Continuity and Width

User Notes: Riparian ecosystems typically form a relatively continuous corridor along the stream channel and floodplain. This variable is measured perpendicular from the top of the bank for a distance laterally of 100'. Both banks of the stream channel are measured and then averaged for determination of the summary rating and subsequent Condition Index Score assignment. Aerial photography can be used for estimation of this variable but should be verified in the field.

Assessment area: An artificial convention of 100' from the top of each bank

	Continuity (%)	100	80-99	60-79	40-59	20-39	5-19	<5
Width(ft)	≥100	1.00	0.90	0.70	0.50	0.30	0.15	0.00
	75-99	0.80	0.75	0.60	0.40	0.25	0.10	0.00
	50-74	0.60	0.50	0.50	0.30	0.20	0.10	0.00
	25-49	0.40	0.30	0.30	0.20	0.15	0.05	0.00
	10-24	0.20	0.20	0.15	0.10	0.10	0.05	0.00
	5-9	0.10	0.10	0.10	0.05	0.05	0.01	0.00
	<5	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Corresponding Summary Rating with Variable score:

If summary rating is between :	Assign the following Condition Index Score:
0.80 - 1.00	1.00
0.60 - 0.79	0.75
0.40 - 0.59	0.50 ← 1.1/2= .55
0.20 - 0.39	0.25
0.01 - 0.19	0.10
0.0 - OR No buffer of permanent vegetation is present = 0	

east bank

Field Notes:

20% for 80 feet on west bank

V_6 Riparian Land Use

User Notes: Land use indicates the way in which a tract of land is utilized, has been developed, or the type of vegetation present

Assessment area: An artificial convention of 100' from the top of each bank. For land use assessment in stream to reservoir conversions, the assessment area is defined as 100' from the lateral extent of the floodpool. This boundary convention is considered synonymous with the upper extent of the floodprone area of stream systems.

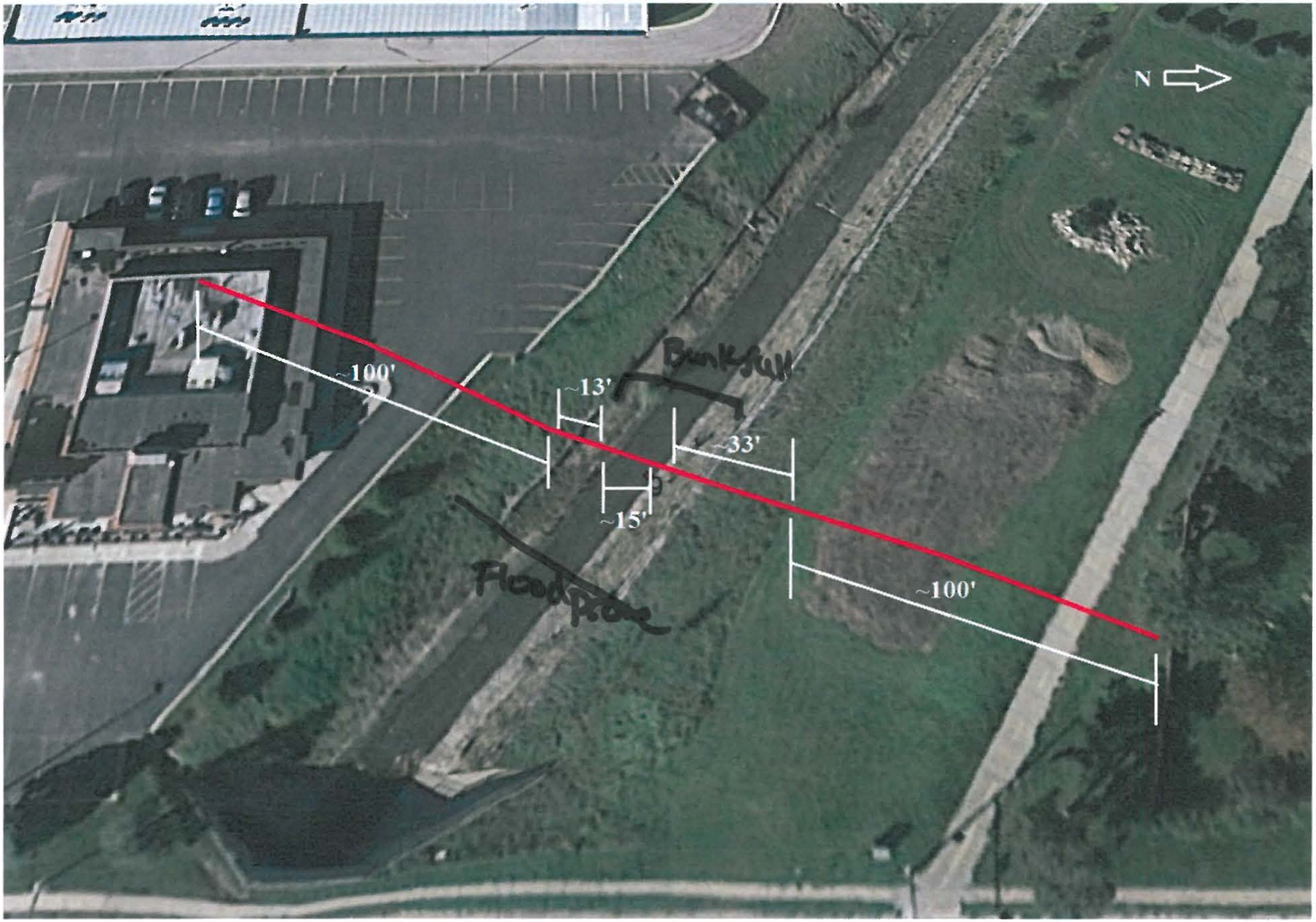
Land Use Category	Land Use Weight		Area of Land Use		Weighted score (WS) for each land use category
Impermeable surface	1	X		=	
Feed lot	1	X		=	
Row crop or Small grain	3	X		=	
Farmstead	6	X	95+90	=	600
Woodlot/shelterbelt	6	X	5+10	=	600
Perennial Cover of any type	8	X		=	
Managed for native vegetation cover and diversity	10	X		=	
			200 Total area	=	
*User notes: ∑ WS is the sum of the Weighted Scores WA is the Weighted Average as defined by ∑Weighted Scores /Total area					∑ WS = 1200 WA = 200 = 6

If the Land Use Weighted Average is:	Assign the following Condition Index Score:
>8	1.00
7-8	0.75
5-6	0.50
2-4	0.25
< 1	0.10

Field Notes:

90 -

Some housing that isn't directly in cross section but should be taken in to account as R D in the lateral 100'



Approximate cross section of DP9. Imagery from GoogleEarth® 2016.

DP9 Existing Conditions

V_1 Hydraulic Conveyance and Sediment Dynamics

User notes: Hydraulic conveyance and sediment dynamics addresses fluvial processes for the active channel within the RR. This indicator is assessed by narrative criteria or measured as a percent of the length of mainstem channel in a riparian reach with (AHC). Aerial photography and field observations are used to estimate the Condition Index Rating of this metric. For impact or mitigation evaluations, **the Condition Index Rating is zero when a stream is converted to a lacustrine system.**

Assessment Area: below bankfull width

Condition Index Rating	Indicator Score or Description of Condition
1.00	__Movement of sediment in the channel is in equilibrium in terms of supply, erosion, and deposition processes. __**On most streams** there are alternating point bars; bank erosion occurs, but is stabilized and moderated by vegetation; and channel width, form, and floodplain area is consistent through the reach. __**In some streams**, some of these indicators may not be apparent, but overall bank and hill slope erosion is moderated by vegetation and there are no apparent culturally induced catastrophic failures. __The channel is stable, no active down-cutting occurring, or; old down-cutting apparent but a new, stable riparian area has formed within the incised channel, OR; __≤5% of active channel within the riparian reach with altered hydraulic conveyance (AHC).
0.75	__Movement of sediment in the channel is in equilibrium with the current hydrologic regime, as opposed to a culturally unaltered condition, and exhibits an overall balance in terms of erosion and deposition processes. __**On most streams** there are alternating point bars; bank erosion occurs, but is stabilized and moderated by vegetation; and channel width, form, and floodplain area are consistent through the reach. __**In some streams,** some of these indicators may not be apparent, but overall bank and hill slope erosion is moderated by vegetation and no culturally induced catastrophic failures are apparent. __The channel has evidence of old down-cutting that has begun stabilizing, vegetation is beginning to establish, even at the base of the falling banks, soil disturbance is evident, OR; __>5 and ≤15% of riparian reach with AHC.
0.50	__Sediment disequilibrium is minor and localized within the reach. __This includes small, localized areas of bank protection, slumping, or encroachment on the floodplain and channel. __This condition class includes previously disrupted reaches on a recovery trajectory, such as deeply entrenched streams where down-cutting has been arrested by structural grade control, and there is sufficient room for lateral channel migration and establishment of a functional floodplain within the incised channel. __Head cuts in early stage are present. Immediate action may prevent further degradation, OR; __ >15 and ≤30% of riparian reach with AHC.
0.25	__Sediment erosion and deposition out of equilibrium. __Water inflow is sediment rich, poor or accelerated bank erosion exists. Channel not actively incising but extensive disequilibrium is evident. __Typical indicators include extensive bank slumping (erosion events that exceed any moderating influence of native vegetation), active gullies feeding into the reach from adjacent hill slopes, or shoaling of sediments rather than deposition in sorted lateral and mid-channel bars. __Apparently stable channels should be placed in this category if there is evidence of regular mechanical disruption, such as bulldozing of the channel bottom and clearing of riparian vegetation to improve flood conveyance. __ Channel with some widening, but limiting new floodplain development; the existing floodplain is not well vegetated. __The vegetation that is present is mainly pioneer species. Bank failure is common, OR; __ >30 and ≤50% of riparian reach with AHC.
✓ 0.10	✓Sediment dynamics within most of the reach are seriously disrupted. ✓This includes reaches where no significant storage or recruitment of sediment occurs (i.e., reaches in underground tunnels/culverts, and reaches hardened with rock or concrete). __It also includes reaches that are either actively incising or functioning as sediment traps (e.g., sediment basins). ✓This also includes reaches that have been subject to recent changes likely to induce severe disequilibrium, such as extensive floodplain filling, change in slope, channel straightening, or other changes that are likely to cause channel down-cutting during future high-flow events. __The channel is deeply incised, resembling a gully, little or no riparian area development, or active down-cutting is clearly occurring. Only occasional or rare flood events access the flood plain. __Tributaries will also exhibit signs of down-cutting, OR; > ✓50% of riparian reach with AHC.

Field Notes:

V_2 In-Stream Habitat/Available Cover

User Notes: The biological components of riparian ecosystems have adapted to episodic cycles of disturbance and developed a variety of mechanisms that make it possible to survive and flourish where other organisms cannot. This variable is evaluated below the floodprone area. For impact or mitigation evaluations, the Condition Index Rating is zero when a stream is converted to a lacustrine system.

Assessment Area: Below the estimated floodprone area

Condition Index Rating	Indicator or Description of Conditions
1.00	__Within the flood prone area, there is greater than >50% coverage by diverse habitat features favorable for stream faunal colonization and maintenance of vegetation dynamics for recruitment. __Features may include snags, submerged logs, undercut banks, roots, cobble, rocks, persistent leaf packs, pools and glides, or other stable habitat at a stage to allow colonization. __No barriers to faunal movement.
0.75	__ Within the flood prone area there is >30% and ≤50% coverage by habitat features favorable for stream faunal colonization and/or cover. __Many habitat features are not transient. Adequate habitat for maintenance of populations is evident. __Seasonal water withdrawals inhibit faunal movement within the reach.
0.50	__ Within the flood prone area, there is >10 and ≤30% coverage by habitat features favorable for stream faunal colonization and cover; __habitat availability may be less than desirable; __substrate may be frequently disturbed. __Drop structures, culverts, dams, or diversions are present within the reach, but with minimal effect to the channel gradient or __faunal movement. Some channel deepening is noticeable.
0.25	__ Within the flood prone area, there is ≤10% coverage of habitat features present; lack of habitat is obvious; substrate unstable or lacking; concrete lined channels are present within portions of the stream. __Habitat features and pools buried or lacking, channel bottom may be flat. __Drop structures, culverts, dams, or diversions are present within the reach with noticeable effects to the channel gradient (deepening) or inhibition of faunal movement.
✓ 0.10	✓ Habitat features and pools are buried or lacking, channel bottom may be flat. ✓ Channels banks are completely armored or concrete lined.

Field Notes:

V_3 Floodplain Interaction–Connectivity

User Notes: Floodplain Interaction–Connectivity indicates of the degree to which the hydrologic interaction between the bankfull channel and the active floodplain and terraces of the riparian ecosystem remains intact. In assigning the Condition Index Rating, the channel evolution concepts previously presented should be consulted. Previous observations for V1 Hydraulic Conveyance and Sediment dynamics variable and including channel cross-section observations should be used to assign this Condition Index Rating. The assessment area for this variable is the floodprone area and abandoned floodplain/terraces.

Assessment Area: Floodprone area and abandoned floodplain/terraces

Condition Index Rating	Indicator or Description of Conditions
1.00	__The floodplain has not been physically manipulated. __No surface alterations (such as constructed channels, dams, dikes, diversions, dugouts, or fill) or subsurface alterations (such as tile drainage) are present. __Natural geomorphic features occur within the floodplain as evidenced by irregular, uneven surfaces (undulating conditions from meander scars, sediment bars, or hummocks). __The current stage of the channel would indicate an equilibrium channel corresponding to a Class I condition (sinuous, pre-modified channel).
0.75	__Few changes to the floodplain surface. __Observable changes in elevation are restricted to only farm roads or bridges with culverts. __The current stage of the channel would indicate quasi-equilibrium corresponding to a Class VI condition.
0.50	__Multiple geomorphic modifications to the floodplain surface to control flood energy, often with bank control structures, but still permitting flow access via culverts. __The current stage of the channel would indicate aggradations and widening, corresponding to a Class V condition.
0.25	__Complete geomorphic modification BUT still permits flow access via culverts and occasional overbank flooding. __The current stage of the channel would indicate degradation and widening corresponding to a Class IV condition.
0.10	✓Complete geomorphic modification to the floodprone area. Bank control structures (dikes, etc) are in a continuous structure preventing channel movement and also preventing overbank flow. ✓The current stage of the channel would indicate channelization and/or active bed degradation corresponding to a Class II or III condition.

Field Notes:

V_4 Riparian Condition & Vegetation Composition

User Notes: Riparian Vegetation Composition is a response variable to both natural and anthropogenic disturbance. Scoring of this variable is determined by comparing the dominant species observed in cross-sections within the RR assessment area to a list of diagnostic and most abundant species. Field sheets on following page.

Assessment Area: V_{4a} above the floodprone area with an artificial convention of 100' from the top of each bank; and, V_{4b} below the floodprone area.

Condition Index Rating	4a	4b	Indicator or Description of Conditions
1.00			__The percent concurrence of dominant plants observed with diagnostic species is ≥ 95 %. __Existing riparian habitat is of high caliber; if this site were to be preserved, minimal management would be necessary due to natural processes still being in effect. __Vegetation represents the reference standard condition with no chronic anthropogenic disturbances; or, __the site has recovered from historical anthropogenic disturbance.
0.75			__The percent concurrence of dominant plants observed with diagnostic species is ≥75 and < 95%. __Existing riparian habitat is only slightly degraded; preservation and/or improvement are likely with moderate management effort. __Native vegetation is on a recovery trajectory with compatible management practices that mimic natural disturbances (i.e., low intensity grazing). __Presences of areas disturbed through natural processes (i.e., fire and flood) are still evident.
0.50			__ The percent concurrence of dominant plants observed with diagnostic species is ≥50% and < 75%. __Existing riparian habitat somewhat degraded; preservation and/or improvement possible but would require significant management effort. __Native vegetation present for some representative communities, but invasive or ruderal species are prevalent. __ Disturbance is largely anthropogenic and natural processes influencing the plant community are rare.
0.25			__ The percent concurrence of dominant plants observed with diagnostic species is ≥ 25% or < 50%. __ Existing riparian habitat degraded; preservation not desirable or attainable; improvements are not likely or would require significant and costly management effort. __ Native vegetation is localized within the assessment area. __ Presence of areas disturbed through natural processes is not evident. __ Vegetation composition is dominated by invasive or ruderal species.
0.10			✓The percent concurrence of dominant plants observed with diagnostic species is ≥ 5% or < 25%. ✓Existing riparian habitat is severely degraded. ✓Native vegetation is largely absent, area is hardened (i.e., paved, urban, etc.) or graded.

Field Notes:

V_5 Riparian Buffer Continuity and Width

User Notes: Riparian ecosystems typically form a relatively continuous corridor along the stream channel and floodplain. This variable is measured perpendicular from the top of the bank for a distance laterally of 100'. Both banks of the stream channel are measured and then averaged for determination of the summary rating and subsequent Condition Index Score assignment. Aerial photography can be used for estimation of this variable but should be verified in the field.

Assessment area: An artificial convention of 100' from the top of each bank

	Continuity (%)	100	80-99	60-79	40-59	20-39	5-19	<5
Width(ft)	≥100	1.00	0.90	0.70	0.50	0.30	0.15	0.00
	75-99	0.80	0.75	0.60	0.40	0.25	0.10	0.00
	50-74	0.60	0.50	0.50	0.30	0.20	0.10	0.00
	25-49	0.40	0.30	0.30	0.20	0.15	0.05	0.00
	10-24	0.20	0.20	0.15	0.10	0.10	0.05	0.00
	5-9	0.10	0.10	0.10	0.05	0.05	0.01	0.00
	<5	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Corresponding Summary Rating with Variable score:

If summary rating is between :	Assign the following Condition Index Score:
0.80 - 1.00	1.00
0.60 - 0.79	0.75
0.40 - 0.59	0.50
0.20 - 0.39	0.25
0.01 - 0.19	0.10
0.0 - OR No buffer of permanent vegetation is present = 0	

.2/2 =
.01

Field Notes:

0 for west bank
(parking lot)
100% veg for 30 ft
on east

V_6 Riparian Land Use

User Notes: Land use indicates the way in which a tract of land is utilized, has been developed, or the type of vegetation present

Assessment area: An artificial convention of 100' from the top of each bank. For land use assessment in stream to reservoir conversions, the assessment area is defined as 100' from the lateral extent of the floodpool. This boundary convention is considered synonymous with the upper extent of the floodprone area of stream systems.

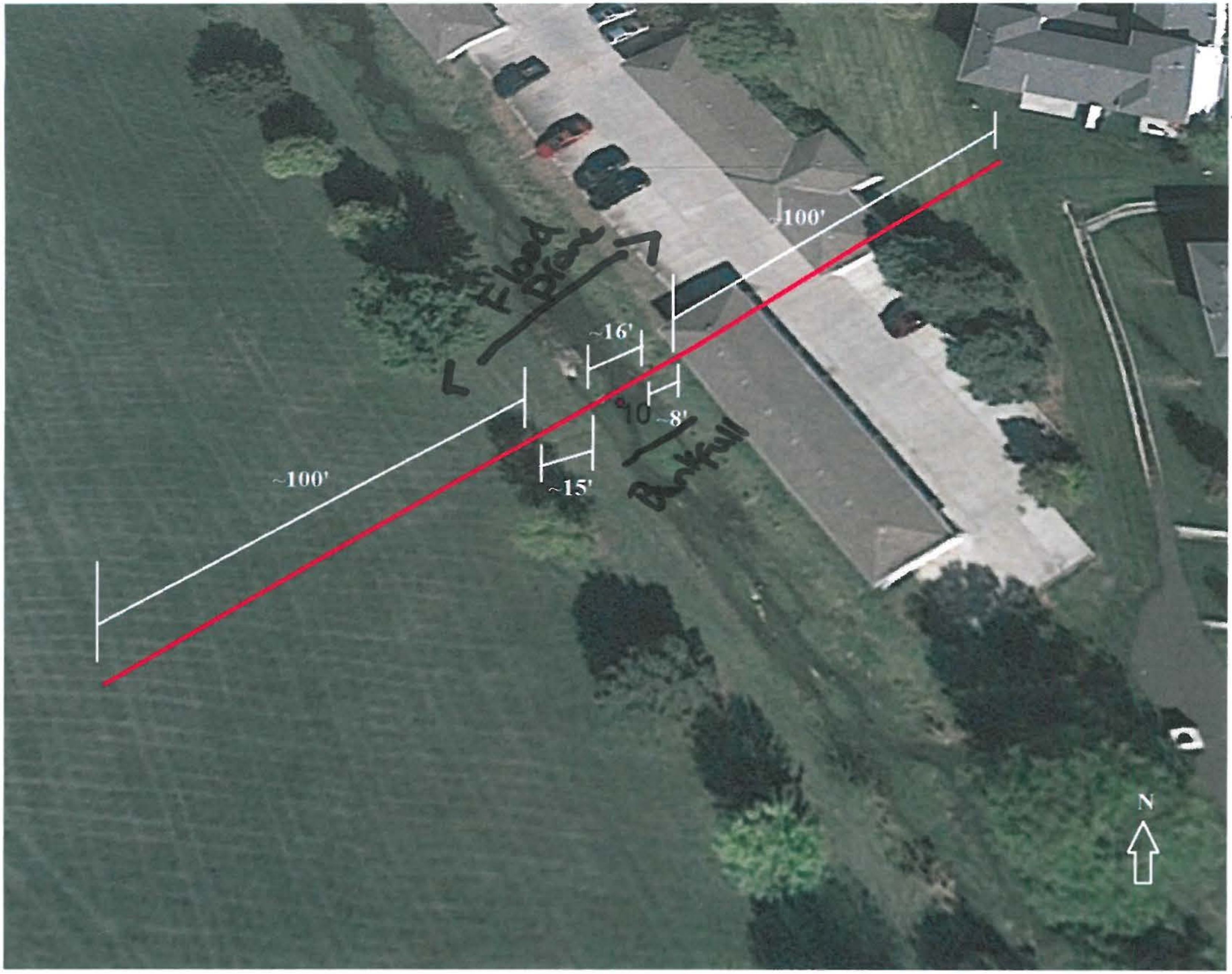
Land Use Category	Land Use Weight		Area of Land Use		Weighted score (WS) for each land use category
Impermeable surface	1	X	100 +10	=	110
Feed lot	1	X	40	=	40
Row crop or Small grain	3	X		=	
Farmstead	6	X	50	=	300
Woodlot/shelterbelt	6	X		=	
Perennial Cover of any type	8	X		=	
Managed for native vegetation cover and diversity	10	X		=	
			200 Total area	=	
*User notes: Σ WS is the sum of the Weighted Scores WA is the Weighted Average as defined by ΣWeighted Scores /Total area					Σ WS = 450/ WA = /200 =2.25

If the Land Use Weighted Average is:	Assign the following Condition Index Score:
>8	1.00
7-8	0.75
5-6	0.50
2-4	0.25 ←
< 1	0.10

Field Notes:

100 ft impermeable surface on west bank

40 feet dirt
10 feet trail
50 feet mowed
East



Approximate cross section of DP10. Imagery from GoogleEarth® 2016.

DP10 Existing Conditions

V_1 Hydraulic Conveyance and Sediment Dynamics

User notes: Hydraulic conveyance and sediment dynamics addresses fluvial processes for the active channel within the RR. This indicator is assessed by narrative criteria or measured as a percent of the length of mainstem channel in a riparian reach with (AHC). Aerial photography and field observations are used to estimate the Condition Index Rating of this metric. For impact or mitigation evaluations, **the Condition Index Rating is zero when a stream is converted to a lacustrine system.**

Assessment Area: below bankfull width

Condition Index Rating	Indicator Score or Description of Condition
1.00	__Movement of sediment in the channel is in equilibrium in terms of supply, erosion, and deposition processes. __**On most streams** there are alternating point bars; bank erosion occurs, but is stabilized and moderated by vegetation; and channel width, form, and floodplain area is consistent through the reach. __**In some streams**, some of these indicators may not be apparent, but overall bank and hill slope erosion is moderated by vegetation and there are no apparent culturally induced catastrophic failures. __The channel is stable, no active down-cutting occurring, or; old down-cutting apparent but a new, stable riparian area has formed within the incised channel, OR; __≤5% of active channel within the riparian reach with altered hydraulic conveyance (AHC).
0.75	__Movement of sediment in the channel is in equilibrium with the current hydrologic regime, as opposed to a culturally unaltered condition, and exhibits an overall balance in terms of erosion and deposition processes. __**On most streams** there are alternating point bars; bank erosion occurs, but is stabilized and moderated by vegetation; and channel width, form, and floodplain area are consistent through the reach. __**In some streams**, some of these indicators may not be apparent, but overall bank and hill slope erosion is moderated by vegetation and no culturally induced catastrophic failures are apparent. __The channel has evidence of old down-cutting that has begun stabilizing, vegetation is beginning to establish, even at the base of the falling banks, soil disturbance is evident, OR; __>5 and ≤15% of riparian reach with AHC.
0.50	✓Sediment disequilibrium is minor and localized within the reach. __This includes small, localized areas of bank protection, slumping, or encroachment on the floodplain and channel. __This condition class includes previously disrupted reaches on a recovery trajectory, such as deeply entrenched streams where down-cutting has been arrested by structural grade control, and there is sufficient room for lateral channel migration and establishment of a functional floodplain within the incised channel. __Head cuts in early stage are present. Immediate action may prevent further degradation, OR; ✓>15 and ≤30% of riparian reach with AHC.
✓ 0.25	__Sediment erosion and deposition out of equilibrium. __Water inflow is sediment rich, poor or accelerated bank erosion exists. Channel not actively incising but extensive disequilibrium is evident. __Typical indicators include extensive bank slumping (erosion events that exceed any moderating influence of native vegetation), active gullies feeding into the reach from adjacent hill slopes, or shoaling of sediments rather than deposition in sorted lateral and mid-channel bars. ✓Apparently stable channels should be placed in this category if there is evidence of regular mechanical disruption, such as bulldozing of the channel bottom and clearing of riparian vegetation to improve flood conveyance. ✓Channel with some widening, but limiting new floodplain development; the existing floodplain is not well vegetated. __The vegetation that is present is mainly pioneer species. Bank failure is common, OR; __ >30 and ≤50% of riparian reach with AHC.
0.10	__Sediment dynamics within most of the reach are seriously disrupted. __This includes reaches where no significant storage or recruitment of sediment occurs (i.e., reaches in underground tunnels/culverts, and reaches hardened with rock or concrete). __It also includes reaches that are either actively incising or functioning as sediment traps (e.g., sediment basins). __This also includes reaches that have been subject to recent changes likely to induce severe disequilibrium, such as extensive floodplain filling, change in slope, channel straightening, or other changes that are likely to cause channel down-cutting during future high-flow events. __The channel is deeply incised, resembling a gully, little or no riparian area development, or active down-cutting is clearly occurring. Only occasional or rare flood events access the flood plain. __Tributaries will also exhibit signs of down-cutting, OR; > __50% of riparian reach with AHC.

Field Notes:

V_2 In-Stream Habitat/Available Cover

User Notes: The biological components of riparian ecosystems have adapted to episodic cycles of disturbance and developed a variety of mechanisms that make it possible to survive and flourish where other organisms cannot. This variable is evaluated below the floodprone area. For impact or mitigation evaluations, the Condition Index Rating is zero when a stream is converted to a lacustrine system.

Assessment Area: Below the estimated floodprone area

Condition Index Rating	Indicator or Description of Conditions
1.00	__Within the flood prone area, there is greater than >50% coverage by diverse habitat features favorable for stream faunal colonization and maintenance of vegetation dynamics for recruitment. __Features may include snags, submerged logs, undercut banks, roots, cobble, rocks, persistent leaf packs, pools and glides, or other stable habitat at a stage to allow colonization. __No barriers to faunal movement.
0.75	__ Within the flood prone area there is >30% and ≤50% coverage by habitat features favorable for stream faunal colonization and/or cover. __Many habitat features are not transient. Adequate habitat for maintenance of populations is evident. __Seasonal water withdrawals inhibit faunal movement within the reach.
0.50	__ Within the flood prone area, there is >10 and ≤30% coverage by habitat features favorable for stream faunal colonization and cover; ✓habitat availability may be less than desirable; ✓substrate may be frequently disturbed. __Drop structures, culverts, dams, or diversions are present within the reach, but with minimal effect to the channel gradient or __faunal movement. Some channel deepening is noticeable.
✓ 0.25	✓ Within the flood prone area, there is ≤10% coverage of habitat features present; lack of habitat is obvious; substrate unstable or lacking; concrete lined channels are present within portions of the stream. __Habitat features and pools buried or lacking, channel bottom may be flat. __Drop structures, culverts, dams, or diversions are present within the reach with noticeable effects to the channel gradient (deepening) or inhibition of faunal movement.
0.10	__Habitat features and pools are buried or lacking, channel bottom may be flat. __Channels banks are completely armored or concrete lined.

Field Notes:

V_4 Riparian Condition & Vegetation Composition

User Notes: Riparian Vegetation Composition is a response variable to both natural and anthropogenic disturbance. Scoring of this variable is determined by comparing the dominant species observed in cross-sections within the RR assessment area to a list of diagnostic and most abundant species. Field sheets on following page.

Assessment Area: V_{4a} above the floodprone area with an artificial convention of 100' from the top of each bank; and, V_{4b} below the floodprone area.

Condition Index Rating	4a	4b	Indicator or Description of Conditions
1.00			__The percent concurrence of dominant plants observed with diagnostic species is ≥ 95 %. __Existing riparian habitat is of high caliber; if this site were to be preserved, minimal management would be necessary due to natural processes still being in effect. __Vegetation represents the reference standard condition with no chronic anthropogenic disturbances; or, __the site has recovered from historical anthropogenic disturbance.
0.75			__The percent concurrence of dominant plants observed with diagnostic species is ≥75 and < 95%. __Existing riparian habitat is only slightly degraded; preservation and/or improvement are likely with moderate management effort. __Native vegetation is on a recovery trajectory with compatible management practices that mimic natural disturbances (i.e., low intensity grazing). __Presences of areas disturbed through natural processes (i.e., fire and flood) are still evident.
0.50			__ The percent concurrence of dominant plants observed with diagnostic species is ≥50% and < 75%. __Existing riparian habitat somewhat degraded; preservation and/or improvement possible but would require significant management effort. __Native vegetation present for some representative communities, but invasive or ruderal species are prevalent. __ Disturbance is largely anthropogenic and natural processes influencing the plant community are rare.
0.25			__ The percent concurrence of dominant plants observed with diagnostic species is ≥ 25% or < 50%. __ Existing riparian habitat degraded; preservation not desirable or attainable; improvements are not likely or would require significant and costly management effort. __ Native vegetation is localized within the assessment area. __ Presence of areas disturbed through natural processes is not evident. __ Vegetation composition is dominated by invasive or ruderal species.
0.10	✓	✓	__ The percent concurrence of dominant plants observed with diagnostic species is ≥ 5% or < 25%. __ Existing riparian habitat is severely degraded. __ Native vegetation is largely absent, area is hardened (i.e., paved, urban, etc.) or graded.

Field Notes:

V_3 Floodplain Interaction–Connectivity

User Notes: Floodplain Interaction–Connectivity indicates of the degree to which the hydrologic interaction between the bankfull channel and the active floodplain and terraces of the riparian ecosystem remains intact. In assigning the Condition Index Rating, the channel evolution concepts previously presented should be consulted. Previous observations for V1 Hydraulic Conveyance and Sediment dynamics variable and including channel cross-section observations should be used to assign this Condition Index Rating. The assessment area for this variable is the floodprone area and abandoned floodplain/terraces.

Assessment Area: Floodprone area and abandoned floodplain/terraces

Condition Index Rating	Indicator or Description of Conditions
1.00	__The floodplain has not been physically manipulated. __No surface alterations (such as constructed channels, dams, dikes, diversions, dugouts, or fill) or subsurface alterations (such as tile drainage) are present. __Natural geomorphic features occur within the floodplain as evidenced by irregular, uneven surfaces (undulating conditions from meander scars, sediment bars, or hummocks). __The current stage of the channel would indicate an equilibrium channel corresponding to a Class I condition (sinuous, pre-modified channel).
0.75	__Few changes to the floodplain surface. __Observable changes in elevation are restricted to only farm roads or bridges with culverts. __The current stage of the channel would indicate quasi-equilibrium corresponding to a Class VI condition.
0.50	__Multiple geomorphic modifications to the floodplain surface to control flood energy, often with bank control structures, but still permitting flow access via culverts. __The current stage of the channel would indicate aggradations and widening, corresponding to a Class V condition.
0.25 ✓	✓Complete geomorphic modification BUT still permits flow access via culverts and occasional overbank flooding. ✓The current stage of the channel would indicate degradation and widening corresponding to a Class IV condition.
0.10	__Complete geomorphic modification to the floodprone area. Bank control structures (dikes, etc) are in a continuous structure preventing channel movement and also preventing overbank flow. __The current stage of the channel would indicate channelization and/or active bed degradation corresponding to a Class II or III condition.

Field Notes:

V_5 Riparian Buffer Continuity and Width

User Notes: Riparian ecosystems typically form a relatively continuous corridor along the stream channel and floodplain. This variable is measured perpendicular from the top of the bank for a distance laterally of 100'. Both banks of the stream channel are measured and then averaged for determination of the summary rating and subsequent Condition Index Score assignment. Aerial photography can be used for estimation of this variable but should be verified in the field.

Assessment area: An artificial convention of 100' from the top of each bank

Width(ft)	Continuity (%)	100	80-99	60-79	40-59	20-39	5-19	<5
	≥100	1.00	0.90	0.70	0.50	0.30	0.15	0.00
	75-99	0.80	0.75	0.60	0.40	0.25	0.10	0.00
	50-74	0.60	0.50	0.50	0.30	0.20	0.10	0.00
	25-49	0.40	0.30	0.30	0.20	0.15	0.05	0.00
	10-24	0.20	0.20	0.15	0.10	0.10	0.05	0.00
	5-9	0.10	0.10	0.10	0.05	0.05	0.01	0.00
	<5	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Corresponding Summary Rating with Variable score:

If summary rating is between :	Assign the following Condition Index Score:
0.80 - 1.00	1.00
0.60 - 0.79	0.75
0.40 - 0.59	0.50
0.20 - 0.39	0.25
0.01 - 0.19	0.10
0.0 - OR No buffer of permanent vegetation is present = 0	

100/2 = 5

Field Notes:

west bank
completely flat field of turf grass

V_6 Riparian Land Use

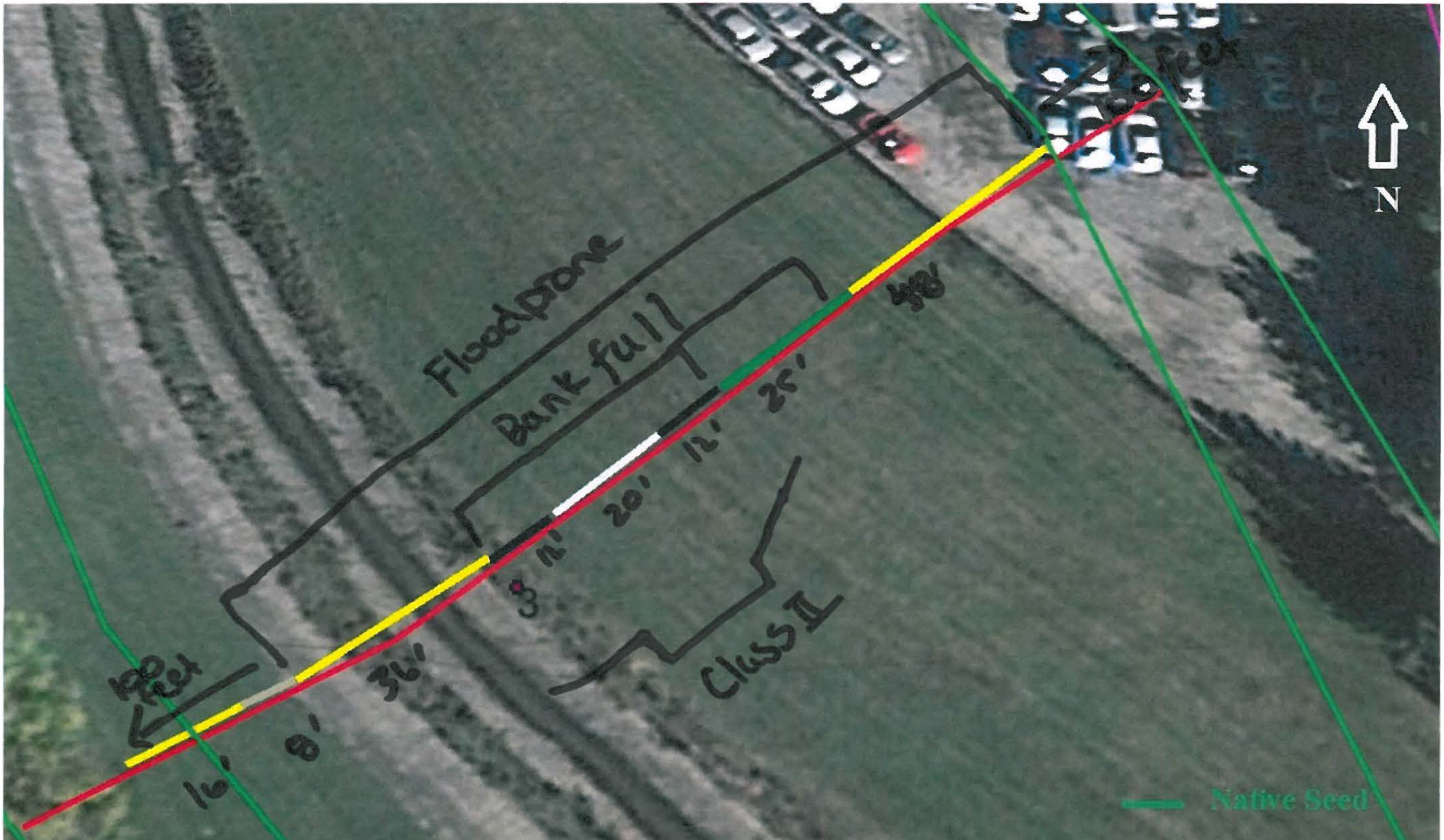
User Notes: Land use indicates the way in which a tract of land is utilized, has been developed, or the type of vegetation present

Assessment area: An artificial convention of 100' from the top of each bank. For land use assessment in stream to reservoir conversions, the assessment area is defined as 100' from the lateral extent of the floodpool. This boundary convention is considered synonymous with the upper extent of the floodprone area of stream systems.

Land Use Category	Land Use Weight		Area of Land Use		Weighted score (WS) for each land use category
Impermeable surface	1	X	100	=	100
Feed lot	1	X		=	
Row crop or Small grain	3	X		=	
Farmstead	6	X	100	=	600
Woodlot/shelterbelt	6	X		=	
Perennial Cover of any type	8	X		=	
Managed for native vegetation cover and diversity	10	X		=	
			200 Total area	=	
*User notes: $\sum$ WS is the sum of the Weighted Scores WA is the Weighted Average as defined by $\sum$Weighted Scores /Total area					$\sum$ WS = 700/ WA = 200/ 3.50

Field Notes:

If the Land Use Weighted Average is:	Assign the following Condition Index Score:
>8	1.00
7-8	0.75
5-6	0.50
2-4	0.25 ←
< 1	0.10



N
Floodprone
Bank full
Class II
100 feet
16'
8'
36'
3
12'
20'
12'
25'
48'
Native Seed
1:3 Sideslope
Channel Bottom
Bike Path
Turf Mat 1:3

DP3 - Alternative 1+2 w/ Channel widening

V_1 Hydraulic Conveyance and Sediment Dynamics

User notes: Hydraulic conveyance and sediment dynamics addresses fluvial processes for the active channel within the RR. This indicator is assessed by narrative criteria or measured as a percent of the length of mainstem channel in a riparian reach with (AHC). Aerial photography and field observations are used to estimate the Condition Index Rating of this metric. For impact or mitigation evaluations, **the Condition Index Rating is zero when a stream is converted to a lacustrine system.**

Assessment Area: below bankfull width

Condition Index Rating	Indicator Score or Description of Condition
1.00	__Movement of sediment in the channel is in equilibrium in terms of supply, erosion, and deposition processes. __**On most streams** there are alternating point bars; bank erosion occurs, but is stabilized and moderated by vegetation; and channel width, form, and floodplain area is consistent through the reach. __**In some streams**, some of these indicators may not be apparent, but overall bank and hill slope erosion is moderated by vegetation and there are no apparent culturally induced catastrophic failures. __The channel is stable, no active down-cutting occurring, or; old down-cutting apparent but a new, stable riparian area has formed within the incised channel, OR; __≤5% of active channel within the riparian reach with altered hydraulic conveyance (AHC).
0.75	__Movement of sediment in the channel is in equilibrium with the current hydrologic regime, as opposed to a culturally unaltered condition, and exhibits an overall balance in terms of erosion and deposition processes. __**On most streams** there are alternating point bars; bank erosion occurs, but is stabilized and moderated by vegetation; and channel width, form, and floodplain area are consistent through the reach. __**In some streams**, some of these indicators may not be apparent, but overall bank and hill slope erosion is moderated by vegetation and no culturally induced catastrophic failures are apparent. __The channel has evidence of old down-cutting that has begun stabilizing, vegetation is beginning to establish, even at the base of the falling banks, soil disturbance is evident, OR; __>5 and ≤15% of riparian reach with AHC.
0.50	__Sediment disequilibrium is minor and localized within the reach. __This includes small, localized areas of bank protection, slumping, or encroachment on the floodplain and channel. __This condition class includes previously disrupted reaches on a recovery trajectory, such as deeply entrenched streams where down-cutting has been arrested by structural grade control, and there is sufficient room for lateral channel migration and establishment of a functional floodplain within the incised channel. __Head cuts in early stage are present. Immediate action may prevent further degradation, OR; __ >15 and ≤30% of riparian reach with AHC.
0.25	__Sediment erosion and deposition out of equilibrium. __Water inflow is sediment rich, poor or accelerated bank erosion exists. Channel not actively incising but extensive disequilibrium is evident. __Typical indicators include extensive bank slumping (erosion events that exceed any moderating influence of native vegetation), active gullies feeding into the reach from adjacent hill slopes, or shoaling of sediments rather than deposition in sorted lateral and mid-channel bars. __Apparently stable channels should be placed in this category if there is evidence of regular mechanical disruption, such as bulldozing of the channel bottom and clearing of riparian vegetation to improve flood conveyance. __Channel with some widening, but limiting new floodplain development; the existing floodplain is not well vegetated. ✓The vegetation that is present is mainly pioneer species. Bank failure is common, OR; __ >30 and ≤50% of riparian reach with AHC. ↳ with new planting on turf mat
0.10	✓Sediment dynamics within most of the reach are seriously disrupted. ✓This includes reaches where no significant storage or recruitment of sediment occurs (i.e., reaches in underground tunnels/culverts, and reaches hardened with rock or concrete). __It also includes reaches that are either actively incising or functioning as sediment traps (e.g., sediment basins). ✓This also includes reaches that have been subject to recent changes likely to induce severe disequilibrium, such as extensive floodplain filling, change in slope, channel straightening, or other changes that are likely to cause channel down-cutting during future high-flow events. __The channel is deeply incised, resembling a gully, little or no riparian area development, or active down-cutting is clearly occurring. Only occasional or rare flood events access the flood plain. __Tributaries will also exhibit signs of down-cutting, OR; > ✓50% of riparian reach with AHC.

Field Notes:

Assuming DP3 will remain same as existing for V_1 - the area will be hardened, still straightened and with highly degraded floodplain

More than 50% of the RR is within Altered hydraulic conveyance

Sediment Dynamics will not improve

V_2 In-Stream Habitat/Available Cover

User Notes: The biological components of riparian ecosystems have adapted to episodic cycles of disturbance and developed a variety of mechanisms that make it possible to survive and flourish where other organisms cannot. This variable is evaluated below the floodprone area. For impact or mitigation evaluations, the Condition Index Rating is zero when a stream is converted to a lacustrine system.

Assessment Area: Below the estimated floodprone area

Condition Index Rating	Indicator or Description of Conditions
1.00	__Within the flood prone area, there is greater than >50% coverage by diverse habitat features favorable for stream faunal colonization and maintenance of vegetation dynamics for recruitment. __Features may include snags, submerged logs, undercut banks, roots, cobble, rocks, persistent leaf packs, pools and glides, or other stable habitat at a stage to allow colonization. __No barriers to faunal movement.
0.75	__ Within the flood prone area there is >30% and ≤50% coverage by habitat features favorable for stream faunal colonization and/or cover. __Many habitat features are not transient. Adequate habitat for maintenance of populations is evident. __Seasonal water withdrawals inhibit faunal movement within the reach.
0.50	__ Within the flood prone area, there is >10 and ≤30% coverage by habitat features favorable for stream faunal colonization and cover; __habitat availability may be less than desirable; __substrate may be frequently disturbed. __Drop structures, culverts, dams, or diversions are present within the reach, but with minimal effect to the channel gradient or __faunal movement. Some channel deepening is noticeable.
0.25	__ Within the flood prone area, there is ≤10% coverage of habitat features present; lack of habitat is obvious; substrate unstable or lacking; concrete lined channels are present within portions of the stream. __Habitat features and pools buried or lacking, channel bottom may be flat. __Drop structures, culverts, dams, or diversions are present within the reach with noticeable effects to the channel gradient (deepening) or inhibition of faunal movement.
0.10	✓Habitat features and pools are buried or lacking, channel bottom may be flat. ✓Channels banks are completely armored or concrete lined.

Field Notes:

No change -
In stream habitat
will not improve -
area will be rehardened
with rip rap

V3 Floodplain Interaction–Connectivity

User Notes: Floodplain Interaction–Connectivity indicates of the degree to which the hydrologic interaction between the bankfull channel and the active floodplain and terraces of the riparian ecosystem remains intact. In assigning the Condition Index Rating, the channel evolution concepts previously presented should be consulted. Previous observations for V1 Hydraulic Conveyance and Sediment dynamics variable and including channel cross-section observations should be used to assign this Condition Index Rating. The assessment area for this variable is the floodprone area and abandoned floodplain/terraces.

Assessment Area: Floodprone area and abandoned floodplain/terraces

Condition Index Rating	Indicator or Description of Conditions
1.00	__The floodplain has not been physically manipulated. __No surface alterations (such as constructed channels, dams, dikes, diversions, dugouts, or fill) or subsurface alterations (such as tile drainage) are present. __Natural geomorphic features occur within the floodplain as evidenced by irregular, uneven surfaces (undulating conditions from meander scars, sediment bars, or hummocks). __The current stage of the channel would indicate an equilibrium channel corresponding to a Class I condition (sinuous, pre-modified channel).
0.75	__Few changes to the floodplain surface. __Observable changes in elevation are restricted to only farm roads or bridges with culverts. __The current stage of the channel would indicate quasi-equilibrium corresponding to a Class VI condition.
0.50	__Multiple geomorphic modifications to the floodplain surface to control flood energy, often with bank control structures, but still permitting flow access via culverts. __The current stage of the channel would indicate aggradations and widening, corresponding to a Class V condition.
0.25	✓Complete geomorphic modification BUT still permits flow access via culverts and occasional overbank flooding. __The current stage of the channel would indicate degradation and widening corresponding to a Class IV condition.
0.10	__Complete geomorphic modification to the floodprone area. Bank control structures (dikes, etc) are in a continuous structure preventing channel movement and also preventing overbank flow. ✓The current stage of the channel would indicate channelization and/or active bed degradation corresponding to a Class II or III condition.

Field Notes:

Assess that the channel have a slight more access to bank w/ widening and lowering
- still defined as a Class II condition

V_4 Riparian Condition & Vegetation Composition

User Notes: Riparian Vegetation Composition is a response variable to both natural and anthropogenic disturbance. Scoring of this variable is determined by comparing the dominant species observed in cross-sections within the RR assessment area to a list of diagnostic and most abundant species. Field sheets on following page.

Assessment Area: V_{4a} above the floodprone area with an artificial convention of 100' from the top of each bank; and, V_{4b} below the floodprone area.

Condition Index Rating	4a	4b	Indicator or Description of Conditions
1.00			__The percent concurrence of dominant plants observed with diagnostic species is ≥ 95 %. __Existing riparian habitat is of high caliber; if this site were to be preserved, minimal management would be necessary due to natural processes still being in effect. __Vegetation represents the reference standard condition with no chronic anthropogenic disturbances; or, __the site has recovered from historical anthropogenic disturbance.
0.75			__The percent concurrence of dominant plants observed with diagnostic species is ≥75 and < 95%. __Existing riparian habitat is only slightly degraded; preservation and/or improvement are likely with moderate management effort. __Native vegetation is on a recovery trajectory with compatible management practices that mimic natural disturbances (i.e., low intensity grazing). __Presences of areas disturbed through natural processes (i.e., fire and flood) are still evident.
0.50			✓The percent concurrence of dominant plants observed with diagnostic species is ≥50% and < 75%. ✓Existing riparian habitat somewhat degraded; preservation and/or improvement possible but would require significant management effort. ✓Native vegetation present for some representative communities, but invasive or ruderal species are prevalent. ✓Disturbance is largely anthropogenic and natural processes influencing the plant community are rare.
0.25			Plants above more upland species ✓The percent concurrence of dominant plants observed with diagnostic species is ≥ 25% or < 50%. ✓Existing riparian habitat degraded; preservation not desirable or attainable; improvements are not likely or would require significant and costly management effort. ✓Native vegetation is localized within the assessment area. ✓Presence of areas disturbed through natural processes is not evident. __ Vegetation composition is dominated by invasive or ruderal species. however quality of vegetation improves
0.10			__ The percent concurrence of dominant plants observed with diagnostic species is ≥ 5% or < 25%. __ Existing riparian habitat is severely degraded. __ Native vegetation is largely absent, area is hardened (i.e., paved, urban, etc.) or graded.

Field Notes:

Using NDOT seed mixture for Region 3 Zone

Above floodprone
Rural Hwy shoulder mix

Below floodprone
Need FACW->FACU plants - herb stratum
no woody vegetation
All seed mixtures being applied would be native species

No mowing in native seed buffer zone (25 ft riparian area)
Brush hog to remove down to 6 inches veg

V_5 Riparian Buffer Continuity and Width

User Notes: Riparian ecosystems typically form a relatively continuous corridor along the stream channel and floodplain. This variable is measured perpendicular from the top of the bank for a distance laterally of 100'. Both banks of the stream channel are measured and then averaged for determination of the summary rating and subsequent Condition Index Score assignment. Aerial photography can be used for estimation of this variable but should be verified in the field.

Assessment area: An artificial convention of 100' from the top of each bank

	Continuity (%)	100	80-99	60-79	40-59	20-39	5-19	<5
Width(ft)	≥100	1.00	0.90	0.70	0.50	0.30	0.15	0.00
	75-99	0.80	0.75	0.60	0.40	0.25	0.10	0.00
	50-74	0.60	0.50	0.50	0.30	0.20	0.10	0.00
	25-49	0.40	0.30	0.30	0.20	0.15	0.05	0.00
	10-24	0.20	0.20	0.15	0.10	0.10	0.05	0.00
	5-9	0.10	0.10	0.10	0.05	0.05	0.01	0.00
	<5	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Corresponding Summary Rating with Variable score:

If summary rating is between :	Assign the following Condition Index Score:
0.80 - 1.00	1.00
0.60 - 0.79	0.75
0.40 - 0.59	0.50
0.20 - 0.39	0.25
0.01 - 0.19	0.10 ←
0.0 - OR No buffer of permanent vegetation is present = 0	

.35/2 =
.17

Field Notes:

Left Descending (west Bank)
46 feet until pavement (50%)
54 pavement

East Bank - 21 ft Native Veg (20%)
79 ft pavement

V_6 Riparian Land Use

User Notes: Land use indicates the way in which a tract of land is utilized, has been developed, or the type of vegetation present

Assessment area: An artificial convention of 100' from the top of each bank. For land use assessment in stream to reservoir conversions, the assessment area is defined as 100' from the lateral extent of the floodpool. This boundary convention is considered synonymous with the upper extent of the floodprone area of stream systems.

Land Use Category	Land Use Weight		Area of Land Use		Weighted score (WS) for each land use category
Impermeable surface	1	X	79+54	=	133
Feed lot	1	X		=	
Row crop or Small grain	3	X		=	
Farmstead	6	X		=	
Woodlot/shelterbelt	6	X	10	=	60
Perennial Cover of any type	8	X	21+36	=	456
Managed for native vegetation cover and diversity	10	X		=	
			200 Total area	=	
*User notes: Σ WS is the sum of the Weighted Scores WA is the Weighted Average as defined by ΣWeighted Scores /Total area					Σ WS = 649/ WA = 200 3.24

If the Land Use Weighted Average is:	Assign the following Condition Index Score:
$\geq$8	1.00
7-8	0.75
5-6	0.50
2-4	0.25
< 1	0.10

remains @ .25
Shifting the channel widens but still located near impervious surfaces

Field Notes:

(west)
Left 46 ft
10 ft = trees
36 ft = perennial cover
54 ft = pavement

(east) 21 perennial
79 pavement

220'
Floodplain
Bank full
12' 20' 12' 25'
Class II
N
1:3 Sideslope
Channel Width
Native Seed
Turf Mat
Bike Trail
© 2016 Google

DP4 Alternative 1+2 Channel widening

V_1 Hydraulic Conveyance and Sediment Dynamics

User notes: Hydraulic conveyance and sediment dynamics addresses fluvial processes for the active channel within the RR. This indicator is assessed by narrative criteria or measured as a percent of the length of mainstem channel in a riparian reach with (AHC). Aerial photography and field observations are used to estimate the Condition Index Rating of this metric. For impact or mitigation evaluations, **the Condition Index Rating is zero when a stream is converted to a lacustrine system.**

Assessment Area: below bankfull width

Condition Index Rating	Indicator Score or Description of Condition
1.00	__Movement of sediment in the channel is in equilibrium in terms of supply, erosion, and deposition processes. __**On most streams** there are alternating point bars; bank erosion occurs, but is stabilized and moderated by vegetation; and channel width, form, and floodplain area is consistent through the reach. __**In some streams**, some of these indicators may not be apparent, but overall bank and hill slope erosion is moderated by vegetation and there are no apparent culturally induced catastrophic failures. __The channel is stable, no active down-cutting occurring, or; old down-cutting apparent but a new, stable riparian area has formed within the incised channel, OR; __≤5% of active channel within the riparian reach with altered hydraulic conveyance (AHC).
0.75	__Movement of sediment in the channel is in equilibrium with the current hydrologic regime, as opposed to a culturally unaltered condition, and exhibits an overall balance in terms of erosion and deposition processes. __**On most streams** there are alternating point bars; bank erosion occurs, but is stabilized and moderated by vegetation; and channel width, form, and floodplain area are consistent through the reach. __**In some streams**, some of these indicators may not be apparent, but overall bank and hill slope erosion is moderated by vegetation and no culturally induced catastrophic failures are apparent. __The channel has evidence of old down-cutting that has begun stabilizing, vegetation is beginning to establish, even at the base of the falling banks, soil disturbance is evident, OR; __>5 and ≤15% of riparian reach with AHC.
0.50	__Sediment disequilibrium is minor and localized within the reach. __This includes small, localized areas of bank protection, slumping, or encroachment on the floodplain and channel. __This condition class includes previously disrupted reaches on a recovery trajectory, such as deeply entrenched streams where down-cutting has been arrested by structural grade control, and there is sufficient room for lateral channel migration and establishment of a functional floodplain within the incised channel. __Head cuts in early stage are present. Immediate action may prevent further degradation, OR; __ >15 and ≤30% of riparian reach with AHC.
0.25	__Sediment erosion and deposition out of equilibrium. __Water inflow is sediment rich, poor or accelerated bank erosion exists. Channel not actively incising but extensive disequilibrium is evident. __Typical indicators include extensive bank slumping (erosion events that exceed any moderating influence of native vegetation), active gullies feeding into the reach from adjacent hill slopes, or shoaling of sediments rather than deposition in sorted lateral and mid-channel bars. __Apparently stable channels should be placed in this category if there is evidence of regular mechanical disruption, such as bulldozing of the channel bottom and clearing of riparian vegetation to improve flood conveyance. __ Channel with some widening, but limiting new floodplain development; the existing floodplain is not well vegetated. __The vegetation that is present is mainly pioneer species. Bank failure is common, OR; __ >30 and ≤50% of riparian reach with AHC.
0.10	✓Sediment dynamics within most of the reach are seriously disrupted. __This includes reaches where no significant storage or recruitment of sediment occurs (i.e., reaches in underground tunnels/culverts, and reaches hardened with rock or concrete). __It also includes reaches that are either actively incising or functioning as sediment traps (e.g., sediment basins). ✓This also includes reaches that have been subject to recent changes likely to induce severe disequilibrium, such as extensive floodplain filling, change in slope, channel straightening, or other changes that are likely to cause channel down-cutting during future high-flow events. ✓The channel is deeply incised, resembling a gully, little or no riparian area development, or active down-cutting is clearly occurring. Only occasional or rare flood events access the flood plain. __Tributaries will also exhibit signs of down-cutting, OR; > ✓50% of riparian reach with AHC.

Field Notes:

Assumption that V_1 remains @ .10 CIR

V_2 In-Stream Habitat/Available Cover

User Notes: The biological components of riparian ecosystems have adapted to episodic cycles of disturbance and developed a variety of mechanisms that make it possible to survive and flourish where other organisms cannot. This variable is evaluated below the floodprone area. For impact or mitigation evaluations, the Condition Index Rating is zero when a stream is converted to a lacustrine system.

Assessment Area: Below the estimated floodprone area

Condition Index Rating	Indicator or Description of Conditions
1.00	__Within the flood prone area, there is greater than >50% coverage by diverse habitat features favorable for stream faunal colonization and maintenance of vegetation dynamics for recruitment. __Features may include snags, submerged logs, undercut banks, roots, cobble, rocks, persistent leaf packs, pools and glides, or other stable habitat at a stage to allow colonization. __No barriers to faunal movement.
0.75	__ Within the flood prone area there is >30% and ≤50% coverage by habitat features favorable for stream faunal colonization and/or cover. __Many habitat features are not transient. Adequate habitat for maintenance of populations is evident. __Seasonal water withdrawals inhibit faunal movement within the reach.
0.50	__ Within the flood prone area, there is >10 and ≤30% coverage by habitat features favorable for stream faunal colonization and cover; __habitat availability may be less than desirable; __substrate may be frequently disturbed. __Drop structures, culverts, dams, or diversions are present within the reach, but with minimal effect to the channel gradient or __faunal movement. Some channel deepening is noticeable.
0.25	__ Within the flood prone area, there is ≤10% coverage of habitat features present; lack of habitat is obvious; substrate unstable or lacking; concrete lined channels are present within portions of the stream. __Habitat features and pools buried or lacking, channel bottom may be flat. __Drop structures, culverts, dams, or diversions are present within the reach with noticeable effects to the channel gradient (deepening) or inhibition of faunal movement.
0.10	✓Habitat features and pools are buried or lacking, channel bottom may be flat. ✓Channels banks are completely armored or concrete lined.

Field Notes:

In-stream value remains consistent as area will be re-hardened

V_3 Floodplain Interaction–Connectivity

User Notes: Floodplain Interaction–Connectivity indicates of the degree to which the hydrologic interaction between the bankfull channel and the active floodplain and terraces of the riparian ecosystem remains intact. In assigning the Condition Index Rating, the channel evolution concepts previously presented should be consulted. Previous observations for V1 Hydraulic Conveyance and Sediment dynamics variable and including channel cross-section observations should be used to assign this Condition Index Rating. The assessment area for this variable is the floodprone area and abandoned floodplain/terraces.

Assessment Area: Floodprone area and abandoned floodplain/terraces

Condition Index Rating	Indicator or Description of Conditions
1.00	__The floodplain has not been physically manipulated. __No surface alterations (such as constructed channels, dams, dikes, diversions, dugouts, or fill) or subsurface alterations (such as tile drainage) are present. __Natural geomorphic features occur within the floodplain as evidenced by irregular, uneven surfaces (undulating conditions from meander scars, sediment bars, or hummocks). __The current stage of the channel would indicate an equilibrium channel corresponding to a Class I condition (sinuous, pre-modified channel).
0.75	__Few changes to the floodplain surface. __Observable changes in elevation are restricted to only farm roads or bridges with culverts. __The current stage of the channel would indicate quasi-equilibrium corresponding to a Class VI condition.
0.50	__Multiple geomorphic modifications to the floodplain surface to control flood energy, often with bank control structures, but still permitting flow access via culverts. __The current stage of the channel would indicate aggradations and widening, corresponding to a Class V condition.
0.25	__Complete geomorphic modification BUT still permits flow access via culverts and occasional overbank flooding. __The current stage of the channel would indicate degradation and widening corresponding to a Class IV condition.
0.10	__Complete geomorphic modification to the floodprone area. Bank control structures (dikes, etc) are in a continuous structure preventing channel movement and also preventing overbank flow. ✓The current stage of the channel would indicate channelization and/or active bed degradation corresponding to a Class II or III condition.

Field Notes:

Channel would likely remain same class condition but access to overbank would be increased w/ widening

V_4 Riparian Condition & Vegetation Composition

User Notes: Riparian Vegetation Composition is a response variable to both natural and anthropogenic disturbance. Scoring of this variable is determined by comparing the dominant species observed in cross-sections within the RR assessment area to a list of diagnostic and most abundant species. Field sheets on following page.

Assessment Area: V_{4a} above the floodprone area with an artificial convention of 100' from the top of each bank; and, V_{4b} below the floodprone area.

Condition Index Rating	4a	4b	Indicator or Description of Conditions
1.00			__The percent concurrence of dominant plants observed with diagnostic species is ≥ 95 %. __Existing riparian habitat is of high caliber; if this site were to be preserved, minimal management would be necessary due to natural processes still being in effect. __Vegetation represents the reference standard condition with no chronic anthropogenic disturbances; or, __the site has recovered from historical anthropogenic disturbance.
0.75			__The percent concurrence of dominant plants observed with diagnostic species is ≥75 and < 95%. __Existing riparian habitat is only slightly degraded; preservation and/or improvement are likely with moderate management effort. __Native vegetation is on a recovery trajectory with compatible management practices that mimic natural disturbances (i.e., low intensity grazing). __Presences of areas disturbed through natural processes (i.e., fire and flood) are still evident.
0.50			✓The percent concurrence of dominant plants observed with diagnostic species is ≥50% and < 75%. ✓Existing riparian habitat somewhat degraded; preservation and/or improvement possible but would require significant management effort. ✓Native vegetation present for some representative communities, but invasive or ruderal species are prevalent. ✓Disturbance is largely anthropogenic and natural processes influencing the plant community are rare.
0.25			✓The percent concurrence of dominant plants observed with diagnostic species is ≥ 25% or < 50%. ✓Existing riparian habitat degraded; preservation not desirable or attainable; improvements are not likely or would require significant and costly management effort. ✓Native vegetation is localized within the assessment area. ✓Presence of areas disturbed through natural processes is not evident. __ Vegetation composition is dominated by invasive or ruderal species.
0.10			__ The percent concurrence of dominant plants observed with diagnostic species is ≥ 5% or < 25%. __ Existing riparian habitat is severely degraded. __ Native vegetation is largely absent, area is hardened (i.e., paved, urban, etc.) or graded.

Field Notes:

Above

Below

Use assumptions from DP3 Alternative Discussion

V_5 Riparian Buffer Continuity and Width

User Notes: Riparian ecosystems typically form a relatively continuous corridor along the stream channel and floodplain. This variable is measured perpendicular from the top of the bank for a distance laterally of 100'. Both banks of the stream channel are measured and then averaged for determination of the summary rating and subsequent Condition Index Score assignment. Aerial photography can be used for estimation of this variable but should be verified in the field.

Assessment area: An artificial convention of 100' from the top of each bank

	Continuity (%)	100	80-99	60-79	40-59	20-39	5-19	<5
Width(ft)	≥100	1.00	0.90	0.70	0.50	0.30	0.15	0.00
	75-99	0.80	0.75	0.60	0.40	0.25	0.10	0.00
	50-74	0.60	0.50	0.50	0.30	0.20	0.10	0.00
	25-49	0.40	0.30	0.30	0.20	0.15	0.05	0.00
	10-24	0.20	0.20	0.15	0.10	0.10	0.05	0.00
	5-9	0.10	0.10	0.10	0.05	0.05	0.01	0.00
	<5	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Corresponding Summary Rating with Variable score:

If summary rating is between :	Assign the following Condition Index Score:
0.80 - 1.00	1.00
0.60 - 0.79	0.75
0.40 - 0.59	0.50
0.20 - 0.39	0.25
0.01 - 0.19	0.10
0.0 - OR No buffer of permanent vegetation is present = 0	

1.10/2 = .55

Field Notes:

North bank = 24 feet of native veg
76 ft agrarian plot

South Bank - arboretum plants - considered potential from existing conditions
100 feet

V_6 Riparian Land Use

User Notes: Land use indicates the way in which a tract of land is utilized, has been developed, or the type of vegetation present

Assessment area: An artificial convention of 100' from the top of each bank. For land use assessment in stream to reservoir conversions, the assessment area is defined as 100' from the lateral extent of the floodpool. This boundary convention is considered synonymous with the upper extent of the floodprone area of stream systems.

Land Use Category	Land Use Weight		Area of Land Use		Weighted score (WS) for each land use category
Impermeable surface	1	X		=	
Feed lot	1	X		=	
Row crop or Small grain	3	X	76	=	228
Farmstead	6	X		=	
Woodlot/shelterbelt	6	X		=	
Perennial Cover of any type	8	X	24+100	=	992
Managed for native vegetation cover and diversity	10	X		=	
			200 Total area	=	1220 /200
*User notes: ∑ WS is the sum of the Weighted Scores WA is the Weighted Average as defined by ∑Weighted Scores /Total area					∑ WS = WA = 6.10

If the Land Use Weighted Average is:	Assign the following Condition Index Score:
>8	1.00
7-8	0.75
5-6	0.50 ←
2-4	0.25
< 1	0.10

Field Notes:

North = 24' perennial cover
76' row crop

South = 100 perennial cover


1:3 Sideslope
Channel Width
Native Buffer
Turf Mat
Bike Trail
N
200'
Flood prone
Bankfull
12'
8'
26'
12'
20'
12'
25'
48'
Class II

DPS - Alternative 1+2 (channel widening)

V_1 Hydraulic Conveyance and Sediment Dynamics

User notes: Hydraulic conveyance and sediment dynamics addresses fluvial processes for the active channel within the RR. This indicator is assessed by narrative criteria or measured as a percent of the length of mainstem channel in a riparian reach with (AHC). Aerial photography and field observations are used to estimate the Condition Index Rating of this metric. For impact or mitigation evaluations, **the Condition Index Rating is zero when a stream is converted to a lacustrine system.**

Assessment Area: below bankfull width

Condition Index Rating	Indicator Score or Description of Condition
1.00	__Movement of sediment in the channel is in equilibrium in terms of supply, erosion, and deposition processes. __**On most streams** there are alternating point bars; bank erosion occurs, but is stabilized and moderated by vegetation; and channel width, form, and floodplain area is consistent through the reach. __**In some streams**, some of these indicators may not be apparent, but overall bank and hill slope erosion is moderated by vegetation and there are no apparent culturally induced catastrophic failures. __The channel is stable, no active down-cutting occurring, or; old down-cutting apparent but a new, stable riparian area has formed within the incised channel, OR; __≤5% of active channel within the riparian reach with altered hydraulic conveyance (AHC).
0.75	__Movement of sediment in the channel is in equilibrium with the current hydrologic regime, as opposed to a culturally unaltered condition, and exhibits an overall balance in terms of erosion and deposition processes. __**On most streams** there are alternating point bars; bank erosion occurs, but is stabilized and moderated by vegetation; and channel width, form, and floodplain area are consistent through the reach. __**In some streams**, some of these indicators may not be apparent, but overall bank and hill slope erosion is moderated by vegetation and no culturally induced catastrophic failures are apparent. __The channel has evidence of old down-cutting that has begun stabilizing, vegetation is beginning to establish, even at the base of the falling banks, soil disturbance is evident, OR; __>5 and ≤15% of riparian reach with AHC.
0.50	__Sediment disequilibrium is minor and localized within the reach. __This includes small, localized areas of bank protection, slumping, or encroachment on the floodplain and channel. __This condition class includes previously disrupted reaches on a recovery trajectory, such as deeply entrenched streams where down-cutting has been arrested by structural grade control, and there is sufficient room for lateral channel migration and establishment of a functional floodplain within the incised channel. __Head cuts in early stage are present. Immediate action may prevent further degradation, OR; __ >15 and ≤30% of riparian reach with AHC.
0.25	__Sediment erosion and deposition out of equilibrium. __Water inflow is sediment rich, poor or accelerated bank erosion exists. Channel not actively incising but extensive disequilibrium is evident. __Typical indicators include extensive bank slumping (erosion events that exceed any moderating influence of native vegetation), active gullies feeding into the reach from adjacent hill slopes, or shoaling of sediments rather than deposition in sorted lateral and mid-channel bars. __Apparently stable channels should be placed in this category if there is evidence of regular mechanical disruption, such as bulldozing of the channel bottom and clearing of riparian vegetation to improve flood conveyance. __Channel with some widening, but limiting new floodplain development; the existing floodplain is not well vegetated. ✓The vegetation that is present is mainly pioneer species. Bank failure is common, OR; __>30 and ≤50% of riparian reach with AHC.
0.10	✓Sediment dynamics within most of the reach are seriously disrupted. __This includes reaches where no significant storage or recruitment of sediment occurs (i.e., reaches in underground tunnels/culverts, and reaches hardened with rock or concrete). __It also includes reaches that are either actively incising or functioning as sediment traps (e.g., sediment basins). __This also includes reaches that have been subject to recent changes likely to induce severe disequilibrium, such as extensive floodplain filling, change in slope, channel straightening, or other changes that are likely to cause channel down-cutting during future high-flow events. __The channel is deeply incised, resembling a gully, little or no riparian area development, or active down-cutting is clearly occurring. Only occasional or rare flood events access the flood plain. __Tributaries will also exhibit signs of down-cutting, OR; > ✓50% of riparian reach with AHC.

Field Notes:

Estimated some hydraulic conveyance and sediment dynamics will be lost with filling the channel bed with rock rip therefore CIR decreases in value

V_2 In-Stream Habitat/Available Cover

User Notes: The biological components of riparian ecosystems have adapted to episodic cycles of disturbance and developed a variety of mechanisms that make it possible to survive and flourish where other organisms cannot. This variable is evaluated below the floodprone area. For impact or mitigation evaluations, the Condition Index Rating is zero when a stream is converted to a lacustrine system.

Assessment Area: Below the estimated floodprone area

Condition Index Rating	Indicator or Description of Conditions
1.00	__Within the flood prone area, there is greater than >50% coverage by diverse habitat features favorable for stream faunal colonization and maintenance of vegetation dynamics for recruitment. __Features may include snags, submerged logs, undercut banks, roots, cobble, rocks, persistent leaf packs, pools and glides, or other stable habitat at a stage to allow colonization. __No barriers to faunal movement.
0.75	__ Within the flood prone area there is >30% and ≤50% coverage by habitat features favorable for stream faunal colonization and/or cover. __Many habitat features are not transient. Adequate habitat for maintenance of populations is evident. __Seasonal water withdrawals inhibit faunal movement within the reach.
0.50	__ Within the flood prone area, there is >10 and ≤30% coverage by habitat features favorable for stream faunal colonization and cover; __habitat availability may be less than desirable; __substrate may be frequently disturbed. __Drop structures, culverts, dams, or diversions are present within the reach, but with minimal effect to the channel gradient or __faunal movement. Some channel deepening is noticeable.
0.25	✓ Within the flood prone area, there is ≤10% coverage of habitat features present; lack of habitat is obvious; substrate unstable or lacking; concrete lined channels are present within portions of the stream. __Habitat features and pools buried or lacking, channel bottom may be flat. __Drop structures, culverts, dams, or diversions are present within the reach with noticeable effects to the channel gradient (deepening) or inhibition of faunal movement.
0.10	✓ Habitat features and pools are buried or lacking, channel bottom may be flat. ✓ Channels banks are completely armored or concrete lined.

Field Notes:

In-stream habitat value will reduce by lining the bed + sides with riprap.

Less then 10%. Still present of features (Trees w/ floodprone area on south Bank) that will remain

V_3 Floodplain Interaction–Connectivity

User Notes: Floodplain Interaction–Connectivity indicates of the degree to which the hydrologic interaction between the bankfull channel and the active floodplain and terraces of the riparian ecosystem remains intact. In assigning the Condition Index Rating, the channel evolution concepts previously presented should be consulted. Previous observations for V1 Hydraulic Conveyance and Sediment dynamics variable and including channel cross-section observations should be used to assign this Condition Index Rating. The assessment area for this variable is the floodprone area and abandoned floodplain/terraces.

Assessment Area: Floodprone area and abandoned floodplain/terraces

Condition Index Rating	Indicator or Description of Conditions
1.00	__The floodplain has not been physically manipulated. __No surface alterations (such as constructed channels, dams, dikes, diversions, dugouts, or fill) or subsurface alterations (such as tile drainage) are present. __Natural geomorphic features occur within the floodplain as evidenced by irregular, uneven surfaces (undulating conditions from meander scars, sediment bars, or hummocks). __The current stage of the channel would indicate an equilibrium channel corresponding to a Class I condition (sinuous, pre-modified channel).
0.75	__Few changes to the floodplain surface. __Observable changes in elevation are restricted to only farm roads or bridges with culverts. __The current stage of the channel would indicate quasi-equilibrium corresponding to a Class VI condition.
0.50	__Multiple geomorphic modifications to the floodplain surface to control flood energy, often with bank control structures, but still permitting flow access via culverts. __The current stage of the channel would indicate aggradations and widening, corresponding to a Class V condition.
0.25	✓Complete geomorphic modification BUT still permits flow access via culverts and occasional overbank flooding. __The current stage of the channel would indicate degradation and widening corresponding to a Class IV condition.
0.10	✓Complete geomorphic modification to the floodprone area. Bank control structures (dikes, etc) are in a continuous structure preventing channel movement and also preventing overbank flow. ✓The current stage of the channel would indicate channelization and/or active bed degradation corresponding to a Class II or III condition.

Field Notes:

Class condition will reduce to a Class II w/ hardening of bed - however - some access to overbank will still occur as a result of widening + sloping the channel

V_4 Riparian Condition & Vegetation Composition

User Notes: Riparian Vegetation Composition is a response variable to both natural and anthropogenic disturbance. Scoring of this variable is determined by comparing the dominant species observed in cross-sections within the RR assessment area to a list of diagnostic and most abundant species. Field sheets on following page.

Assessment Area: V_{4a} above the floodprone area with an artificial convention of 100' from the top of each bank; and, V_{4b} below the floodprone area.

Condition Index Rating	4a	4b	Indicator or Description of Conditions
1.00			__The percent concurrence of dominant plants observed with diagnostic species is ≥ 95 %. __Existing riparian habitat is of high caliber; if this site were to be preserved, minimal management would be necessary due to natural processes still being in effect. __Vegetation represents the reference standard condition with no chronic anthropogenic disturbances; or, __the site has recovered from historical anthropogenic disturbance.
0.75			__The percent concurrence of dominant plants observed with diagnostic species is ≥75 and < 95%. __Existing riparian habitat is only slightly degraded; preservation and/or improvement are likely with moderate management effort. __Native vegetation is on a recovery trajectory with compatible management practices that mimic natural disturbances (i.e., low intensity grazing). __Presences of areas disturbed through natural processes (i.e., fire and flood) are still evident.
0.50			__ The percent concurrence of dominant plants observed with diagnostic species is ≥50% and < 75%. __Existing riparian habitat somewhat degraded; preservation and/or improvement possible but would require significant management effort. __Native vegetation present for some representative communities, but invasive or ruderal species are prevalent. __ Disturbance is largely anthropogenic and natural processes influencing the plant community are rare.
0.25			__ The percent concurrence of dominant plants observed with diagnostic species is ≥ 25% or < 50%. __ Existing riparian habitat degraded; preservation not desirable or attainable; improvements are not likely or would require significant and costly management effort. __ Native vegetation is localized within the assessment area. __ Presence of areas disturbed through natural processes is not evident. __ Vegetation composition is dominated by invasive or ruderal species.
0.10			__ The percent concurrence of dominant plants observed with diagnostic species is ≥ 5% or < 25%. __ Existing riparian habitat is severely degraded. __ Native vegetation is largely absent, area is hardened (i.e., paved, urban, etc.) or graded.

Field Notes:

Above

Below

V5 Riparian Buffer Continuity and Width

User Notes: Riparian ecosystems typically form a relatively continuous corridor along the stream channel and floodplain. This variable is measured perpendicular from the top of the bank for a distance laterally of 100'. Both banks of the stream channel are measured and then averaged for determination of the summary rating and subsequent Condition Index Score assignment. Aerial photography can be used for estimation of this variable but should be verified in the field.

Assessment area: An artificial convention of 100' from the top of each bank

	Continuity (%)	100	80-99	60-79	40-59	20-39	5-19	<5
Width(ft)	≥100	1.00	0.90	0.70	0.50	0.30	0.15	0.00
	75-99	0.80	0.75	0.60	0.40	0.25	0.10	0.00
	50-74	0.60	0.50	0.50	0.30	0.20	0.10	0.00
	25-49	0.40	0.30	0.30	0.20	0.15	0.05	0.00
	10-24	0.20	0.20	0.15	0.10	0.10	0.05	0.00
	5-9	0.10	0.10	0.10	0.05	0.05	0.01	0.00
	<5	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Corresponding Summary Rating with Variable score:

If summary rating is between :	Assign the following Condition Index Score:
0.80 - 1.00	1.00
0.60 - 0.79	0.75
0.40 - 0.59	0.50 ←
0.20 - 0.39	0.25
0.01 - 0.19	0.10
0.0 - OR No buffer of permanent vegetation is present = 0	

1.1/2

.55

Field Notes:

North Bank = 21 ft perennial veg

21%

79 ft row crop

South Bank = 21 ft perennial

79 ft mowed turf

100% grass

V_6 Riparian Land Use

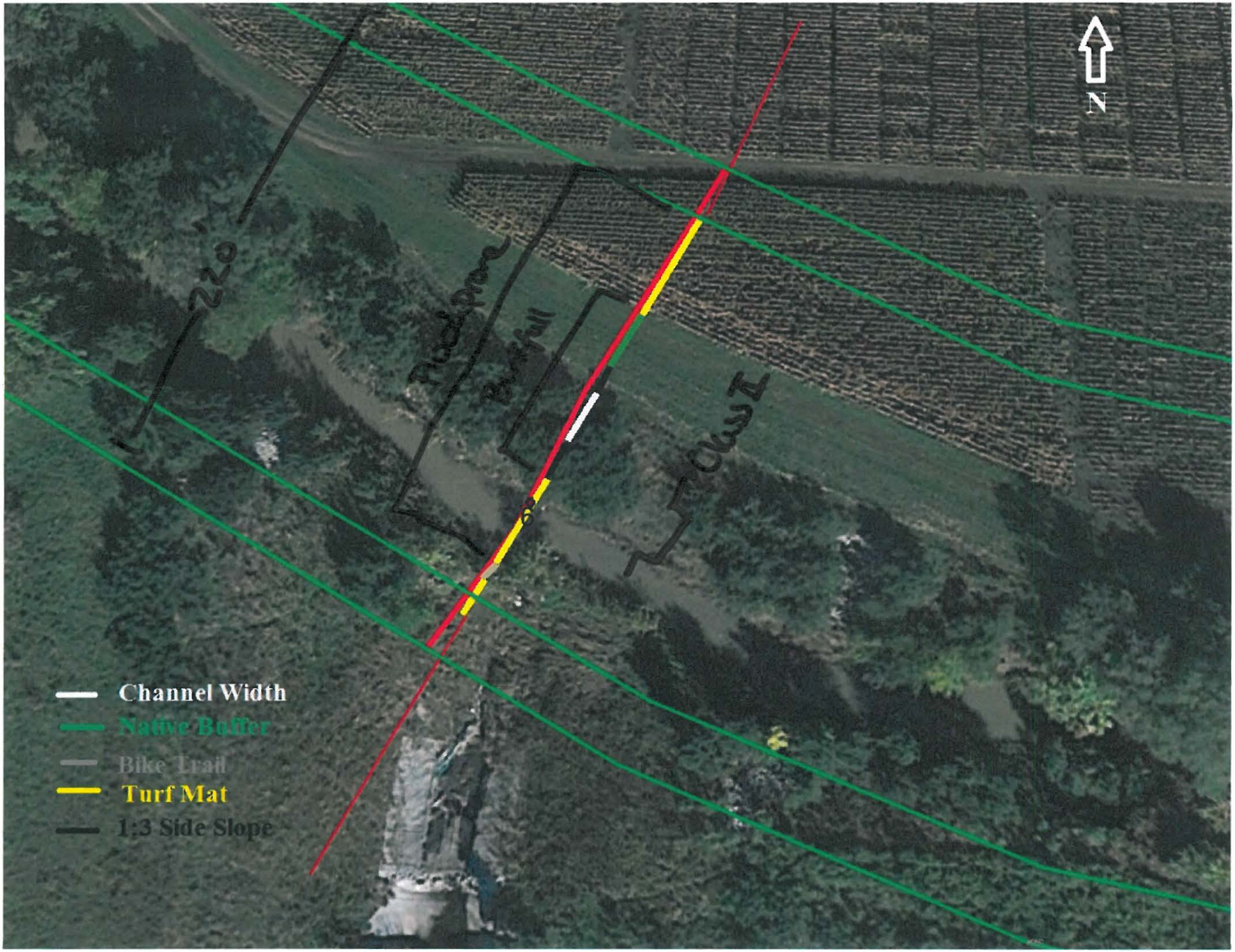
User Notes: Land use indicates the way in which a tract of land is utilized, has been developed, or the type of vegetation present

Assessment area: An artificial convention of 100' from the top of each bank. For land use assessment in stream to reservoir conversions, the assessment area is defined as 100' from the lateral extent of the floodpool. This boundary convention is considered synonymous with the upper extent of the floodprone area of stream systems.

Land Use Category	Land Use Weight		Area of Land Use		Weighted score (WS) for each land use category
Impermeable surface	1	X		=	
Feed lot	1	X		=	
Row crop or Small grain	3	X	79	=	237
Farmstead	6	X	79	=	474
Woodlot/shelterbelt	6	X		=	
Perennial Cover of any type	8	X	21+21	=	336
Managed for native vegetation cover and diversity	10	X		=	
			200 Total area	=	
*User notes: Σ WS is the sum of the Weighted Scores WA is the Weighted Average as defined by ΣWeighted Scores /Total area					Σ WS = 1047/ WA = /200 5.2

Field Notes:

If the Land Use Weighted Average is:	Assign the following Condition Index Score:
>8	1.00
7-8	0.75
5-6	0.50 ←
2-4	0.25
< 1	0.10


N
220'
Channel Width
Native Buffer
Bike Trail
Turf Mat
1:3 Side Slope

DP6 Alternatives 1+2 Channel Widening

V_1 Hydraulic Conveyance and Sediment Dynamics

User notes: Hydraulic conveyance and sediment dynamics addresses fluvial processes for the active channel within the RR. This indicator is assessed by narrative criteria or measured as a percent of the length of mainstem channel in a riparian reach with (AHC). Aerial photography and field observations are used to estimate the Condition Index Rating of this metric. For impact or mitigation evaluations, **the Condition Index Rating is zero when a stream is converted to a lacustrine system.**

Assessment Area: below bankfull width

Condition Index Rating	Indicator Score or Description of Condition
1.00	__Movement of sediment in the channel is in equilibrium in terms of supply, erosion, and deposition processes. __**On most streams** there are alternating point bars; bank erosion occurs, but is stabilized and moderated by vegetation; and channel width, form, and floodplain area is consistent through the reach. __**In some streams**, some of these indicators may not be apparent, but overall bank and hill slope erosion is moderated by vegetation and there are no apparent culturally induced catastrophic failures. __The channel is stable, no active down-cutting occurring, or; old down-cutting apparent but a new, stable riparian area has formed within the incised channel, OR; __≤5% of active channel within the riparian reach with altered hydraulic conveyance (AHC).
0.75	__Movement of sediment in the channel is in equilibrium with the current hydrologic regime, as opposed to a culturally unaltered condition, and exhibits an overall balance in terms of erosion and deposition processes. __**On most streams** there are alternating point bars; bank erosion occurs, but is stabilized and moderated by vegetation; and channel width, form, and floodplain area are consistent through the reach. __**In some streams**, some of these indicators may not be apparent, but overall bank and hill slope erosion is moderated by vegetation and no culturally induced catastrophic failures are apparent. __The channel has evidence of old down-cutting that has begun stabilizing, vegetation is beginning to establish, even at the base of the falling banks, soil disturbance is evident, OR; __>5 and ≤15% of riparian reach with AHC.
0.50	__Sediment disequilibrium is minor and localized within the reach. __This includes small, localized areas of bank protection, slumping, or encroachment on the floodplain and channel. __This condition class includes previously disrupted reaches on a recovery trajectory, such as deeply entrenched streams where down-cutting has been arrested by structural grade control, and there is sufficient room for lateral channel migration and establishment of a functional floodplain within the incised channel. __Head cuts in early stage are present. Immediate action may prevent further degradation, OR; __ >15 and ≤30% of riparian reach with AHC.
0.25	__Sediment erosion and deposition out of equilibrium. __Water inflow is sediment rich, poor or accelerated bank erosion exists. Channel not actively incising but extensive disequilibrium is evident. __Typical indicators include extensive bank slumping (erosion events that exceed any moderating influence of native vegetation), active gullies feeding into the reach from adjacent hill slopes, or shoaling of sediments rather than deposition in sorted lateral and mid-channel bars. __Apparently stable channels should be placed in this category if there is evidence of regular mechanical disruption, such as bulldozing of the channel bottom and clearing of riparian vegetation to improve flood conveyance. __ Channel with some widening, but limiting new floodplain development; the existing floodplain is not well vegetated. __The vegetation that is present is mainly pioneer species. Bank failure is common, OR; __ >30 and ≤50% of riparian reach with AHC.
0.10	✓Sediment dynamics within most of the reach are seriously disrupted. ✓This includes reaches where no significant storage or recruitment of sediment occurs (i.e., reaches in underground tunnels/culverts, and reaches hardened with rock or concrete). __It also includes reaches that are either actively incising or functioning as sediment traps (e.g., sediment basins). ✓This also includes reaches that have been subject to recent changes likely to induce severe disequilibrium, such as extensive floodplain filling, change in slope, channel straightening, or other changes that are likely to cause channel down-cutting during future high-flow events. __The channel is deeply incised, resembling a gully, little or no riparian area development, or active down-cutting is clearly occurring. Only occasional or rare flood events access the flood plain. ✓Tributaries will also exhibit signs of down-cutting, OR; > — no name still downcut ✓50% of riparian reach with AHC.

Field Notes:

Class II condition created w/ channel armoring = loss of sediment function

V_2 In-Stream Habitat/Available Cover

User Notes: The biological components of riparian ecosystems have adapted to episodic cycles of disturbance and developed a variety of mechanisms that make it possible to survive and flourish where other organisms cannot. This variable is evaluated below the floodprone area. For impact or mitigation evaluations, the Condition Index Rating is zero when a stream is converted to a lacustrine system.

Assessment Area: Below the estimated floodprone area

Condition Index Rating	Indicator or Description of Conditions
1.00	__Within the flood prone area, there is greater than >50% coverage by diverse habitat features favorable for stream faunal colonization and maintenance of vegetation dynamics for recruitment. __Features may include snags, submerged logs, undercut banks, roots, cobble, rocks, persistent leaf packs, pools and glides, or other stable habitat at a stage to allow colonization. __No barriers to faunal movement.
0.75	__ Within the flood prone area there is >30% and ≤50% coverage by habitat features favorable for stream faunal colonization and/or cover. __Many habitat features are not transient. Adequate habitat for maintenance of populations is evident. __Seasonal water withdrawals inhibit faunal movement within the reach.
0.50	__ Within the flood prone area, there is >10 and ≤30% coverage by habitat features favorable for stream faunal colonization and cover; __habitat availability may be less than desirable; __substrate may be frequently disturbed. __Drop structures, culverts, dams, or diversions are present within the reach, but with minimal effect to the channel gradient or __faunal movement. Some channel deepening is noticeable.
0.25	__ Within the flood prone area, there is ≤10% coverage of habitat features present; lack of habitat is obvious; substrate unstable or lacking; concrete lined channels are present within portions of the stream. __Habitat features and pools buried or lacking, channel bottom may be flat. __Drop structures, culverts, dams, or diversions are present within the reach with noticeable effects to the channel gradient (deepening) or inhibition of faunal movement.
0.10	✓ Habitat features and pools are buried or lacking, channel bottom may be flat. ✓ Channels banks are completely armored or concrete lined.

Field Notes:

.10 - loss of trees will prevent some shade overhang (not much existing on south bank)

V_3 Floodplain Interaction–Connectivity

User Notes: Floodplain Interaction–Connectivity indicates of the degree to which the hydrologic interaction between the bankfull channel and the active floodplain and terraces of the riparian ecosystem remains intact. In assigning the Condition Index Rating, the channel evolution concepts previously presented should be consulted. Previous observations for V1 Hydraulic Conveyance and Sediment dynamics variable and including channel cross-section observations should be used to assign this Condition Index Rating. The assessment area for this variable is the floodprone area and abandoned floodplain/terraces.

Assessment Area: Floodprone area and abandoned floodplain/terraces

Condition Index Rating	Indicator or Description of Conditions
1.00	__The floodplain has not been physically manipulated. __No surface alterations (such as constructed channels, dams, dikes, diversions, dugouts, or fill) or subsurface alterations (such as tile drainage) are present. __Natural geomorphic features occur within the floodplain as evidenced by irregular, uneven surfaces (undulating conditions from meander scars, sediment bars, or hummocks). __The current stage of the channel would indicate an equilibrium channel corresponding to a Class I condition (sinuous, pre-modified channel).
0.75	__Few changes to the floodplain surface. __Observable changes in elevation are restricted to only farm roads or bridges with culverts. __The current stage of the channel would indicate quasi-equilibrium corresponding to a Class VI condition.
0.50	__Multiple geomorphic modifications to the floodplain surface to control flood energy, often with bank control structures, but still permitting flow access via culverts. __The current stage of the channel would indicate aggradations and widening, corresponding to a Class V condition.
0.25	✓Complete geomorphic modification BUT still permits flow access via culverts and occasional overbank flooding. __The current stage of the channel would indicate degradation and widening corresponding to a Class IV condition.
0.10	__Complete geomorphic modification to the floodprone area. Bank control structures (dikes, etc) are in a continuous structure preventing channel movement and also preventing overbank flow. ✓The current stage of the channel would indicate channelization and/or active bed degradation corresponding to a Class II or III condition.

Field Notes:

Class II condition
however - some
bank connection
would be permitted
as a result
of widening and
lowering

V_4 Riparian Condition & Vegetation Composition

User Notes: Riparian Vegetation Composition is a response variable to both natural and anthropogenic disturbance. Scoring of this variable is determined by comparing the dominant species observed in cross-sections within the RR assessment area to a list of diagnostic and most abundant species. Field sheets on following page.

Assessment Area: V_{4a} above the floodprone area with an artificial convention of 100' from the top of each bank; and, V_{4b} below the floodprone area.

Condition Index Rating	4a	4b	Indicator or Description of Conditions
1.00			__The percent concurrence of dominant plants observed with diagnostic species is ≥ 95 %. __Existing riparian habitat is of high caliber; if this site were to be preserved, minimal management would be necessary due to natural processes still being in effect. __Vegetation represents the reference standard condition with no chronic anthropogenic disturbances; or, __the site has recovered from historical anthropogenic disturbance.
0.75			__The percent concurrence of dominant plants observed with diagnostic species is ≥75 and < 95%. __Existing riparian habitat is only slightly degraded; preservation and/or improvement are likely with moderate management effort. __Native vegetation is on a recovery trajectory with compatible management practices that mimic natural disturbances (i.e., low intensity grazing). __Presences of areas disturbed through natural processes (i.e., fire and flood) are still evident.
0.50			__ The percent concurrence of dominant plants observed with diagnostic species is ≥50% and < 75%. __Existing riparian habitat somewhat degraded; preservation and/or improvement possible but would require significant management effort. __Native vegetation present for some representative communities, but invasive or ruderal species are prevalent. __ Disturbance is largely anthropogenic and natural processes influencing the plant community are rare.
0.25			__ The percent concurrence of dominant plants observed with diagnostic species is ≥ 25% or < 50%. __ Existing riparian habitat degraded; preservation not desirable or attainable; improvements are not likely or would require significant and costly management effort. __ Native vegetation is localized within the assessment area. __ Presence of areas disturbed through natural processes is not evident. __ Vegetation composition is dominated by invasive or ruderal species.
0.10			__ The percent concurrence of dominant plants observed with diagnostic species is ≥ 5% or < 25%. __ Existing riparian habitat is severely degraded. __ Native vegetation is largely absent, area is hardened (i.e., paved, urban, etc.) or graded.

Field Notes:

V_5 Riparian Buffer Continuity and Width

User Notes: Riparian ecosystems typically form a relatively continuous corridor along the stream channel and floodplain. This variable is measured perpendicular from the top of the bank for a distance laterally of 100'. Both banks of the stream channel are measured and then averaged for determination of the summary rating and subsequent Condition Index Score assignment. Aerial photography can be used for estimation of this variable but should be verified in the field.

Assessment area: An artificial convention of 100' from the top of each bank

Width(ft)	Continuity (%)	100	80-99	60-79	40-59	20-39	5-19	<5
	≥100	1.00	0.90	0.70	0.50	0.30	0.15	0.00
	75-99	0.80	0.75	0.60	0.40	0.25	0.10	0.00
	50-74	0.60	0.50	0.50	0.30	0.20	0.10	0.00
	25-49	0.40	0.30	0.30	0.20	0.15	0.05	0.00
	10-24	0.20	0.20	0.15	0.10	0.10	0.05	0.00
	5-9	0.10	0.10	0.10	0.05	0.05	0.01	0.00
	<5	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Corresponding Summary Rating with Variable score:

If summary rating is between :	Assign the following Condition Index Score:
0.80 - 1.00	1.00
0.60 - 0.79	0.75
0.40 - 0.59	0.50
0.20 - 0.39	0.25
0.01 - 0.19	0.10
0.0 - OR No buffer of permanent vegetation is present = 0	

1.1/2 =
.55

Field Notes:

North = 21 ft perennial
74 ft row crop
South 100 perennial

V_6 Riparian Land Use

User Notes: Land use indicates the way in which a tract of land is utilized, has been developed, or the type of vegetation present

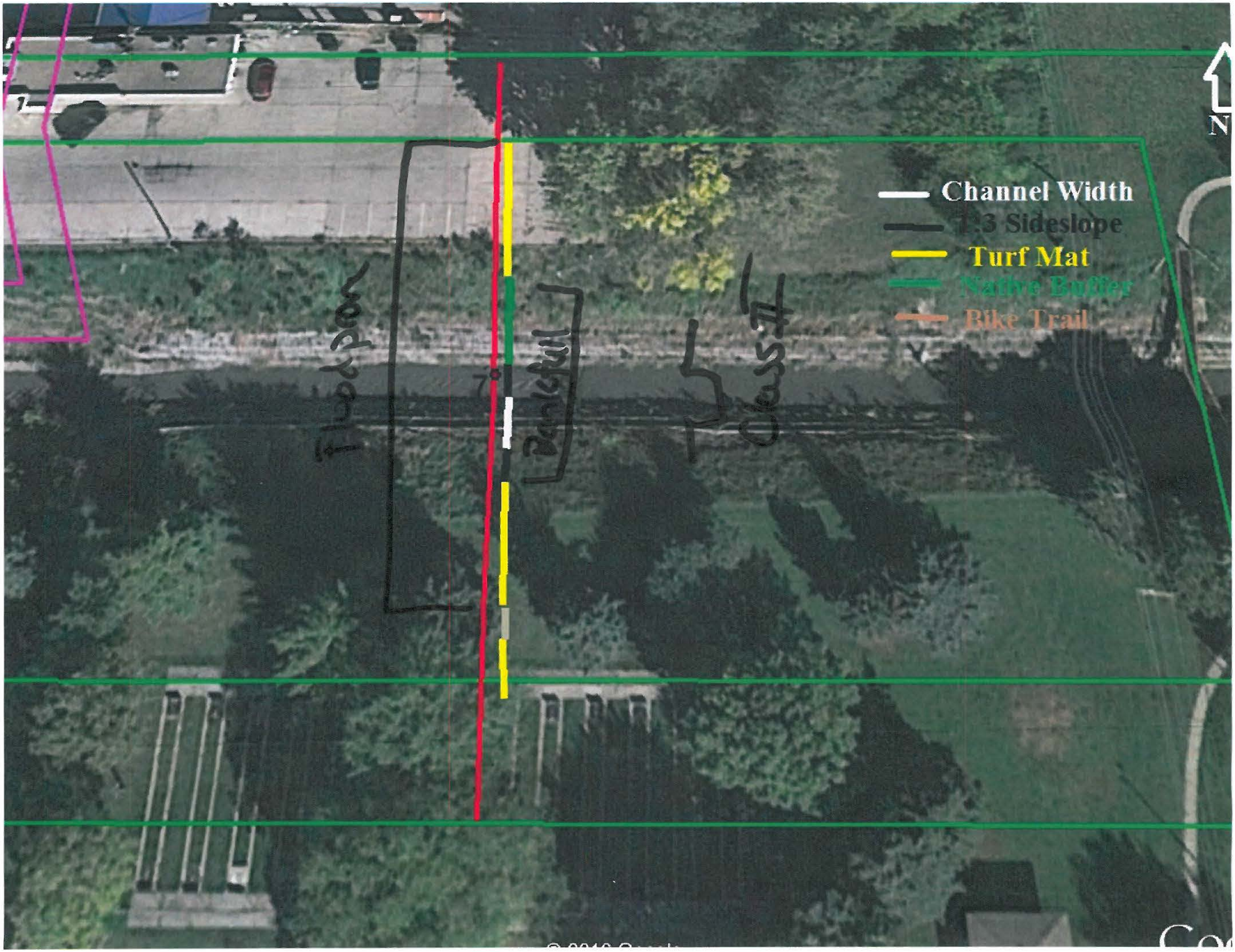
Assessment area: An artificial convention of 100' from the top of each bank. For land use assessment in stream to reservoir conversions, the assessment area is defined as 100' from the lateral extent of the floodpool. This boundary convention is considered synonymous with the upper extent of the floodprone area of stream systems.

Land Use Category	Land Use Weight		Area of Land Use		Weighted score (WS) for each land use category
Impermeable surface	1	X		=	
Feed lot	1	X		=	
Row crop or Small grain	3	X	79	=	237
Farmstead	6	X		=	
Woodlot/shelterbelt	6	X		=	
Perennial Cover of any type	8	X	121	=	968
Managed for native vegetation cover and diversity	10	X		=	
			200 Total area	=	
*User notes: Σ WS is the sum of the Weighted Scores WA is the Weighted Average as defined by ΣWeighted Scores /Total area					Σ WS = 1205 / WA = /200 6.025

Field Notes:

South = 100
North = 21 pcs

If the Land Use Weighted Average is:	Assign the following Condition Index Score:
≥ 8	1.00
7-8	0.75
5-6	0.50
2-4	0.25
< 1	0.10


N
Channel Width
1:3 Sideslope
Turf Mat
Native Buffer
Bike Trail
Floodplain
Bankfull
Class II

V_1 Hydraulic Conveyance and Sediment Dynamics

User notes: Hydraulic conveyance and sediment dynamics addresses fluvial processes for the active channel within the RR. This indicator is assessed by narrative criteria or measured as a percent of the length of mainstem channel in a riparian reach with (AHC). Aerial photography and field observations are used to estimate the Condition Index Rating of this metric. For impact or mitigation evaluations, **the Condition Index Rating is zero when a stream is converted to a lacustrine system.**

Assessment Area: below bankfull width

Condition Index Rating	Indicator Score or Description of Condition
1.00	__Movement of sediment in the channel is in equilibrium in terms of supply, erosion, and deposition processes. __**On most streams** there are alternating point bars; bank erosion occurs, but is stabilized and moderated by vegetation; and channel width, form, and floodplain area is consistent through the reach. __**In some streams**, some of these indicators may not be apparent, but overall bank and hill slope erosion is moderated by vegetation and there are no apparent culturally induced catastrophic failures. __The channel is stable, no active down-cutting occurring, or; old down-cutting apparent but a new, stable riparian area has formed within the incised channel, OR; __≤5% of active channel within the riparian reach with altered hydraulic conveyance (AHC).
0.75	__Movement of sediment in the channel is in equilibrium with the current hydrologic regime, as opposed to a culturally unaltered condition, and exhibits an overall balance in terms of erosion and deposition processes. __**On most streams** there are alternating point bars; bank erosion occurs, but is stabilized and moderated by vegetation; and channel width, form, and floodplain area are consistent through the reach. __**In some streams**, some of these indicators may not be apparent, but overall bank and hill slope erosion is moderated by vegetation and no culturally induced catastrophic failures are apparent. __The channel has evidence of old down-cutting that has begun stabilizing, vegetation is beginning to establish, even at the base of the falling banks, soil disturbance is evident, OR; __>5 and ≤15% of riparian reach with AHC.
0.50	__Sediment disequilibrium is minor and localized within the reach. __This includes small, localized areas of bank protection, slumping, or encroachment on the floodplain and channel. __This condition class includes previously disrupted reaches on a recovery trajectory, such as deeply entrenched streams where down-cutting has been arrested by structural grade control, and there is sufficient room for lateral channel migration and establishment of a functional floodplain within the incised channel. __Head cuts in early stage are present. Immediate action may prevent further degradation, OR; __ >15 and ≤30% of riparian reach with AHC.
0.25	__Sediment erosion and deposition out of equilibrium. __Water inflow is sediment rich, poor or accelerated bank erosion exists. Channel not actively incising but extensive disequilibrium is evident. __Typical indicators include extensive bank slumping (erosion events that exceed any moderating influence of native vegetation), active gullies feeding into the reach from adjacent hill slopes, or shoaling of sediments rather than deposition in sorted lateral and mid-channel bars. __Apparently stable channels should be placed in this category if there is evidence of regular mechanical disruption, such as bulldozing of the channel bottom and clearing of riparian vegetation to improve flood conveyance. __ Channel with some widening, but limiting new floodplain development; the existing floodplain is not well vegetated. __The vegetation that is present is mainly pioneer species. Bank failure is common, OR; __ >30 and ≤50% of riparian reach with AHC.
0.10	__Sediment dynamics within most of the reach are seriously disrupted. __This includes reaches where no significant storage or recruitment of sediment occurs (i.e., reaches in underground tunnels/culverts, and reaches hardened with rock or concrete). __It also includes reaches that are either actively incising or functioning as sediment traps (e.g., sediment basins). __This also includes reaches that have been subject to recent changes likely to induce severe disequilibrium, such as extensive floodplain filling, change in slope, channel straightening, or other changes that are likely to cause channel down-cutting during future high-flow events. __The channel is deeply incised, resembling a gully, little or no riparian area development, or active down-cutting is clearly occurring. Only occasional or rare flood events access the flood plain. __Tributaries will also exhibit signs of down-cutting, OR; > __50% of riparian reach with AHC.

Field Notes:

V_2 In-Stream Habitat/Available Cover

User Notes: The biological components of riparian ecosystems have adapted to episodic cycles of disturbance and developed a variety of mechanisms that make it possible to survive and flourish where other organisms cannot. This variable is evaluated below the floodprone area. For impact or mitigation evaluations, the Condition Index Rating is zero when a stream is converted to a lacustrine system.

Assessment Area: Below the estimated floodprone area

Condition Index Rating	Indicator or Description of Conditions
1.00	__Within the flood prone area, there is greater than >50% coverage by diverse habitat features favorable for stream faunal colonization and maintenance of vegetation dynamics for recruitment. __Features may include snags, submerged logs, undercut banks, roots, cobble, rocks, persistent leaf packs, pools and glides, or other stable habitat at a stage to allow colonization. __No barriers to faunal movement.
0.75	__ Within the flood prone area there is >30% and ≤50% coverage by habitat features favorable for stream faunal colonization and/or cover. __Many habitat features are not transient. Adequate habitat for maintenance of populations is evident. __Seasonal water withdrawals inhibit faunal movement within the reach.
0.50	__ Within the flood prone area, there is >10 and ≤30% coverage by habitat features favorable for stream faunal colonization and cover; __habitat availability may be less than desirable; __substrate may be frequently disturbed. __Drop structures, culverts, dams, or diversions are present within the reach, but with minimal effect to the channel gradient or __faunal movement. Some channel deepening is noticeable.
0.25	__ Within the flood prone area, there is ≤10% coverage of habitat features present; lack of habitat is obvious; substrate unstable or lacking; concrete lined channels are present within portions of the stream. __Habitat features and pools buried or lacking, channel bottom may be flat. __Drop structures, culverts, dams, or diversions are present within the reach with noticeable effects to the channel gradient (deepening) or inhibition of faunal movement.
0.10	✓Habitat features and pools are buried or lacking, channel bottom may be flat. ✓Channels banks are completely armored or concrete lined.

Field Notes:

Class II channel

V_3 Floodplain Interaction–Connectivity

User Notes: Floodplain Interaction–Connectivity indicates of the degree to which the hydrologic interaction between the bankfull channel and the active floodplain and terraces of the riparian ecosystem remains intact. In assigning the Condition Index Rating, the channel evolution concepts previously presented should be consulted. Previous observations for V1 Hydraulic Conveyance and Sediment dynamics variable and including channel cross-section observations should be used to assign this Condition Index Rating. The assessment area for this variable is the floodprone area and abandoned floodplain/terraces.

Assessment Area: Floodprone area and abandoned floodplain/terraces

Condition Index Rating	Indicator or Description of Conditions
1.00	__The floodplain has not been physically manipulated. __No surface alterations (such as constructed channels, dams, dikes, diversions, dugouts, or fill) or subsurface alterations (such as tile drainage) are present. __Natural geomorphic features occur within the floodplain as evidenced by irregular, uneven surfaces (undulating conditions from meander scars, sediment bars, or hummocks). __The current stage of the channel would indicate an equilibrium channel corresponding to a Class I condition (sinuous, pre-modified channel).
0.75	__Few changes to the floodplain surface. __Observable changes in elevation are restricted to only farm roads or bridges with culverts. __The current stage of the channel would indicate quasi-equilibrium corresponding to a Class VI condition.
0.50	__Multiple geomorphic modifications to the floodplain surface to control flood energy, often with bank control structures, but still permitting flow access via culverts. __The current stage of the channel would indicate aggradations and widening, corresponding to a Class V condition.
0.25	✓Complete geomorphic modification BUT still permits flow access via culverts and occasional overbank flooding. __The current stage of the channel would indicate degradation and widening corresponding to a Class IV condition.
0.10	✓Complete geomorphic modification to the floodprone area. Bank control structures (dikes, etc) are in a continuous structure preventing channel movement and also preventing overbank flow. ✓The current stage of the channel would indicate channelization and/or active bed degradation corresponding to a Class II or III condition.

Field Notes:

Occassional overbankflooding would be permitted

V_4 Riparian Condition & Vegetation Composition

User Notes: Riparian Vegetation Composition is a response variable to both natural and anthropogenic disturbance. Scoring of this variable is determined by comparing the dominant species observed in cross-sections within the RR assessment area to a list of diagnostic and most abundant species. Field sheets on following page.

Assessment Area: V_{4a} above the floodprone area with an artificial convention of 100' from the top of each bank; and, V_{4b} below the floodprone area.

Condition Index Rating	4a	4b	Indicator or Description of Conditions
1.00			__The percent concurrence of dominant plants observed with diagnostic species is ≥ 95 %. __Existing riparian habitat is of high caliber; if this site were to be preserved, minimal management would be necessary due to natural processes still being in effect. __Vegetation represents the reference standard condition with no chronic anthropogenic disturbances; or, __the site has recovered from historical anthropogenic disturbance.
0.75			__The percent concurrence of dominant plants observed with diagnostic species is ≥75 and < 95%. __Existing riparian habitat is only slightly degraded; preservation and/or improvement are likely with moderate management effort. __Native vegetation is on a recovery trajectory with compatible management practices that mimic natural disturbances (i.e., low intensity grazing). __Presences of areas disturbed through natural processes (i.e., fire and flood) are still evident.
0.50			__ The percent concurrence of dominant plants observed with diagnostic species is ≥50% and < 75%. __Existing riparian habitat somewhat degraded; preservation and/or improvement possible but would require significant management effort. __Native vegetation present for some representative communities, but invasive or ruderal species are prevalent. __ Disturbance is largely anthropogenic and natural processes influencing the plant community are rare.
0.25			__ The percent concurrence of dominant plants observed with diagnostic species is ≥ 25% or < 50%. __ Existing riparian habitat degraded; preservation not desirable or attainable; improvements are not likely or would require significant and costly management effort. __ Native vegetation is localized within the assessment area. __ Presence of areas disturbed through natural processes is not evident. __ Vegetation composition is dominated by invasive or ruderal species.
0.10			__ The percent concurrence of dominant plants observed with diagnostic species is ≥ 5% or < 25%. __ Existing riparian habitat is severely degraded. __ Native vegetation is largely absent, area is hardened (i.e., paved, urban, etc.) or graded.

Field Notes:

Assuming Native seed mixes on fw banks

V_5 Riparian Buffer Continuity and Width

User Notes: Riparian ecosystems typically form a relatively continuous corridor along the stream channel and floodplain. This variable is measured perpendicular from the top of the bank for a distance laterally of 100'. Both banks of the stream channel are measured and then averaged for determination of the summary rating and subsequent Condition Index Score assignment. Aerial photography can be used for estimation of this variable but should be verified in the field.

Assessment area: An artificial convention of 100' from the top of each bank

	Continuity (%)	100	80-99	60-79	40-59	20-39	5-19	<5
Width (ft)	≥100	1.00	0.90	0.70	0.50	0.30	0.15	0.00
	75-99	0.80	0.75	0.60	0.40	0.25	0.10	0.00
	50-74	0.60	0.50	0.50	0.30	0.20	0.10	0.00
	25-49	0.40	0.30	0.30	0.20	0.15	0.05	0.00
	10-24	0.20	0.20	0.15	0.10	0.10	0.05	0.00
	5-9	0.10	0.10	0.10	0.05	0.05	0.01	0.00
	<5	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Corresponding Summary Rating with Variable score:

If summary rating is between :	Assign the following Condition Index Score:
0.80 - 1.00	1.00
0.60 - 0.79	0.75
0.40 - 0.59	0.50
0.20 - 0.39	0.25
0.01 - 0.19	0.10
0.0 - OR No buffer of permanent vegetation is present = 0	

.30/2
.15

Field Notes:

North Bank = paved lot 100 feet
75% veg for 50 ft
&
South bank -
100 ft turf grass
+ garden

V_6 Riparian Land Use

User Notes: Land use indicates the way in which a tract of land is utilized, has been developed, or the type of vegetation present

Assessment area: An artificial convention of 100' from the top of each bank. For land use assessment in stream to reservoir conversions, the assessment area is defined as 100' from the lateral extent of the floodpool. This boundary convention is considered synonymous with the upper extent of the floodprone area of stream systems.

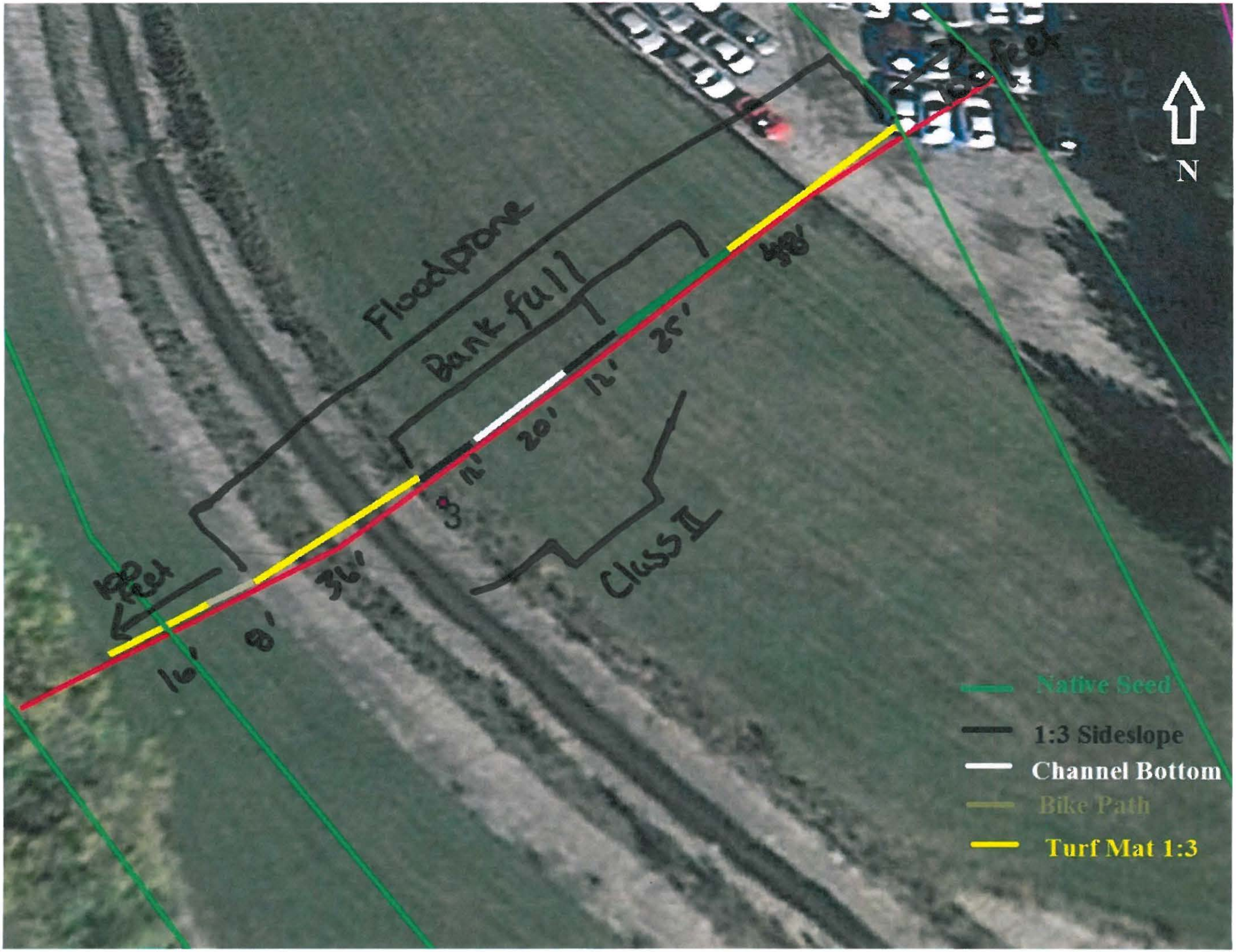
Land Use Category	Land Use Weight		Area of Land Use		Weighted score (WS) for each land use category
Impermeable surface	1	X	100	=	100
Feed lot	1	X		=	
Row crop or Small grain	3	X	50	=	150
Farmstead	6	X	50	=	300
Woodlot/shelterbelt	6	X		=	
Perennial Cover of any type	8	X		=	
Managed for native vegetation cover and diversity	10	X		=	
			200 Total area	=	
*User notes: Σ WS is the sum of the Weighted Scores WA is the Weighted Average as defined by ΣWeighted Scores /Total area					Σ WS = 550/ WA = /200 2.75

If the Land Use Weighted Average is:	Assign the following Condition Index Score:
>8	1.00
7-8	0.75
5-6	0.50
2-4	0.25
< 1	0.10

Field Notes:

South Bank = 50 ft row crop (garden)
50 ft turf

North = 100 perennial


Floodprone
Bank full
Class II
100 feet
16'
8'
36'
3
12'
20'
12'
28'
N
Native Seed
1:3 Sideslope
Channel Bottom
Bike Path
Turf Mat 1:3

DP3 - Alternative 1+2 w/ Channel widening

V_1 Hydraulic Conveyance and Sediment Dynamics

User notes: Hydraulic conveyance and sediment dynamics addresses fluvial processes for the active channel within the RR. This indicator is assessed by narrative criteria or measured as a percent of the length of mainstem channel in a riparian reach with (AHC). Aerial photography and field observations are used to estimate the Condition Index Rating of this metric. For impact or mitigation evaluations, **the Condition Index Rating is zero when a stream is converted to a lacustrine system.**

Assessment Area: below bankfull width

Condition Index Rating	Indicator Score or Description of Condition
1.00	__Movement of sediment in the channel is in equilibrium in terms of supply, erosion, and deposition processes. __**On most streams** there are alternating point bars; bank erosion occurs, but is stabilized and moderated by vegetation; and channel width, form, and floodplain area is consistent through the reach. __**In some streams**, some of these indicators may not be apparent, but overall bank and hill slope erosion is moderated by vegetation and there are no apparent culturally induced catastrophic failures. __The channel is stable, no active down-cutting occurring, or; old down-cutting apparent but a new, stable riparian area has formed within the incised channel, OR; __≤5% of active channel within the riparian reach with altered hydraulic conveyance (AHC).
0.75	__Movement of sediment in the channel is in equilibrium with the current hydrologic regime, as opposed to a culturally unaltered condition, and exhibits an overall balance in terms of erosion and deposition processes. __**On most streams** there are alternating point bars; bank erosion occurs, but is stabilized and moderated by vegetation; and channel width, form, and floodplain area are consistent through the reach. __**In some streams**, some of these indicators may not be apparent, but overall bank and hill slope erosion is moderated by vegetation and no culturally induced catastrophic failures are apparent. __The channel has evidence of old down-cutting that has begun stabilizing, vegetation is beginning to establish, even at the base of the falling banks, soil disturbance is evident, OR; __>5 and ≤15% of riparian reach with AHC.
0.50	__Sediment disequilibrium is minor and localized within the reach. __This includes small, localized areas of bank protection, slumping, or encroachment on the floodplain and channel. __This condition class includes previously disrupted reaches on a recovery trajectory, such as deeply entrenched streams where down-cutting has been arrested by structural grade control, and there is sufficient room for lateral channel migration and establishment of a functional floodplain within the incised channel. __Head cuts in early stage are present. Immediate action may prevent further degradation, OR; __ >15 and ≤30% of riparian reach with AHC.
0.25	__Sediment erosion and deposition out of equilibrium. __Water inflow is sediment rich, poor or accelerated bank erosion exists. Channel not actively incising but extensive disequilibrium is evident. __Typical indicators include extensive bank slumping (erosion events that exceed any moderating influence of native vegetation), active gullies feeding into the reach from adjacent hill slopes, or shoaling of sediments rather than deposition in sorted lateral and mid-channel bars. __Apparently stable channels should be placed in this category if there is evidence of regular mechanical disruption, such as bulldozing of the channel bottom and clearing of riparian vegetation to improve flood conveyance. __Channel with some widening, but limiting new floodplain development; the existing floodplain is not well vegetated. ✓The vegetation that is present is mainly pioneer species. Bank failure is common, OR; __ >30 and ≤50% of riparian reach with AHC. ↳ with new planting on turf mat
0.10	✓Sediment dynamics within most of the reach are seriously disrupted. ✓This includes reaches where no significant storage or recruitment of sediment occurs (i.e., reaches in underground tunnels/culverts, and reaches hardened with rock or concrete). __It also includes reaches that are either actively incising or functioning as sediment traps (e.g., sediment basins). ✓This also includes reaches that have been subject to recent changes likely to induce severe disequilibrium, such as extensive floodplain filling, change in slope, channel straightening, or other changes that are likely to cause channel down-cutting during future high-flow events. __The channel is deeply incised, resembling a gully, little or no riparian area development, or active down-cutting is clearly occurring. Only occasional or rare flood events access the flood plain. __Tributaries will also exhibit signs of down-cutting, OR; > ✓50% of riparian reach with AHC.

Field Notes:

Assuming DP3 will remain same as existing for V_1 - the area will be hardened, still straightened and with highly degraded floodplain

More than 50% of the RR is within Altered hydraulic conveyance

Sediment Dynamics will not improve

V_2 In-Stream Habitat/Available Cover

User Notes: The biological components of riparian ecosystems have adapted to episodic cycles of disturbance and developed a variety of mechanisms that make it possible to survive and flourish where other organisms cannot. This variable is evaluated below the floodprone area. For impact or mitigation evaluations, the Condition Index Rating is zero when a stream is converted to a lacustrine system.

Assessment Area: Below the estimated floodprone area

Condition Index Rating	Indicator or Description of Conditions
1.00	__Within the flood prone area, there is greater than >50% coverage by diverse habitat features favorable for stream faunal colonization and maintenance of vegetation dynamics for recruitment. __Features may include snags, submerged logs, undercut banks, roots, cobble, rocks, persistent leaf packs, pools and glides, or other stable habitat at a stage to allow colonization. __No barriers to faunal movement.
0.75	__ Within the flood prone area there is >30% and ≤50% coverage by habitat features favorable for stream faunal colonization and/or cover. __Many habitat features are not transient. Adequate habitat for maintenance of populations is evident. __Seasonal water withdrawals inhibit faunal movement within the reach.
0.50	__ Within the flood prone area, there is >10 and ≤30% coverage by habitat features favorable for stream faunal colonization and cover; __habitat availability may be less than desirable; __substrate may be frequently disturbed. __Drop structures, culverts, dams, or diversions are present within the reach, but with minimal effect to the channel gradient or __faunal movement. Some channel deepening is noticeable.
0.25	__ Within the flood prone area, there is ≤10% coverage of habitat features present; lack of habitat is obvious; substrate unstable or lacking; concrete lined channels are present within portions of the stream. __Habitat features and pools buried or lacking, channel bottom may be flat. __Drop structures, culverts, dams, or diversions are present within the reach with noticeable effects to the channel gradient (deepening) or inhibition of faunal movement.
0.10	✓Habitat features and pools are buried or lacking, channel bottom may be flat. ✓Channels banks are completely armored or concrete lined.

Field Notes:

No change -
In stream habitat
will not improve -
area will be rchardened
with rip rap

V_3 Floodplain Interaction–Connectivity

User Notes: Floodplain Interaction–Connectivity indicates of the degree to which the hydrologic interaction between the bankfull channel and the active floodplain and terraces of the riparian ecosystem remains intact. In assigning the Condition Index Rating, the channel evolution concepts previously presented should be consulted. Previous observations for V1 Hydraulic Conveyance and Sediment dynamics variable and including channel cross-section observations should be used to assign this Condition Index Rating. The assessment area for this variable is the floodprone area and abandoned floodplain/terraces.

Assessment Area: Floodprone area and abandoned floodplain/terraces

Condition Index Rating	Indicator or Description of Conditions
1.00	__The floodplain has not been physically manipulated. __No surface alterations (such as constructed channels, dams, dikes, diversions, dugouts, or fill) or subsurface alterations (such as tile drainage) are present. __Natural geomorphic features occur within the floodplain as evidenced by irregular, uneven surfaces (undulating conditions from meander scars, sediment bars, or hummocks). __The current stage of the channel would indicate an equilibrium channel corresponding to a Class I condition (sinuous, pre-modified channel).
0.75	__Few changes to the floodplain surface. __Observable changes in elevation are restricted to only farm roads or bridges with culverts. __The current stage of the channel would indicate quasi-equilibrium corresponding to a Class VI condition.
0.50	__Multiple geomorphic modifications to the floodplain surface to control flood energy, often with bank control structures, but still permitting flow access via culverts. __The current stage of the channel would indicate aggradations and widening, corresponding to a Class V condition.
0.25	✓__Complete geomorphic modification BUT still permits flow access via culverts and occasional overbank flooding. __The current stage of the channel would indicate degradation and widening corresponding to a Class IV condition.
0.10	__Complete geomorphic modification to the floodprone area. Bank control structures (dikes, etc) are in a continuous structure preventing channel movement and also preventing overbank flow. ✓__The current stage of the channel would indicate channelization and/or active bed degradation corresponding to a Class II or III condition.

Field Notes:

Assess that the channel have a slight more access to bank w/ widening and lowering

- still defined as a Class II condition

V_4 Riparian Condition & Vegetation Composition

User Notes: Riparian Vegetation Composition is a response variable to both natural and anthropogenic disturbance. Scoring of this variable is determined by comparing the dominant species observed in cross-sections within the RR assessment area to a list of diagnostic and most abundant species. Field sheets on following page.

Assessment Area: V_{4a} above the floodprone area with an artificial convention of 100' from the top of each bank; and, V_{4b} below the floodprone area.

Condition Index Rating	4a	4b	Indicator or Description of Conditions
1.00			__The percent concurrence of dominant plants observed with diagnostic species is ≥ 95 %. __Existing riparian habitat is of high caliber; if this site were to be preserved, minimal management would be necessary due to natural processes still being in effect. __Vegetation represents the reference standard condition with no chronic anthropogenic disturbances; or, __the site has recovered from historical anthropogenic disturbance.
0.75			__The percent concurrence of dominant plants observed with diagnostic species is ≥75 and < 95%. __Existing riparian habitat is only slightly degraded; preservation and/or improvement are likely with moderate management effort. __Native vegetation is on a recovery trajectory with compatible management practices that mimic natural disturbances (i.e., low intensity grazing). __Presences of areas disturbed through natural processes (i.e., fire and flood) are still evident.
0.50			✓The percent concurrence of dominant plants observed with diagnostic species is ≥50% and < 75%. ✓Existing riparian habitat somewhat degraded; preservation and/or improvement possible but would require significant management effort. ✓Native vegetation present for some representative communities, but invasive or ruderal species are prevalent. ✓Disturbance is largely anthropogenic and natural processes influencing the plant community are rare.
0.25			Plants above more upland species ✓The percent concurrence of dominant plants observed with diagnostic species is ≥ 25% or < 50%. ✓Existing riparian habitat degraded; preservation not desirable or attainable; improvements are not likely or would require significant and costly management effort. ✓Native vegetation is localized within the assessment area. ✓Presence of areas disturbed through natural processes is not evident. __ Vegetation composition is dominated by invasive or ruderal species. however quality of vegetation improves
0.10			__ The percent concurrence of dominant plants observed with diagnostic species is ≥ 5% or < 25%. __ Existing riparian habitat is severely degraded. __ Native vegetation is largely absent, area is hardened (i.e., paved, urban, etc.) or graded.

Field Notes:

Using NDOT seed mixture for Region 3 Zone

Above floodprone
Rural Hwy shoulder mix

Below floodprone
Need FACW->FACU plants - herb stratum
no woody vegetation
All seed mixtures being applied would be native species

No mowing in native seed buffer zone (25 ft riparian area)
Brush hog to remove down to 6 inches veg

V_5 Riparian Buffer Continuity and Width

User Notes: Riparian ecosystems typically form a relatively continuous corridor along the stream channel and floodplain. This variable is measured perpendicular from the top of the bank for a distance laterally of 100'. Both banks of the stream channel are measured and then averaged for determination of the summary rating and subsequent Condition Index Score assignment. Aerial photography can be used for estimation of this variable but should be verified in the field.

Assessment area: An artificial convention of 100' from the top of each bank

	Continuity (%)	100	80-99	60-79	40-59	20-39	5-19	<5
Width(ft)	≥100	1.00	0.90	0.70	0.50	0.30	0.15	0.00
	75-99	0.80	0.75	0.60	0.40	0.25	0.10	0.00
	50-74	0.60	0.50	0.50	0.30	0.20	0.10	0.00
	25-49	0.40	0.30	0.30	0.20	0.15	0.05	0.00
	10-24	0.20	0.20	0.15	0.10	0.10	0.05	0.00
	5-9	0.10	0.10	0.10	0.05	0.05	0.01	0.00
	<5	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Corresponding Summary Rating with Variable score:

If summary rating is between :	Assign the following Condition Index Score:
0.80 - 1.00	1.00
0.60 - 0.79	0.75
0.40 - 0.59	0.50
0.20 - 0.39	0.25
0.01 - 0.19	0.10 ←

0.0 - OR No buffer of permanent vegetation is present = 0

.35/2 =
.17

Field Notes:

Left Descending (west Bank)
46 feet until pavement (50%)
54 pavement

East Bank - 21 ft Native Veg (20%)
79 ft pavement

V_6 Riparian Land Use

User Notes: Land use indicates the way in which a tract of land is utilized, has been developed, or the type of vegetation present

Assessment area: An artificial convention of 100' from the top of each bank. For land use assessment in stream to reservoir conversions, the assessment area is defined as 100' from the lateral extent of the floodpool. This boundary convention is considered synonymous with the upper extent of the floodprone area of stream systems.

Land Use Category	Land Use Weight		Area of Land Use		Weighted score (WS) for each land use category
Impermeable surface	1	X	79+54	=	133
Feed lot	1	X		=	
Row crop or Small grain	3	X		=	
Farmstead	6	X		=	
Woodlot/shelterbelt	6	X	10	=	60
Perennial Cover of any type	8	X	21+36	=	456
Managed for native vegetation cover and diversity	10	X		=	
			200 Total area	=	
*User notes: Σ WS is the sum of the Weighted Scores WA is the Weighted Average as defined by ΣWeighted Scores /Total area					Σ WS = 649/ WA = 200 3.24

If the Land Use Weighted Average is:	Assign the following Condition Index Score:
>8	1.00
7-8	0.75
5-6	0.50
2-4	0.25
< 1	0.10

remains @ .25
Shifting the channel waters but still located near impervious surfaces

Field Notes:
(west)
Left 46 ft
10 ft = trees
36 ft = perennial cover
54 ft = pavement

(east) 21 perennial
79 pavement

220'
N
Floodplain
Bank full
12' 20' 12' 25'
Class II
1:3 Sideslope
Channel Width
Native Seed
Turf Mat
Bike Trail
© 2016 Google

DP4 Alternative 1+2 Channel widening

V_1 Hydraulic Conveyance and Sediment Dynamics

User notes: Hydraulic conveyance and sediment dynamics addresses fluvial processes for the active channel within the RR. This indicator is assessed by narrative criteria or measured as a percent of the length of mainstem channel in a riparian reach with (AHC). Aerial photography and field observations are used to estimate the Condition Index Rating of this metric. For impact or mitigation evaluations, **the Condition Index Rating is zero when a stream is converted to a lacustrine system.**

Assessment Area: below bankfull width

Condition Index Rating	Indicator Score or Description of Condition
1.00	__Movement of sediment in the channel is in equilibrium in terms of supply, erosion, and deposition processes. __**On most streams** there are alternating point bars; bank erosion occurs, but is stabilized and moderated by vegetation; and channel width, form, and floodplain area is consistent through the reach. __**In some streams**, some of these indicators may not be apparent, but overall bank and hill slope erosion is moderated by vegetation and there are no apparent culturally induced catastrophic failures. __The channel is stable, no active down-cutting occurring, or; old down-cutting apparent but a new, stable riparian area has formed within the incised channel, OR; __≤5% of active channel within the riparian reach with altered hydraulic conveyance (AHC).
0.75	__Movement of sediment in the channel is in equilibrium with the current hydrologic regime, as opposed to a culturally unaltered condition, and exhibits an overall balance in terms of erosion and deposition processes. __**On most streams** there are alternating point bars; bank erosion occurs, but is stabilized and moderated by vegetation; and channel width, form, and floodplain area are consistent through the reach. __**In some streams**, some of these indicators may not be apparent, but overall bank and hill slope erosion is moderated by vegetation and no culturally induced catastrophic failures are apparent. __The channel has evidence of old down-cutting that has begun stabilizing, vegetation is beginning to establish, even at the base of the falling banks, soil disturbance is evident, OR; __>5 and ≤15% of riparian reach with AHC.
0.50	__Sediment disequilibrium is minor and localized within the reach. __This includes small, localized areas of bank protection, slumping, or encroachment on the floodplain and channel. __This condition class includes previously disrupted reaches on a recovery trajectory, such as deeply entrenched streams where down-cutting has been arrested by structural grade control, and there is sufficient room for lateral channel migration and establishment of a functional floodplain within the incised channel. __Head cuts in early stage are present. Immediate action may prevent further degradation, OR; __ >15 and ≤30% of riparian reach with AHC.
0.25	__Sediment erosion and deposition out of equilibrium. __Water inflow is sediment rich, poor or accelerated bank erosion exists. Channel not actively incising but extensive disequilibrium is evident. __Typical indicators include extensive bank slumping (erosion events that exceed any moderating influence of native vegetation), active gullies feeding into the reach from adjacent hill slopes, or shoaling of sediments rather than deposition in sorted lateral and mid-channel bars. __Apparently stable channels should be placed in this category if there is evidence of regular mechanical disruption, such as bulldozing of the channel bottom and clearing of riparian vegetation to improve flood conveyance. __ Channel with some widening, but limiting new floodplain development; the existing floodplain is not well vegetated. __The vegetation that is present is mainly pioneer species. Bank failure is common, OR; __ >30 and ≤50% of riparian reach with AHC.
0.10	✓Sediment dynamics within most of the reach are seriously disrupted. __This includes reaches where no significant storage or recruitment of sediment occurs (i.e., reaches in underground tunnels/culverts, and reaches hardened with rock or concrete). __It also includes reaches that are either actively incising or functioning as sediment traps (e.g., sediment basins). ✓This also includes reaches that have been subject to recent changes likely to induce severe disequilibrium, such as extensive floodplain filling, change in slope, channel straightening, or other changes that are likely to cause channel down-cutting during future high-flow events. ✓The channel is deeply incised, resembling a gully, little or no riparian area development, or active down-cutting is clearly occurring. Only occasional or rare flood events access the flood plain. __Tributaries will also exhibit signs of down-cutting, OR; > ✓50% of riparian reach with AHC.

Field Notes:

Assumption that V_1 remains @ .10 CIR

V_2 In-Stream Habitat/Available Cover

User Notes: The biological components of riparian ecosystems have adapted to episodic cycles of disturbance and developed a variety of mechanisms that make it possible to survive and flourish where other organisms cannot. This variable is evaluated below the floodprone area. For impact or mitigation evaluations, the Condition Index Rating is zero when a stream is converted to a lacustrine system.

Assessment Area: Below the estimated floodprone area

Condition Index Rating	Indicator or Description of Conditions
1.00	__Within the flood prone area, there is greater than >50% coverage by diverse habitat features favorable for stream faunal colonization and maintenance of vegetation dynamics for recruitment. __Features may include snags, submerged logs, undercut banks, roots, cobble, rocks, persistent leaf packs, pools and glides, or other stable habitat at a stage to allow colonization. __No barriers to faunal movement.
0.75	__ Within the flood prone area there is >30% and ≤50% coverage by habitat features favorable for stream faunal colonization and/or cover. __Many habitat features are not transient. Adequate habitat for maintenance of populations is evident. __Seasonal water withdrawals inhibit faunal movement within the reach.
0.50	__ Within the flood prone area, there is >10 and ≤30% coverage by habitat features favorable for stream faunal colonization and cover; __habitat availability may be less than desirable; __substrate may be frequently disturbed. __Drop structures, culverts, dams, or diversions are present within the reach, but with minimal effect to the channel gradient or __faunal movement. Some channel deepening is noticeable.
0.25	__ Within the flood prone area, there is ≤10% coverage of habitat features present; lack of habitat is obvious; substrate unstable or lacking; concrete lined channels are present within portions of the stream. __Habitat features and pools buried or lacking, channel bottom may be flat. __Drop structures, culverts, dams, or diversions are present within the reach with noticeable effects to the channel gradient (deepening) or inhibition of faunal movement.
0.10	✓Habitat features and pools are buried or lacking, channel bottom may be flat. ✓Channels banks are completely armored or concrete lined.

Field Notes:

In-stream value remains consistent as area will be re-hardened

V_3 Floodplain Interaction–Connectivity

User Notes: Floodplain Interaction–Connectivity indicates of the degree to which the hydrologic interaction between the bankfull channel and the active floodplain and terraces of the riparian ecosystem remains intact. In assigning the Condition Index Rating, the channel evolution concepts previously presented should be consulted. Previous observations for V1 Hydraulic Conveyance and Sediment dynamics variable and including channel cross-section observations should be used to assign this Condition Index Rating. The assessment area for this variable is the floodprone area and abandoned floodplain/terraces.

Assessment Area: Floodprone area and abandoned floodplain/terraces

Condition Index Rating	Indicator or Description of Conditions
1.00	__The floodplain has not been physically manipulated. __No surface alterations (such as constructed channels, dams, dikes, diversions, dugouts, or fill) or subsurface alterations (such as tile drainage) are present. __Natural geomorphic features occur within the floodplain as evidenced by irregular, uneven surfaces (undulating conditions from meander scars, sediment bars, or hummocks). __The current stage of the channel would indicate an equilibrium channel corresponding to a Class I condition (sinuous, pre-modified channel).
0.75	__Few changes to the floodplain surface. __Observable changes in elevation are restricted to only farm roads or bridges with culverts. __The current stage of the channel would indicate quasi-equilibrium corresponding to a Class VI condition.
0.50	__Multiple geomorphic modifications to the floodplain surface to control flood energy, often with bank control structures, but still permitting flow access via culverts. __The current stage of the channel would indicate aggradations and widening, corresponding to a Class V condition.
0.25	__Complete geomorphic modification BUT still permits flow access via culverts and occasional overbank flooding. __The current stage of the channel would indicate degradation and widening corresponding to a Class IV condition.
0.10	__Complete geomorphic modification to the floodprone area. Bank control structures (dikes, etc) are in a continuous structure preventing channel movement and also preventing overbank flow. ✓The current stage of the channel would indicate channelization and/or active bed degradation corresponding to a Class II or III condition.

Field Notes:

Channel would likely remain same class condition but access to overbank would be increased w/ widening

V_4 Riparian Condition & Vegetation Composition

User Notes: Riparian Vegetation Composition is a response variable to both natural and anthropogenic disturbance. Scoring of this variable is determined by comparing the dominant species observed in cross-sections within the RR assessment area to a list of diagnostic and most abundant species. Field sheets on following page.

Assessment Area: V_{4a} above the floodprone area with an artificial convention of 100' from the top of each bank; and, V_{4b} below the floodprone area.

Condition Index Rating	4a	4b	Indicator or Description of Conditions
1.00			__The percent concurrence of dominant plants observed with diagnostic species is ≥ 95 %. __Existing riparian habitat is of high caliber; if this site were to be preserved, minimal management would be necessary due to natural processes still being in effect. __Vegetation represents the reference standard condition with no chronic anthropogenic disturbances; or, __the site has recovered from historical anthropogenic disturbance.
0.75			__The percent concurrence of dominant plants observed with diagnostic species is ≥75 and < 95%. __Existing riparian habitat is only slightly degraded; preservation and/or improvement are likely with moderate management effort. __Native vegetation is on a recovery trajectory with compatible management practices that mimic natural disturbances (i.e., low intensity grazing). __Presences of areas disturbed through natural processes (i.e., fire and flood) are still evident.
0.50			✓The percent concurrence of dominant plants observed with diagnostic species is ≥50% and < 75%. ✓Existing riparian habitat somewhat degraded; preservation and/or improvement possible but would require significant management effort. ✓Native vegetation present for some representative communities, but invasive or ruderal species are prevalent. ✓Disturbance is largely anthropogenic and natural processes influencing the plant community are rare.
0.25			✓The percent concurrence of dominant plants observed with diagnostic species is ≥ 25% or < 50%. ✓Existing riparian habitat degraded; preservation not desirable or attainable; improvements are not likely or would require significant and costly management effort. ✓Native vegetation is localized within the assessment area. ✓Presence of areas disturbed through natural processes is not evident. __ Vegetation composition is dominated by invasive or ruderal species.
0.10			__ The percent concurrence of dominant plants observed with diagnostic species is ≥ 5% or < 25%. __ Existing riparian habitat is severely degraded. __ Native vegetation is largely absent, area is hardened (i.e., paved, urban, etc.) or graded.

Field Notes:

Above

Below

Use assumptions from DP3 Alternative Discussion

V_5 Riparian Buffer Continuity and Width

User Notes: Riparian ecosystems typically form a relatively continuous corridor along the stream channel and floodplain. This variable is measured perpendicular from the top of the bank for a distance laterally of 100'. Both banks of the stream channel are measured and then averaged for determination of the summary rating and subsequent Condition Index Score assignment. Aerial photography can be used for estimation of this variable but should be verified in the field.

Assessment area: An artificial convention of 100' from the top of each bank

Width(ft)	Continuity (%)	100	80-99	60-79	40-59	20-39	5-19	<5
	≥100	1.00	0.90	0.70	0.50	0.30	0.15	0.00
	75-99	0.80	0.75	0.60	0.40	0.25	0.10	0.00
	50-74	0.60	0.50	0.50	0.30	0.20	0.10	0.00
	25-49	0.40	0.30	0.30	0.20	0.15	0.05	0.00
	10-24	0.20	0.20	0.15	0.10	0.10	0.05	0.00
	5-9	0.10	0.10	0.10	0.05	0.05	0.01	0.00
	<5	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Corresponding Summary Rating with Variable score:

If summary rating is between :	Assign the following Condition Index Score:
0.80 - 1.00	1.00
0.60 - 0.79	0.75
0.40 - 0.59	0.50
0.20 - 0.39	0.25
0.01 - 0.19	0.10
0.0 - OR No buffer of permanent vegetation is present = 0	

1.10/2 = .55

Field Notes:

North bank = 24 feet of native veg

76 ft agrarian plot

South Bank - arboretum plants - considered perennial from existing conditions

100 feet

V_6 Riparian Land Use

User Notes: Land use indicates the way in which a tract of land is utilized, has been developed, or the type of vegetation present

Assessment area: An artificial convention of 100' from the top of each bank. For land use assessment in stream to reservoir conversions, the assessment area is defined as 100' from the lateral extent of the floodpool. This boundary convention is considered synonymous with the upper extent of the floodprone area of stream systems.

Land Use Category	Land Use Weight		Area of Land Use		Weighted score (WS) for each land use category
Impermeable surface	1	X		=	
Feed lot	1	X		=	
Row crop or Small grain	3	X	76	=	228
Farmstead	6	X		=	
Woodlot/shelterbelt	6	X		=	
Perennial Cover of any type	8	X	24+100	=	992
Managed for native vegetation cover and diversity	10	X		=	
			200 Total area	=	1220

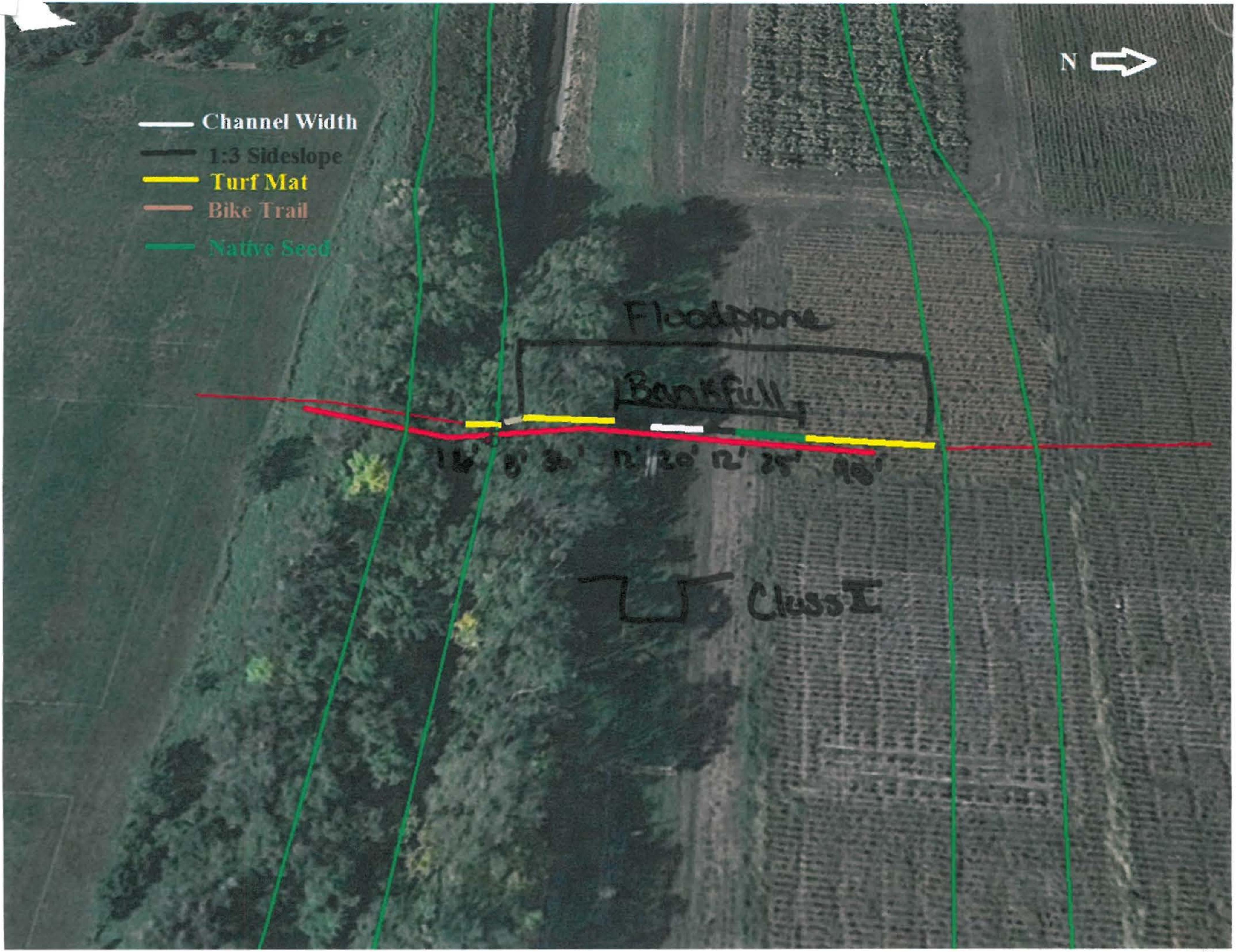
*User notes:
∑ WS is the sum of the Weighted Scores
WA is the Weighted Average as defined by ∑Weighted Scores /Total area

∑ WS = 1220 /200
WA = 6.10

If the Land Use Weighted Average is:	Assign the following Condition Index Score:
≥8	1.00
7-8	0.75
5-6	0.50 ←
2-4	0.25
< 1	0.10

Field Notes:

North = 24' perennial cover
76' row crop
South = 100 perennial cover



N
Channel Width
1:3 Sideslope
Turf Mat
Bike Trail
Native Seed
Floodprone
Bankfull
16' 8' 36' 12' 20' 12' 25' 96'
Class II

Channel widening Variation 2 DPS

V_1 Hydraulic Conveyance and Sediment Dynamics

User notes: Hydraulic conveyance and sediment dynamics addresses fluvial processes for the active channel within the RR. This indicator is assessed by narrative criteria or measured as a percent of the length of mainstem channel in a riparian reach with (AHC). Aerial photography and field observations are used to estimate the Condition Index Rating of this metric. For impact or mitigation evaluations, **the Condition Index Rating is zero when a stream is converted to a lacustrine system.**

Assessment Area: below bankfull width

Condition Index Rating	Indicator Score or Description of Condition
1.00	__Movement of sediment in the channel is in equilibrium in terms of supply, erosion, and deposition processes. __**On most streams** there are alternating point bars; bank erosion occurs, but is stabilized and moderated by vegetation; and channel width, form, and floodplain area is consistent through the reach. __**In some streams**, some of these indicators may not be apparent, but overall bank and hill slope erosion is moderated by vegetation and there are no apparent culturally induced catastrophic failures. __The channel is stable, no active down-cutting occurring, or; old down-cutting apparent but a new, stable riparian area has formed within the incised channel, OR; __≤5% of active channel within the riparian reach with altered hydraulic conveyance (AHC).
0.75	__Movement of sediment in the channel is in equilibrium with the current hydrologic regime, as opposed to a culturally unaltered condition, and exhibits an overall balance in terms of erosion and deposition processes. __**On most streams** there are alternating point bars; bank erosion occurs, but is stabilized and moderated by vegetation; and channel width, form, and floodplain area are consistent through the reach. __**In some streams**, some of these indicators may not be apparent, but overall bank and hill slope erosion is moderated by vegetation and no culturally induced catastrophic failures are apparent. __The channel has evidence of old down-cutting that has begun stabilizing, vegetation is beginning to establish, even at the base of the falling banks, soil disturbance is evident, OR; __>5 and ≤15% of riparian reach with AHC.
0.50	__Sediment disequilibrium is minor and localized within the reach. __This includes small, localized areas of bank protection, slumping, or encroachment on the floodplain and channel. __This condition class includes previously disrupted reaches on a recovery trajectory, such as deeply entrenched streams where down-cutting has been arrested by structural grade control, and there is sufficient room for lateral channel migration and establishment of a functional floodplain within the incised channel. __Head cuts in early stage are present. Immediate action may prevent further degradation, OR; __ >15 and ≤30% of riparian reach with AHC.
0.25	__Sediment erosion and deposition out of equilibrium. __Water inflow is sediment rich, poor or accelerated bank erosion exists. Channel not actively incising but extensive disequilibrium is evident. __Typical indicators include extensive bank slumping (erosion events that exceed any moderating influence of native vegetation), active gullies feeding into the reach from adjacent hill slopes, or shoaling of sediments rather than deposition in sorted lateral and mid-channel bars. __Apparently stable channels should be placed in this category if there is evidence of regular mechanical disruption, such as bulldozing of the channel bottom and clearing of riparian vegetation to improve flood conveyance. __ Channel with some widening, but limiting new floodplain development; the existing floodplain is not well vegetated. __The vegetation that is present is mainly pioneer species. Bank failure is common, OR; __>30 and ≤50% of riparian reach with AHC.
0.10	✓Sediment dynamics within most of the reach are seriously disrupted. ✓This includes reaches where no significant storage or recruitment of sediment occurs (i.e., reaches in underground tunnels/culverts, and reaches hardened with rock or concrete). __It also includes reaches that are either actively incising or functioning as sediment traps (e.g., sediment basins). ✓This also includes reaches that have been subject to recent changes likely to induce severe disequilibrium, such as extensive floodplain filling, change in slope, channel straightening, or other changes that are likely to cause channel down-cutting during future high-flow events. __The channel is deeply incised, resembling a gully, little or no riparian area development, or active down-cutting is clearly occurring. Only occasional or rare flood events access the flood plain. __Tributaries will also exhibit signs of down-cutting, OR; > ✓50% of riparian reach with AHC.

Field Notes:

V_2 In-Stream Habitat/Available Cover

User Notes: The biological components of riparian ecosystems have adapted to episodic cycles of disturbance and developed a variety of mechanisms that make it possible to survive and flourish where other organisms cannot. This variable is evaluated below the floodprone area. For impact or mitigation evaluations, the Condition Index Rating is zero when a stream is converted to a lacustrine system.

Assessment Area: Below the estimated floodprone area

Condition Index Rating	Indicator or Description of Conditions
1.00	__Within the flood prone area, there is greater than >50% coverage by diverse habitat features favorable for stream faunal colonization and maintenance of vegetation dynamics for recruitment. __Features may include snags, submerged logs, undercut banks, roots, cobble, rocks, persistent leaf packs, pools and glides, or other stable habitat at a stage to allow colonization. __No barriers to faunal movement.
0.75	__ Within the flood prone area there is >30% and ≤50% coverage by habitat features favorable for stream faunal colonization and/or cover. __Many habitat features are not transient. Adequate habitat for maintenance of populations is evident. __Seasonal water withdrawals inhibit faunal movement within the reach.
0.50	__ Within the flood prone area, there is >10 and ≤30% coverage by habitat features favorable for stream faunal colonization and cover; __habitat availability may be less than desirable; __substrate may be frequently disturbed. __Drop structures, culverts, dams, or diversions are present within the reach, but with minimal effect to the channel gradient or __faunal movement. Some channel deepening is noticeable.
0.25	✓ Within the flood prone area, there is ≤10% coverage of habitat features present; lack of habitat is obvious; substrate unstable or lacking; concrete lined channels are present within portions of the stream. ✓ Habitat features and pools buried or lacking, channel bottom may be flat. __Drop structures, culverts, dams, or diversions are present within the reach with noticeable effects to the channel gradient (deepening) or inhibition of faunal movement.
0.10	✓ Habitat features and pools are buried or lacking, channel bottom may be flat. ✓ Channels banks are completely armored or concrete lined.

Field Notes:

Variation 2 assumes south bank would remain treed - therefore some overhang/shading & woody debris would still fall in the channel

Assumed a 0.25 rating to show improvement from complete tree removal

V_3 Floodplain Interaction–Connectivity

User Notes: Floodplain Interaction–Connectivity indicates of the degree to which the hydrologic interaction between the bankfull channel and the active floodplain and terraces of the riparian ecosystem remains intact. In assigning the Condition Index Rating, the channel evolution concepts previously presented should be consulted. Previous observations for V1 Hydraulic Conveyance and Sediment dynamics variable and including channel cross-section observations should be used to assign this Condition Index Rating. The assessment area for this variable is the floodprone area and abandoned floodplain/terraces.

Assessment Area: Floodprone area and abandoned floodplain/terraces

Condition Index Rating	Indicator or Description of Conditions
1.00	__The floodplain has not been physically manipulated. __No surface alterations (such as constructed channels, dams, dikes, diversions, dugouts, or fill) or subsurface alterations (such as tile drainage) are present. __Natural geomorphic features occur within the floodplain as evidenced by irregular, uneven surfaces (undulating conditions from meander scars, sediment bars, or hummocks). __The current stage of the channel would indicate an equilibrium channel corresponding to a Class I condition (sinuous, pre-modified channel).
0.75	__Few changes to the floodplain surface. __Observable changes in elevation are restricted to only farm roads or bridges with culverts. __The current stage of the channel would indicate quasi-equilibrium corresponding to a Class VI condition.
0.50	__Multiple geomorphic modifications to the floodplain surface to control flood energy, often with bank control structures, but still permitting flow access via culverts. __The current stage of the channel would indicate aggradations and widening, corresponding to a Class V condition.
0.25	✓ Complete geomorphic modification BUT still permits flow access via culverts and occasional overbank flooding. __The current stage of the channel would indicate degradation and widening corresponding to a Class IV condition.
0.10	__Complete geomorphic modification to the floodprone area. Bank control structures (dikes, etc) are in a continuous structure preventing channel movement and also preventing overbank flow. ✓ The current stage of the channel would indicate channelization and/or active bed degradation corresponding to a Class II or III condition.

Field Notes:

Some overbank flooding would occur as a result of lowering/widening

V_4 Riparian Condition & Vegetation Composition

User Notes: Riparian Vegetation Composition is a response variable to both natural and anthropogenic disturbance. Scoring of this variable is determined by comparing the dominant species observed in cross-sections within the RR assessment area to a list of diagnostic and most abundant species. Field sheets on following page.

Assessment Area: V_{4a} above the floodprone area with an artificial convention of 100' from the top of each bank; and, V_{4b} below the floodprone area.

Condition Index Rating	4a	4b	Indicator or Description of Conditions
1.00			__The percent concurrence of dominant plants observed with diagnostic species is ≥ 95 %. __Existing riparian habitat is of high caliber; if this site were to be preserved, minimal management would be necessary due to natural processes still being in effect. __Vegetation represents the reference standard condition with no chronic anthropogenic disturbances; or, __the site has recovered from historical anthropogenic disturbance.
0.75			__The percent concurrence of dominant plants observed with diagnostic species is ≥75 and < 95%. __Existing riparian habitat is only slightly degraded; preservation and/or improvement are likely with moderate management effort. __Native vegetation is on a recovery trajectory with compatible management practices that mimic natural disturbances (i.e., low intensity grazing). __Presences of areas disturbed through natural processes (i.e., fire and flood) are still evident.
0.50		✓	__ The percent concurrence of dominant plants observed with diagnostic species is ≥50% and < 75%. __Existing riparian habitat somewhat degraded; preservation and/or improvement possible but would require significant management effort. __Native vegetation present for some representative communities, but invasive or ruderal species are prevalent. __ Disturbance is largely anthropogenic and natural processes influencing the plant community are rare.
0.25	✓		__ The percent concurrence of dominant plants observed with diagnostic species is ≥ 25% or < 50%. __ Existing riparian habitat degraded; preservation not desirable or attainable; improvements are not likely or would require significant and costly management effort. __ Native vegetation is localized within the assessment area. __ Presence of areas disturbed through natural processes is not evident. __ Vegetation composition is dominated by invasive or ruderal species.
0.10			__ The percent concurrence of dominant plants observed with diagnostic species is ≥ 5% or < 25%. __ Existing riparian habitat is severely degraded. __ Native vegetation is largely absent, area is hardened (i.e., paved, urban, etc.) or graded.

Field Notes:

V_5 Riparian Buffer Continuity and Width

User Notes: Riparian ecosystems typically form a relatively continuous corridor along the stream channel and floodplain. This variable is measured perpendicular from the top of the bank for a distance laterally of 100'. Both banks of the stream channel are measured and then averaged for determination of the summary rating and subsequent Condition Index Score assignment. Aerial photography can be used for estimation of this variable but should be verified in the field.

Assessment area: An artificial convention of 100' from the top of each bank

	Continuity (%)	100	80-99	60-79	40-59	20-39	5-19	<5
Width(ft)	≥100	1.00	0.90	0.70	0.50	0.30	0.15	0.00
	75-99	0.80	0.75	0.60	0.40	0.25	0.10	0.00
	50-74	0.60	0.50	0.50	0.30	0.20	0.10	0.00
	25-49	0.40	0.30	0.30	0.20	0.15	0.05	0.00
	10-24	0.20	0.20	0.15	0.10	0.10	0.05	0.00
	5-9	0.10	0.10	0.10	0.05	0.05	0.01	0.00
	<5	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Corresponding Summary Rating with Variable score:

If summary rating is between :	Assign the following Condition Index Score:
0.80 - 1.00	1.00
0.60 - 0.79	0.75
0.40 - 0.59	0.50
0.20 - 0.39	0.25
0.01 - 0.19	0.10
0.0 - OR No buffer of permanent vegetation is present = 0	

.6/2 = .3

Field Notes:

South bank ~ 44' shelter-trees

100'
67 ft

23' perennial

33' mowed grass

North - All row crop

0 ft 0%

V_6 Riparian Land Use

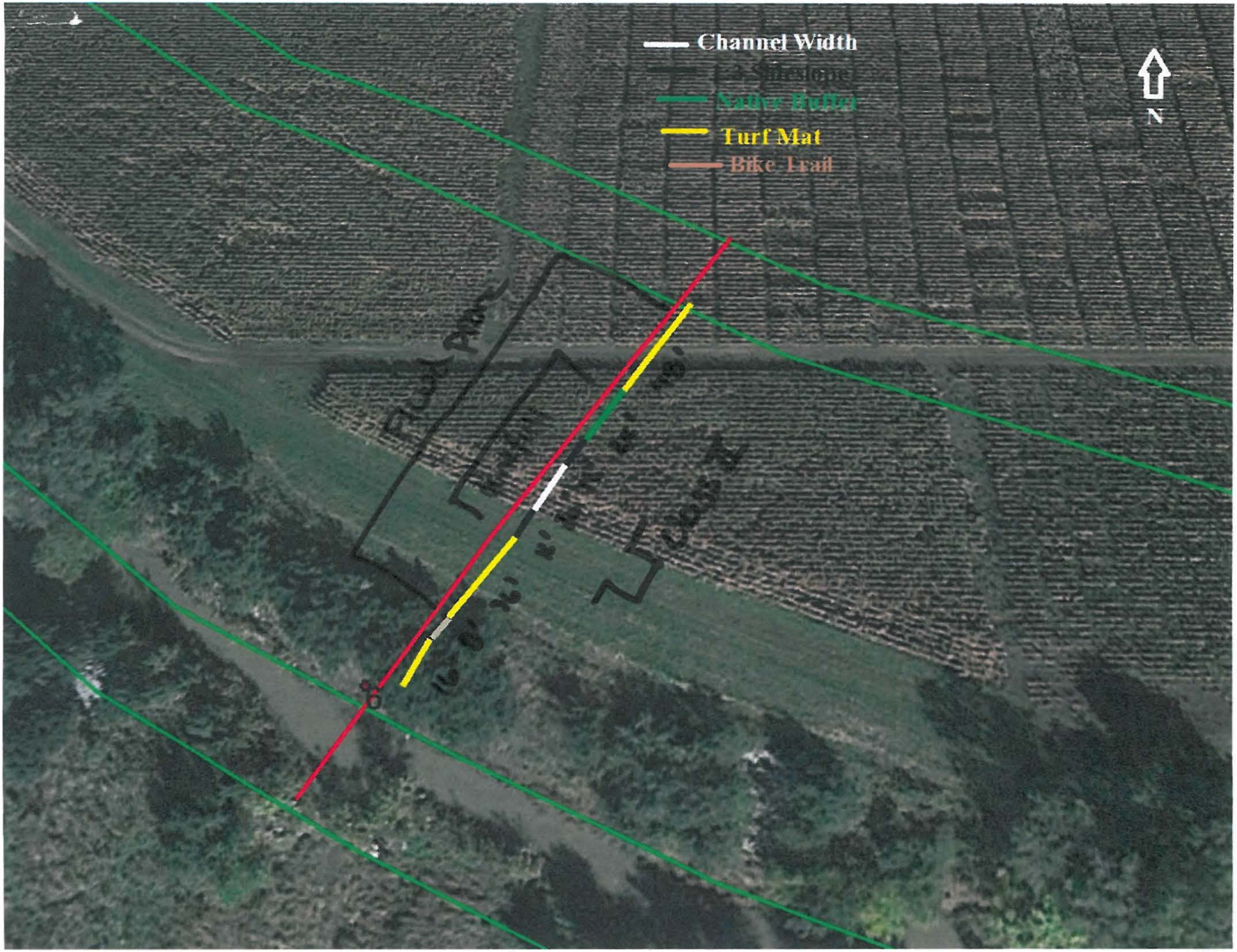
User Notes: Land use indicates the way in which a tract of land is utilized, has been developed, or the type of vegetation present

Assessment area: An artificial convention of 100' from the top of each bank. For land use assessment in stream to reservoir conversions, the assessment area is defined as 100' from the lateral extent of the floodpool. This boundary convention is considered synonymous with the upper extent of the floodprone area of stream systems.

Land Use Category	Land Use Weight		Area of Land Use		Weighted score (WS) for each land use category
Impermeable surface	1	X		=	
Feed lot	1	X		=	
Row crop or Small grain	3	X	100	=	300
Farmstead	6	X	33	=	198
Woodlot/shelterbelt	6	X	44	=	264
Perennial Cover of any type	8	X	23	=	184
Managed for native vegetation cover and diversity	10	X		=	
			Total area	=	
*User notes: Σ WS is the sum of the Weighted Scores WA is the Weighted Average as defined by ΣWeighted Scores /Total area					Σ WS = 946 WA = /200 4.73

If the Land Use Weighted Average is:	Assign the following Condition Index Score:
≥ 8	1.00
7-8	0.75
5-6	0.50
2-4	0.25
< 1	0.10

Field Notes:



Channel Width
Sideslope
Native Buffer
Turf Mat
Bike Trail
N

V_1 Hydraulic Conveyance and Sediment Dynamics

User notes: Hydraulic conveyance and sediment dynamics addresses fluvial processes for the active channel within the RR. This indicator is assessed by narrative criteria or measured as a percent of the length of mainstem channel in a riparian reach with (AHC). Aerial photography and field observations are used to estimate the Condition Index Rating of this metric. For impact or mitigation evaluations, **the Condition Index Rating is zero when a stream is converted to a lacustrine system.**

Assessment Area: below bankfull width

Condition Index Rating	Indicator Score or Description of Condition
1.00	__Movement of sediment in the channel is in equilibrium in terms of supply, erosion, and deposition processes. __**On most streams** there are alternating point bars; bank erosion occurs, but is stabilized and moderated by vegetation; and channel width, form, and floodplain area is consistent through the reach. __**In some streams**, some of these indicators may not be apparent, but overall bank and hill slope erosion is moderated by vegetation and there are no apparent culturally induced catastrophic failures. __The channel is stable, no active down-cutting occurring, or; old down-cutting apparent but a new, stable riparian area has formed within the incised channel, OR; __≤5% of active channel within the riparian reach with altered hydraulic conveyance (AHC).
0.75	__Movement of sediment in the channel is in equilibrium with the current hydrologic regime, as opposed to a culturally unaltered condition, and exhibits an overall balance in terms of erosion and deposition processes. __**On most streams** there are alternating point bars; bank erosion occurs, but is stabilized and moderated by vegetation; and channel width, form, and floodplain area are consistent through the reach. __**In some streams**, some of these indicators may not be apparent, but overall bank and hill slope erosion is moderated by vegetation and no culturally induced catastrophic failures are apparent. __The channel has evidence of old down-cutting that has begun stabilizing, vegetation is beginning to establish, even at the base of the falling banks, soil disturbance is evident, OR; __>5 and ≤15% of riparian reach with AHC.
0.50	__Sediment disequilibrium is minor and localized within the reach. __This includes small, localized areas of bank protection, slumping, or encroachment on the floodplain and channel. __This condition class includes previously disrupted reaches on a recovery trajectory, such as deeply entrenched streams where down-cutting has been arrested by structural grade control, and there is sufficient room for lateral channel migration and establishment of a functional floodplain within the incised channel. __Head cuts in early stage are present. Immediate action may prevent further degradation, OR; __ >15 and ≤30% of riparian reach with AHC.
0.25	__Sediment erosion and deposition out of equilibrium. __Water inflow is sediment rich, poor or accelerated bank erosion exists. Channel not actively incising but extensive disequilibrium is evident. __Typical indicators include extensive bank slumping (erosion events that exceed any moderating influence of native vegetation), active gullies feeding into the reach from adjacent hill slopes, or shoaling of sediments rather than deposition in sorted lateral and mid-channel bars. __Apparently stable channels should be placed in this category if there is evidence of regular mechanical disruption, such as bulldozing of the channel bottom and clearing of riparian vegetation to improve flood conveyance. __ Channel with some widening, but limiting new floodplain development; the existing floodplain is not well vegetated. __The vegetation that is present is mainly pioneer species. Bank failure is common, OR; __ >30 and ≤50% of riparian reach with AHC.
0.10	✓Sediment dynamics within most of the reach are seriously disrupted. __This includes reaches where no significant storage or recruitment of sediment occurs (i.e., reaches in underground tunnels/culverts, and reaches hardened with rock or concrete). __It also includes reaches that are either actively incising or functioning as sediment traps (e.g., sediment basins). __This also includes reaches that have been subject to recent changes likely to induce severe disequilibrium, such as extensive floodplain filling, change in slope, channel straightening, or other changes that are likely to cause channel down-cutting during future high-flow events. __The channel is deeply incised, resembling a gully, little or no riparian area development, or active down-cutting is clearly occurring. Only occasional or rare flood events access the flood plain. __Tributaries will also exhibit signs of down-cutting, OR; > ✓50% of riparian reach with AHC.

Field Notes:

V_2 In-Stream Habitat/Available Cover

User Notes: The biological components of riparian ecosystems have adapted to episodic cycles of disturbance and developed a variety of mechanisms that make it possible to survive and flourish where other organisms cannot. This variable is evaluated below the floodprone area. For impact or mitigation evaluations, the Condition Index Rating is zero when a stream is converted to a lacustrine system.

Assessment Area: Below the estimated floodprone area

Condition Index Rating	Indicator or Description of Conditions
1.00	__Within the flood prone area, there is greater than >50% coverage by diverse habitat features favorable for stream faunal colonization and maintenance of vegetation dynamics for recruitment. __Features may include snags, submerged logs, undercut banks, roots, cobble, rocks, persistent leaf packs, pools and glides, or other stable habitat at a stage to allow colonization. __No barriers to faunal movement.
0.75	__ Within the flood prone area there is >30% and ≤50% coverage by habitat features favorable for stream faunal colonization and/or cover. __Many habitat features are not transient. Adequate habitat for maintenance of populations is evident. __Seasonal water withdrawals inhibit faunal movement within the reach.
0.50	__ Within the flood prone area, there is >10 and ≤30% coverage by habitat features favorable for stream faunal colonization and cover; __habitat availability may be less than desirable; __substrate may be frequently disturbed. __Drop structures, culverts, dams, or diversions are present within the reach, but with minimal effect to the channel gradient or __faunal movement. Some channel deepening is noticeable.
0.25	__ Within the flood prone area, there is ≤10% coverage of habitat features present; lack of habitat is obvious; substrate unstable or lacking; concrete lined channels are present within portions of the stream. __Habitat features and pools buried or lacking, channel bottom may be flat. __Drop structures, culverts, dams, or diversions are present within the reach with noticeable effects to the channel gradient (deepening) or inhibition of faunal movement.
0.10	__Habitat features and pools are buried or lacking, channel bottom may be flat. ✓Channels banks are completely armored or concrete lined.

Field Notes:

V_3 Floodplain Interaction–Connectivity

User Notes: Floodplain Interaction–Connectivity indicates of the degree to which the hydrologic interaction between the bankfull channel and the active floodplain and terraces of the riparian ecosystem remains intact. In assigning the Condition Index Rating, the channel evolution concepts previously presented should be consulted. Previous observations for V1 Hydraulic Conveyance and Sediment dynamics variable and including channel cross-section observations should be used to assign this Condition Index Rating. The assessment area for this variable is the floodprone area and abandoned floodplain/terraces.

Assessment Area: Floodprone area and abandoned floodplain/terraces

Condition Index Rating	Indicator or Description of Conditions
1.00	__The floodplain has not been physically manipulated. __No surface alterations (such as constructed channels, dams, dikes, diversions, dugouts, or fill) or subsurface alterations (such as tile drainage) are present. __Natural geomorphic features occur within the floodplain as evidenced by irregular, uneven surfaces (undulating conditions from meander scars, sediment bars, or hummocks). __The current stage of the channel would indicate an equilibrium channel corresponding to a Class I condition (sinuous, pre-modified channel).
0.75	__Few changes to the floodplain surface. __Observable changes in elevation are restricted to only farm roads or bridges with culverts. __The current stage of the channel would indicate quasi-equilibrium corresponding to a Class VI condition.
0.50	__Multiple geomorphic modifications to the floodplain surface to control flood energy, often with bank control structures, but still permitting flow access via culverts. __The current stage of the channel would indicate aggradations and widening, corresponding to a Class V condition.
0.25	__Complete geomorphic modification BUT still permits flow access via culverts and occasional overbank flooding. __The current stage of the channel ~~would indicate degradation~~ and widening corresponding to a Class IV condition.
0.10	__Complete geomorphic modification to the floodprone area. Bank control structures (dikes, etc) are in a continuous structure preventing channel movement and also preventing overbank flow. __The current stage of the channel would indicate channelization and/or active bed degradation corresponding to a Class II or III condition.

Field Notes:

V_4 Riparian Condition & Vegetation Composition

User Notes: Riparian Vegetation Composition is a response variable to both natural and anthropogenic disturbance. Scoring of this variable is determined by comparing the dominant species observed in cross-sections within the RR assessment area to a list of diagnostic and most abundant species. Field sheets on following page.

Assessment Area: V_{4a} above the floodprone area with an artificial convention of 100' from the top of each bank; and, V_{4b} below the floodprone area.

Condition Index Rating	4a	4b	Indicator or Description of Conditions
1.00			__The percent concurrence of dominant plants observed with diagnostic species is ≥ 95 %. __Existing riparian habitat is of high caliber; if this site were to be preserved, minimal management would be necessary due to natural processes still being in effect. __Vegetation represents the reference standard condition with no chronic anthropogenic disturbances; or, __the site has recovered from historical anthropogenic disturbance.
0.75			__The percent concurrence of dominant plants observed with diagnostic species is ≥75 and < 95%. __Existing riparian habitat is only slightly degraded; preservation and/or improvement are likely with moderate management effort. __Native vegetation is on a recovery trajectory with compatible management practices that mimic natural disturbances (i.e., low intensity grazing). __Presences of areas disturbed through natural processes (i.e., fire and flood) are still evident.
0.50		✓	__ The percent concurrence of dominant plants observed with diagnostic species is ≥50% and < 75%. ✓Existing riparian habitat somewhat degraded; preservation and/or improvement possible but would require significant management effort. __Native vegetation present for some representative communities, but invasive or ruderal species are prevalent. __ Disturbance is largely anthropogenic and natural processes influencing the plant community are rare.
0.25	✓		__ The percent concurrence of dominant plants observed with diagnostic species is ≥ 25% or < 50%. __ Existing riparian habitat degraded; preservation not desirable or attainable; improvements are not likely or would require significant and costly management effort. __ Native vegetation is localized within the assessment area. __ Presence of areas disturbed through natural processes is not evident. __ Vegetation composition is dominated by invasive or ruderal species.
0.10			__ The percent concurrence of dominant plants observed with diagnostic species is ≥ 5% or < 25%. __ Existing riparian habitat is severely degraded. __ Native vegetation is largely absent, area is hardened (i.e., paved, urban, etc.) or graded.

Field Notes:

V_5 Riparian Buffer Continuity and Width

User Notes: Riparian ecosystems typically form a relatively continuous corridor along the stream channel and floodplain. This variable is measured perpendicular from the top of the bank for a distance laterally of 100'. Both banks of the stream channel are measured and then averaged for determination of the summary rating and subsequent Condition Index Score assignment. Aerial photography can be used for estimation of this variable but should be verified in the field.

Assessment area: An artificial convention of 100' from the top of each bank

	Continuity (%)	100	80-99	60-79	40-59	20-39	5-19	<5
Width(ft)	≥100	1.00	0.90	0.70	0.50	0.30	0.15	0.00
	75-99	0.80	0.75	0.60	0.40	0.25	0.10	0.00
	50-74	0.60	0.50	0.50	0.30	0.20	0.10	0.00
	25-49	0.40	0.30	0.30	0.20	0.15	0.05	0.00
	10-24	0.20	0.20	0.15	0.10	0.10	0.05	0.00
	5-9	0.10	0.10	0.10	0.05	0.05	0.01	0.00
	<5	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Corresponding Summary Rating with Variable score:

If summary rating is between :	Assign the following Condition Index Score:
0.80 - 1.00	1.00
0.60 - 0.79	0.75
0.40 - 0.59	0.50
0.20 - 0.39	0.25
0.01 - 0.19	0.10
0.0 - OR No buffer of permanent vegetation is present = 0	

.5

Field Notes:

100 ft /% perennial south bank

100 ft /% row crop

V_6 Riparian Land Use

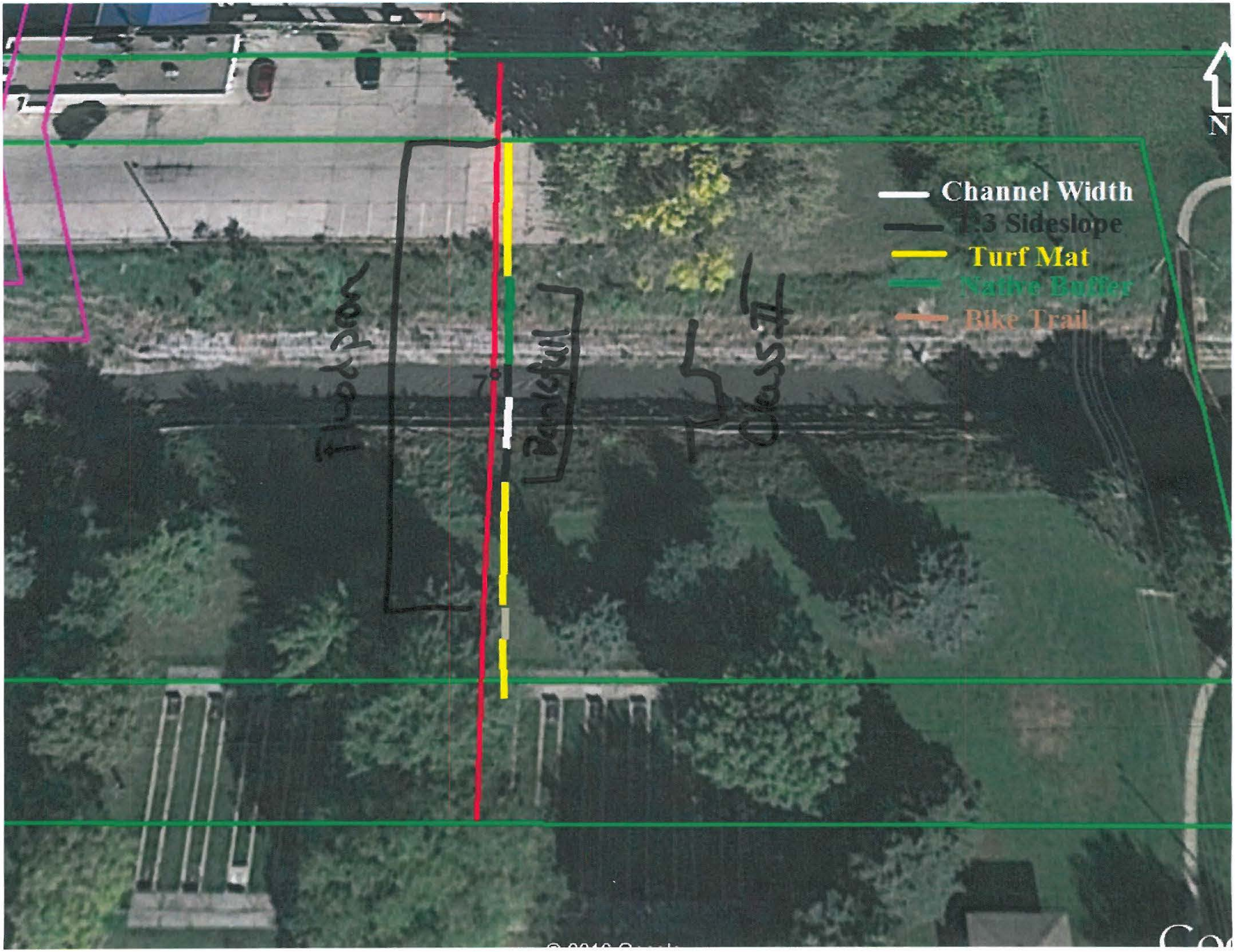
User Notes: Land use indicates the way in which a tract of land is utilized, has been developed, or the type of vegetation present

Assessment area: An artificial convention of 100' from the top of each bank. For land use assessment in stream to reservoir conversions, the assessment area is defined as 100' from the lateral extent of the floodpool. This boundary convention is considered synonymous with the upper extent of the floodprone area of stream systems.

Land Use Category	Land Use Weight		Area of Land Use		Weighted score (WS) for each land use category
Impermeable surface	1	X		=	
Feed lot	1	X		=	
Row crop or Small grain	3	X	100	=	300
Farmstead	6	X		=	
Woodlot/shelterbelt	6	X		=	
Perennial Cover of any type	8	X	100	=	800
Managed for native vegetation cover and diversity	10	X		=	
			Total area	=	
*User notes: $\sum$ WS is the sum of the Weighted Scores WA is the Weighted Average as defined by $\sum$Weighted Scores /Total area					$\sum$ WS = 1100/ WA = /200 5.5

Field Notes:

If the Land Use Weighted Average is:	Assign the following Condition Index Score:
≥ 8	1.00
7-8	0.75
5-6	0.50
2-4	0.25
< 1	0.10



N
Channel Width
1:3 Sideslope
Turf Mat
Native Buffer
Bike Trail
Floodplain
Bankfull
Class II

V_1 Hydraulic Conveyance and Sediment Dynamics

User notes: Hydraulic conveyance and sediment dynamics addresses fluvial processes for the active channel within the RR. This indicator is assessed by narrative criteria or measured as a percent of the length of mainstem channel in a riparian reach with (AHC). Aerial photography and field observations are used to estimate the Condition Index Rating of this metric. For impact or mitigation evaluations, **the Condition Index Rating is zero when a stream is converted to a lacustrine system.**

Assessment Area: below bankfull width

Condition Index Rating	Indicator Score or Description of Condition
1.00	__Movement of sediment in the channel is in equilibrium in terms of supply, erosion, and deposition processes. __**On most streams** there are alternating point bars; bank erosion occurs, but is stabilized and moderated by vegetation; and channel width, form, and floodplain area is consistent through the reach. __**In some streams**, some of these indicators may not be apparent, but overall bank and hill slope erosion is moderated by vegetation and there are no apparent culturally induced catastrophic failures. __The channel is stable, no active down-cutting occurring, or; old down-cutting apparent but a new, stable riparian area has formed within the incised channel, OR; __≤5% of active channel within the riparian reach with altered hydraulic conveyance (AHC).
0.75	__Movement of sediment in the channel is in equilibrium with the current hydrologic regime, as opposed to a culturally unaltered condition, and exhibits an overall balance in terms of erosion and deposition processes. __**On most streams** there are alternating point bars; bank erosion occurs, but is stabilized and moderated by vegetation; and channel width, form, and floodplain area are consistent through the reach. __**In some streams**, some of these indicators may not be apparent, but overall bank and hill slope erosion is moderated by vegetation and no culturally induced catastrophic failures are apparent. __The channel has evidence of old down-cutting that has begun stabilizing, vegetation is beginning to establish, even at the base of the falling banks, soil disturbance is evident, OR; __>5 and ≤15% of riparian reach with AHC.
0.50	__Sediment disequilibrium is minor and localized within the reach. __This includes small, localized areas of bank protection, slumping, or encroachment on the floodplain and channel. __This condition class includes previously disrupted reaches on a recovery trajectory, such as deeply entrenched streams where down-cutting has been arrested by structural grade control, and there is sufficient room for lateral channel migration and establishment of a functional floodplain within the incised channel. __Head cuts in early stage are present. Immediate action may prevent further degradation, OR; __ >15 and ≤30% of riparian reach with AHC.
0.25	__Sediment erosion and deposition out of equilibrium. __Water inflow is sediment rich, poor or accelerated bank erosion exists. Channel not actively incising but extensive disequilibrium is evident. __Typical indicators include extensive bank slumping (erosion events that exceed any moderating influence of native vegetation), active gullies feeding into the reach from adjacent hill slopes, or shoaling of sediments rather than deposition in sorted lateral and mid-channel bars. __Apparently stable channels should be placed in this category if there is evidence of regular mechanical disruption, such as bulldozing of the channel bottom and clearing of riparian vegetation to improve flood conveyance. __ Channel with some widening, but limiting new floodplain development; the existing floodplain is not well vegetated. __The vegetation that is present is mainly pioneer species. Bank failure is common, OR; __ >30 and ≤50% of riparian reach with AHC.
0.10	__Sediment dynamics within most of the reach are seriously disrupted. __This includes reaches where no significant storage or recruitment of sediment occurs (i.e., reaches in underground tunnels/culverts, and reaches hardened with rock or concrete). __It also includes reaches that are either actively incising or functioning as sediment traps (e.g., sediment basins). __This also includes reaches that have been subject to recent changes likely to induce severe disequilibrium, such as extensive floodplain filling, change in slope, channel straightening, or other changes that are likely to cause channel down-cutting during future high-flow events. __The ~~channel is deeply incised~~, resembling a gully, little or no riparian area development, or active down-cutting is clearly occurring. Only occasional or rare flood events access the flood plain. __Tributaries will also exhibit signs of down-cutting, OR; > __50% of riparian reach with AHC.

Field Notes:

V_2 In-Stream Habitat/Available Cover

User Notes: The biological components of riparian ecosystems have adapted to episodic cycles of disturbance and developed a variety of mechanisms that make it possible to survive and flourish where other organisms cannot. This variable is evaluated below the floodprone area. For impact or mitigation evaluations, the Condition Index Rating is zero when a stream is converted to a lacustrine system.

Assessment Area: Below the estimated floodprone area

Condition Index Rating	Indicator or Description of Conditions
1.00	__Within the flood prone area, there is greater than >50% coverage by diverse habitat features favorable for stream faunal colonization and maintenance of vegetation dynamics for recruitment. __Features may include snags, submerged logs, undercut banks, roots, cobble, rocks, persistent leaf packs, pools and glides, or other stable habitat at a stage to allow colonization. __No barriers to faunal movement.
0.75	__ Within the flood prone area there is >30% and ≤50% coverage by habitat features favorable for stream faunal colonization and/or cover. __Many habitat features are not transient. Adequate habitat for maintenance of populations is evident. __Seasonal water withdrawals inhibit faunal movement within the reach.
0.50	__ Within the flood prone area, there is >10 and ≤30% coverage by habitat features favorable for stream faunal colonization and cover; __habitat availability may be less than desirable; __substrate may be frequently disturbed. __Drop structures, culverts, dams, or diversions are present within the reach, but with minimal effect to the channel gradient or __faunal movement. Some channel deepening is noticeable.
0.25	__ Within the flood prone area, there is ≤10% coverage of habitat features present; lack of habitat is obvious; substrate unstable or lacking; concrete lined channels are present within portions of the stream. __Habitat features and pools buried or lacking, channel bottom may be flat. __Drop structures, culverts, dams, or diversions are present within the reach with noticeable effects to the channel gradient (deepening) or inhibition of faunal movement.
0.10	✓Habitat features and pools are buried or lacking, channel bottom may be flat. ✓Channels banks are completely armored or concrete lined.

Field Notes:

Class II channel

V_3 Floodplain Interaction–Connectivity

User Notes: Floodplain Interaction–Connectivity indicates of the degree to which the hydrologic interaction between the bankfull channel and the active floodplain and terraces of the riparian ecosystem remains intact. In assigning the Condition Index Rating, the channel evolution concepts previously presented should be consulted. Previous observations for V1 Hydraulic Conveyance and Sediment dynamics variable and including channel cross-section observations should be used to assign this Condition Index Rating. The assessment area for this variable is the floodprone area and abandoned floodplain/terraces.

Assessment Area: Floodprone area and abandoned floodplain/terraces

Condition Index Rating	Indicator or Description of Conditions
1.00	__The floodplain has not been physically manipulated. __No surface alterations (such as constructed channels, dams, dikes, diversions, dugouts, or fill) or subsurface alterations (such as tile drainage) are present. __Natural geomorphic features occur within the floodplain as evidenced by irregular, uneven surfaces (undulating conditions from meander scars, sediment bars, or hummocks). __The current stage of the channel would indicate an equilibrium channel corresponding to a Class I condition (sinuous, pre-modified channel).
0.75	__Few changes to the floodplain surface. __Observable changes in elevation are restricted to only farm roads or bridges with culverts. __The current stage of the channel would indicate quasi-equilibrium corresponding to a Class VI condition.
0.50	__Multiple geomorphic modifications to the floodplain surface to control flood energy, often with bank control structures, but still permitting flow access via culverts. __The current stage of the channel would indicate aggradations and widening, corresponding to a Class V condition.
0.25	✓Complete geomorphic modification BUT still permits flow access via culverts and occasional overbank flooding. __The current stage of the channel would indicate degradation and widening corresponding to a Class IV condition.
0.10	✓Complete geomorphic modification to the floodprone area. Bank control structures (dikes, etc) are in a continuous structure preventing channel movement and also preventing overbank flow. ✓The current stage of the channel would indicate channelization and/or active bed degradation corresponding to a Class II or III condition.

Field Notes:

Occassional overbankflooding would be permitted

V_4 Riparian Condition & Vegetation Composition

User Notes: Riparian Vegetation Composition is a response variable to both natural and anthropogenic disturbance. Scoring of this variable is determined by comparing the dominant species observed in cross-sections within the RR assessment area to a list of diagnostic and most abundant species. Field sheets on following page.

Assessment Area: V_{4a} above the floodprone area with an artificial convention of 100' from the top of each bank; and, V_{4b} below the floodprone area.

Condition Index Rating	4a	4b	Indicator or Description of Conditions
1.00			__The percent concurrence of dominant plants observed with diagnostic species is ≥ 95 %. __Existing riparian habitat is of high caliber; if this site were to be preserved, minimal management would be necessary due to natural processes still being in effect. __Vegetation represents the reference standard condition with no chronic anthropogenic disturbances; or, __the site has recovered from historical anthropogenic disturbance.
0.75			__The percent concurrence of dominant plants observed with diagnostic species is ≥75 and < 95%. __Existing riparian habitat is only slightly degraded; preservation and/or improvement are likely with moderate management effort. __Native vegetation is on a recovery trajectory with compatible management practices that mimic natural disturbances (i.e., low intensity grazing). __Presences of areas disturbed through natural processes (i.e., fire and flood) are still evident.
0.50			__ The percent concurrence of dominant plants observed with diagnostic species is ≥50% and < 75%. __Existing riparian habitat somewhat degraded; preservation and/or improvement possible but would require significant management effort. __Native vegetation present for some representative communities, but invasive or ruderal species are prevalent. __ Disturbance is largely anthropogenic and natural processes influencing the plant community are rare.
0.25			__ The percent concurrence of dominant plants observed with diagnostic species is ≥ 25% or < 50%. __ Existing riparian habitat degraded; preservation not desirable or attainable; improvements are not likely or would require significant and costly management effort. __ Native vegetation is localized within the assessment area. __ Presence of areas disturbed through natural processes is not evident. __ Vegetation composition is dominated by invasive or ruderal species.
0.10			__ The percent concurrence of dominant plants observed with diagnostic species is ≥ 5% or < 25%. __ Existing riparian habitat is severely degraded. __ Native vegetation is largely absent, area is hardened (i.e., paved, urban, etc.) or graded.

Field Notes:

Assuming Native seed mixes on fw flanks

V_5 Riparian Buffer Continuity and Width

User Notes: Riparian ecosystems typically form a relatively continuous corridor along the stream channel and floodplain. This variable is measured perpendicular from the top of the bank for a distance laterally of 100'. Both banks of the stream channel are measured and then averaged for determination of the summary rating and subsequent Condition Index Score assignment. Aerial photography can be used for estimation of this variable but should be verified in the field.

Assessment area: An artificial convention of 100' from the top of each bank

	Continuity (%)	100	80-99	60-79	40-59	20-39	5-19	<5
Width (ft)	≥100	1.00	0.90	0.70	0.50	0.30	0.15	0.00
	75-99	0.80	0.75	0.60	0.40	0.25	0.10	0.00
	50-74	0.60	0.50	0.50	0.30	0.20	0.10	0.00
	25-49	0.40	0.30	0.30	0.20	0.15	0.05	0.00
	10-24	0.20	0.20	0.15	0.10	0.10	0.05	0.00
	5-9	0.10	0.10	0.10	0.05	0.05	0.01	0.00
	<5	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Corresponding Summary Rating with Variable score:

If summary rating is between :	Assign the following Condition Index Score:	
0.80 - 1.00	1.00	
0.60 - 0.79	0.75	.30/2
0.40 - 0.59	0.50	
0.20 - 0.39	0.25	.15
0.01 - 0.19	0.10	

0.0 - OR No buffer of permanent vegetation is present = 0

Field Notes:

North Bank = paved lot 100 feet

75% veg for 50 ft

&

South bank -

100 ft turf grass

+ garden

V_6 Riparian Land Use

User Notes: Land use indicates the way in which a tract of land is utilized, has been developed, or the type of vegetation present

Assessment area: An artificial convention of 100' from the top of each bank. For land use assessment in stream to reservoir conversions, the assessment area is defined as 100' from the lateral extent of the floodpool. This boundary convention is considered synonymous with the upper extent of the floodprone area of stream systems.

Land Use Category	Land Use Weight		Area of Land Use		Weighted score (WS) for each land use category
Impermeable surface	1	X	100	=	100
Feed lot	1	X		=	
Row crop or Small grain	3	X	50	=	150
Farmstead	6	X	50	=	300
Woodlot/shelterbelt	6	X		=	
Perennial Cover of any type	8	X		=	
Managed for native vegetation cover and diversity	10	X		=	
			200 Total area	=	
*User notes: Σ WS is the sum of the Weighted Scores WA is the Weighted Average as defined by ΣWeighted Scores /Total area					Σ WS = 550/ WA = 200 2.75

If the Land Use Weighted Average is:	Assign the following Condition Index Score:
≥8	1.00
7-8	0.75
5-6	0.50
2-4	0.25
< 1	0.10

Field Notes:

South Bank = 50 ft row crop (garden)
50 ft turf

North = 100 perennial

From:	Scott, Tricia
To:	Bozarth, Rebecca L NWO
Subject:	[EXTERNAL] Deadmans Run Flood Risk Management Project
Date:	Tuesday, June 09, 2015 3:29:46 PM

June 9, 2015

Department of the Army

Corps of Engineers, Omaha District

1616 Capitol Avenue

Omaha, NE 68102-4901

RE: Deadmans Run Flood Risk Management Project

Dear Ms. Bozarth:

The Nebraska Department of Environmental Quality (NDEQ) has reviewed the above referenced project. We have no comments regarding this project that would fall under the jurisdiction of our programs. However, the project may need a 404 permit which is issued by the Core of Engineers. Please call (402) 896-0896 for additional information regarding the 404 permit. Additionally, the project may be required to receive a general NPDES Dewatering Permit for discharge of surplus water from the borrow sites.

If you have questions about the permitting process, or any other questions, feel free to contact me at (402) 471-6974. For more information, please visit our website at www.deq.state.ne.us.

Sincerely,

Tricia Scott

Field Services and Assistance

NE Department of Environmental Quality

1200 "N" Street, The Atrium, Suite 400

P.O. Box 98922, Lincoln, NE 68509-8922

Phone: 402.471.6974 | E-mail: tricia.scott@nebraska.gov

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 7
11201 Renner Boulevard
Lenexa, Kansas 66219

JUN 8 2015

Mr. Eric Laux, Chief
Environmental Resources and Missouri River
Recovery Program Plan Formulation Section
U.S. Army Corps of Engineers, Omaha District
1616 Capitol Avenue
Omaha, Nebraska 68102

Dear Mr. Laux:

Thank you for your May 20, 2015, letter asking for project scoping comments regarding the proposed flood risk management project for Deadman's Run in Lincoln, NE, authorized under Section 205 of the Flood Control Act of 1948. The Corps is in the process of developing a feasibility study to investigate potential flood risk management measures for this urbanized tributary to Salt Creek. The Corps anticipates conducting this study in two phases. The first phase will determine whether cost effective risk reduction solutions exist and the second phase will evaluate alternatives. We appreciate the opportunity to provide you with our comments regarding the scope of the feasibility study and the range of alternatives to be considered within the National Environmental Policy Act compliance document. We would appreciate the opportunity to review the draft NEPA compliance document once it becomes available.

We strongly urge the Corps to give full consideration to non-structural alternatives as is provided for under Section 205. Under Section 205, "a project is accepted for construction only after detailed investigation clearly shows its engineering feasibility, environmental acceptability and economic justification." We believe that a project which includes non-structural components as part of the overall flood risk reduction design directly determines the project's adherence to these last two measures and is in the best long-term interests of the community and the federal government. A project is much more sustainable and cost-effective when it incorporates non-structural components into its design. We believe there is ample opportunity within the Deadman's Run watershed to provide non-structural alternatives which could address possibly all, but certainly at least some, of the flood risk either alone or in combination with smaller structural components. We also urge the Corps to conduct its two-phase assessment in such a manner that flood risk problems within discrete watershed components are evaluated individually as well as part of a whole watershed risk evaluation. The assessment should also include alternatives which represent structural solutions, non-structural solutions and flood risk reduction solutions composed of both structural and non-structural components. In short, the Corps' assessment should evaluate individual watershed sub-units as well as the watershed as a whole and evaluate risk reduction solutions which range from structural to non-structural designs and designs incorporating both approaches.

In reviewing the project map enclosed with your May 20, 2015, letter, it appears that the Corps considers the geographic scope of the project defined as the confluence of Deadman's Run and Salt Creek to Wedgewood Lake. We advise that the final scope of the project include the entire watershed of Deadman's Run extending possibly as far south as Van Dorn Street and as far east as South 84th Street. Opportunities for retaining precipitation "where it falls" throughout this upper portion of the watershed should be considered. Landscape features designed to temporarily store runoff would also provide passive treatment of runoff before it reaches Wedgewood Lake, potentially improving lake water quality.

Evaluating the urban/suburban space along the entire length of Deadman's Run, it appears that there are many green spaces which could be used to retain and detain runoff beyond that which is provided by Wedgewood Lake itself. This design component is particularly important downstream of Wedgewood Lake as the watershed collects greater amounts of runoff from increasingly impervious surfaces. Component areas of the watershed and reaches of the stream below Wedgewood Lake and south of Vine Street include a green corridor associated with the Mopac Trail and open expanses of floodplain land which could be utilized to slow runoff and store flash runoff rather than passing it downstream to more developed constrained areas. Smaller open spaces exist north to 48th Street which could be utilized to slow stream flow and increase infiltration. Between 48th Street and Huntington Avenue there appears to be large areas under cultivation which could be used in-part for temporary storage of runoff and passive improvement of stream water quality prior to discharging to Salt Creek.

We appreciate the opportunity to provide comments and suggestions to the Corps early in the project evaluation process. If you have any questions regarding these comments, please contact me at shepard.larry@epa.gov or 913-551-7441.

Sincerely,

Larry Shepard
NEPA Analyst

cc: Rebecca Bozarth, USACE
Eliodora Chamberlain, WWPD/WPIB

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Nebraska Field Office
9325 South Alda Road
Wood River, Nebraska 68883

January 15, 2016

FWS-NE: 2016-070

Eric Laux
Department of the Army
Corps of Engineers, Omaha District
1616 Capitol Avenue
Omaha, NE 68102-4901

RE: Section 205 Flood Risk Management Study, Deadmans Run, City of Lincoln, Lancaster County, Nebraska

Dear Mr. Laux:

This responds to your December 11, 2015, request for comments and concurrence from the U.S. Fish and Wildlife Service (Service) regarding the proposed project. The Service has responsibility for conservation and management of fish and wildlife resources for the benefit of the American public under the following authorities: 1) Endangered Species Act of 1973 (ESA); 2) Fish and Wildlife Coordination Act (FWCA); 3) Bald and Golden Eagle Protection Act (Eagle Act); and 4) Migratory Bird Treaty Act (MBTA). The National Environmental Policy Act requires compliance with all of these statutes and regulations. The project proponent and lead federal agency is responsible for compliance with these federal laws.

The Service has special concerns for endangered and threatened species, migratory birds, and other fish and wildlife and their habitats. Habitats frequently used by fish and wildlife species are wetlands, streams, riparian (streamside) woodlands, and grasslands. Special attention is given to proposed developments that include modification of wetlands, stream alteration, loss of riparian habitat, or contamination of habitats. When this occurs, the Service recommends ways to avoid, minimize, or compensate for adverse effects to fish and wildlife and their habitats.

ENDANGERED SPECIES ACT

In your December 11, 2015; request for comment, the following species were identified within the area of interest for the proposed project:

Listed Species	Expected Occurrence
Interior least tern (*Sterna antillarum*)	Migration, nesting
Northern Long-eared Bat (*Myotis septentrionalis*)	Migration, brood rearing
Piping plover (*Charadrius melodus*)	Migration, nesting
Pallid sturgeon (*Scaphirhynchus albus*)	Lower Platte River and Missouri River
Salt Creek tiger beetle (*Cicindela nevadica lincolniana*)	Salt Creek basin resident
Western prairie fringed orchid (*Platanthera praeclara*)	Tall-grass prairie and wet meadows
Whooping crane (*Grus americana*)	Roosting, migrant

In accordance with section 7 of ESA, the Service has determined that the following federally listed species may occur or be affected by the proposed subject action:

Northern Long-eared Bat

The northern long-eared bat (NLEB) is listed as threatened with an interim 4(d) rule under the Endangered Species Act (ESA) (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) in May 2015. The 4(d) rule was finalized in January 2016. No critical habitat has been proposed for the NLEB. The state of Nebraska is within the known range of the NLEB. During the summer, NLEBs typically roost singly or in colonies in cavities, underneath bark, crevices, or hollows of both live and dead trees and/or snags (typically ≥3 inches dbh). Males and non-reproductive females may also roost in cooler places, like caves and mines. This bat seems opportunistic in selecting roosts, using tree species based on presence of cavities or crevices or presence of peeling bark. It has also been occasionally found roosting in structures like barns and sheds (particularly when suitable tree roosts are unavailable). They forage for insects in upland and lowland woodlots and tree lined corridors from the vegetation and from water surfaces. During the winter, NLEBs predominately hibernate in caves and abandoned mine portals. Additional habitat types may be identified as new information is obtained.

NLEBs are susceptible to white-nose syndrome (WNS), which poses a severe and immediate threat. Since symptoms were first observed in New York in 2006, WNS has spread rapidly from the Northeast to the Midwest and Southeast; an area that includes the core of the northern long-eared bat’s range where it was most common before this disease. Numbers of NLEB (from hibernacula counts) have declined by up to 99 percent in the Northeast. The listing of the NLEB designated areas of the country impacted by WNS and then provided a buffer zone of 150 miles surrounding those areas to provide extra protection. For projects within the WNS buffer zone, measures provided in the 4(d) rule exempt take from the following activities:

(1) forest management practices;
(2) maintenance and limited expansion of transportation and utility rights-of-way;
(3) prairie habitat management; and
(4) limited tree removal projects, provided these activities protect know maternity roost and hibernacula.

The proposed project occurs in Lancaster County, a county included within the WNS buffer zone. As such, the guidance below, including conservation measures would be applicable to the project. The below link provides additional NLEB information for federal projects and includes a map of the WNS buffer zone.
http://www.fws.gov/Midwest/endangered/mammals/nleb/KeyFinal4dNLEBFedProjects.html

Take is ONLY exempted within the WNS buffer zone if the following conservation measures are implemented:
(1) No tree clearing can occur within 150 feet of maternity trees between June 1 and July 31.
(2) No tree clearing can occur within 0.25-mile of a hibernacula at any time of the year.
(3) Hibernacula (e.g., mines caves) receive full protection under ESA throughout the year. No take exemption is provided for NLEBs that are present in the hibernacula—all take from any type of source (e.g., blasting, prescribed burns, mining, etc.) is prohibited at hibernacula.

While these conservation measures per the 4(d) rule satisfy federal requirements, additional coordination may be required with Nebraska Game and Parks Commission to ensure compliance with the Nebraska Nongame and Endangered Species Conservation Act.

Least Tern and Piping Plover
The least tern, federally listed as endangered, and the piping plover, federally listed as threatened, nest on unvegetated or sparsely vegetated sandbars in river channels. The nesting season for the least tern and piping plover is from April 15 through August 15. Least terns feed on small fish in the river and piping plovers forage for invertebrates on exposed beach substrates.

The least tern and the piping plover may be impacted by water depletions in the Platte River system (see section titled: Depletions to the Platte River). The proposed project has the potential to affect habitat in the Platte River, and recommendations to assess these effects are described in the FWCA section of this document.

Pallid Sturgeon
The pallid sturgeon was officially listed as an endangered species on September 6, 1990. In Nebraska, the pallid sturgeon is found in the Missouri and lower Platte rivers. Floodplains, backwaters, chutes, sloughs, islands, sandbars, and main channel waters formed the large-river ecosystem that provided macrohabitat requirements for the pallid sturgeon, a species that is associated with diverse aquatic habitats. These habitats historically were dynamic and in a constant state of change due to influences from the natural hydrograph, and sediment and

runoff inputs from an enormous watershed spanning portions of ten states. Navigation, channelization and bank stabilization, and hydropower generation projects have caused the widespread loss of this diverse array of dynamic habitats once provided to pallid sturgeon on the Missouri River, resulting in a precipitous decline in populations of the species.

The pallid sturgeon may be impacted by water depletions to the Platte River system (see section titled: Depletions to the Platte River). The proposed project has the potential to directly affect individuals and/or indirectly affect species habitat in the Platte River, and recommendations to assess these effects are described in the FWCA section of this document.

Salt Creek Tiger Beetle
The entire life cycle of the federally endangered Salt Creek tiger beetle is linked to exposed mud flats of saline wetlands and mud banks of streams that drain these wetland complexes in the Salt Creek drainage in Lancaster and the southern margin of Saunders Counties in Nebraska. The Salt Creek tiger beetle, a predatory insect, is known from just three populations in Lancaster County and has been extirpated from Saunders County since 1998. The Service designated critical habitat for the species in Oak, Haines Branch, Little Salt, and Rock creeks. Intrusion of excess freshwater, sediment, and stream entrenchment can have a negative effect of this species. Alteration of hydrologic cycles though depletions to Little Salt and Rock Creeks can have an adverse effect of the Salt Creek tiger beetle by drying out larval habitat.

The Service does not expect the proposed project to impact the beetle because of the proposed project would occur in a Salt Creek tributary located downstream of occupied habitats.

Western Prairie Fringed Orchid
The western prairie fringed orchid, federally listed as threatened, inhabits tall-grass calcareous silt loam or sub-irrigated sand prairies. Declines in western prairie fringed orchid populations have been caused by the drainage and conversion of its habitats to agricultural production, channelization, siltation, road and bridge construction, grazing, haying, and the application of herbicides. Populations are known to occur in Boone, Cherry, Dodge, Garfield, Grant, Greeley, Hall, Holt, Lancaster, Loup, Madison, Otoe, Pierce, Rock, Saline, Sarpy, Seward, and Wheeler counties, and may occur at other sites in Nebraska.

The Service does not expect the proposed project to impact the western prairie fringed orchid because of the existing land cover is unlikely habitat for the species; however, this plant may be impacted by alterations to the hydrology of sub-irrigated wetland habitat areas along the Platte River resulting from depletions to the Platte River system (see section titled: Depletions to the Platte River).

Whooping Crane
Whooping cranes, federally listed as endangered, use shallow, sparsely vegetated wetlands and streams in which to feed and roost during migration. Major river systems used by whooping cranes in Nebraska include the Platte, Loup, Republican, and Niobrara Rivers. In addition, a 3-mile-wide, 56-mile-long reach of the Platte River between Lexington and Denman, Nebraska has been federally designated as critical habitat for whooping cranes. Migration periods for the whooping crane in Nebraska are from approximately March 23 through May 10 and from September 16 through November 16. Channel constrictions caused by bridges, bridge

approaches, roadway embankments, bank stabilization, levees, and other unnatural obstructions can result in the loss of broad, shallow, unobstructed channel and sandbar complexes used as roosting habitat by whooping cranes. Drainage and filling of playa wetlands can also result in the loss of important foraging and roosting habitats. Ill-timed human activities in the vicinity of important roosting and feeding habitats can disturb whooping cranes, prematurely hastening their departure from riverine and wetland habitats.

The Service does not expect the proposed project to impact the whooping crane because the existing land cover is unlikely habitat for the species.

<u>Depletions to the Platte River</u>
Since 1978, the Service has concluded in all of its section 7 consultations on water projects in the Platte River basin, that the Platte River ecosystem is in a state of jeopardy and any federal action resulting in a water depletion to the system will further or continue the deterioration of already stressed habitat conditions. Due to the cumulative effect of many water depletion projects in the Platte River basin, the Service considers any depletion of flows (direct or indirect) from the Platte River system to be significant. Consequently, the Service has adopted a jeopardy standard for all section 7 consultations on federal actions which result in water depletions to the Platte River system. The Service considers the Platte River and its associated wetland habitats to be resources of national and international importance.

Because the proposed project is to be located near the Salt Creek basin, the Service is concerned that the proposed action could result in an instream flow depletion to the lower Platte River, which would impact federally listed species. The Service is primarily concerned about what effect, if any, alternatives related to basin retention or detention will have upon the lower Platte River system. If basin detention or retention is described among proposed alternatives, then the Service requests that an engineering analysis be performed regarding the net effect (in terms of acre-feet) that may be depleted during each month on an average annual basis over the life of the project. It is further requested that the lead federal agency provide the results of that analysis in support of its determination of affect for consideration by the Service in partial fulfillment of the section 7 consultation process as outlined in this letter.

REVIEW, COMMENTS, AND RECOMMENDATIONS ON THE PROPOSED PROJECT ACTION UNDER OTHER FISH AND WILDLIFE STATUTES

Fish and Wildlife Coordination Act

The FWCA requires consultation with the Service and State fish and wildlife agency for the purpose of giving equal consideration to fish and wildlife resources in the planning, implementation, and operation of federal and federally funded, permitted, or licensed water resource development projects. The FWCA requires that federal agencies take into consideration the effect that water related projects may have on fish and wildlife resources, to take action to avoid impact to these resources, and to provide for the enhancement of these resources.

Site Specific Effects to Wetlands, Streams, and Riparian Habitats
The Service recommends that impacts to wetlands, streams, and riparian areas be avoided or minimized, in accordance with the Section 404(B)(1) Guidelines of the Clean Water Act. The Service also recommends that any instream structures should be constructed at elevations so as to not impede animal/fish movement.

The Service has reviewed the proposed project's Draft Environmental Analysis, and has determined that the proposed evaluation methods would adequately assess potential onsite effects of the proposed project.

Evaluation Tools to Assess Potential Effects to Platte River Resources
The proposed project has the potential to beneficially and/or adversely affect federally listed species and aquatic resources in Salt Creek and the lower Platte River. We have provided the following examples where the proposed project could affect lower Platte River resources.

Water detention or retention could result in a depletion to Salt Creek, resulting in adverse effects to federally listed species and the aquatic community in the lower Platte River. The proposed project could have significant impacts during low flow and high temperature conditions. Under these conditions, water retention from the proposed project could result in an increased likelihood of fish kills in Salt Creek or the lower Platte River.

The proposed project also has the potential to affect sediment transport in the Lower Platte River. A report cosponsored by your office and the Lower Platte River Corridor Alliance detailed a sediment budget analysis for sandbars in the Lower Platte River. The report suggested channel degradation in the Platte River from the Salt Creek confluence to its mouth. The report also notes that Salt Creek contributes very little bedload to the Platte River. If the proposed project includes levees or floodwalls, then there is a potential to increase peak flows in Salt Creek, resulting in increased sediment transport in the Platte River. Increases in Platte River sediment transport, without supplying the river with corresponding sediment, could exacerbate channel bed degradation. Channel degradation has the potential to reduce bar size and height for nesting interior least terns and piping plovers. Channel degradation could also decrease availability of side channels and backwaters for the aquatic community. Conversely, attenuation of peak flows could benefit the Platte River by decreasing sediment transport and reducing channel bed degradation.

Presently, no action alternatives have been defined, so it is unclear if the proposed project will significantly affect Salt Creek and Platte River hydrology as well as the associated fish and wildlife resources. If proposed alternatives have the potential to affect downstream hydrology, then the Service recommends a hydrologic analysis to evaluate these potential effects.

Bald and Golden Eagle Protection Act

The Eagle Act provides for the protection of the bald eagle *(Haliaeetus leucocephalus)* and golden eagle (*Aquila chrysaetos*). The golden eagle is found in arid, open country with grassland for foraging in western Nebraska and usually near buttes or canyons which serve as nesting sites. Golden eagles are often a permanent resident in the Pine Ridge area of Nebraska. Bald eagles utilize mature, forested riparian areas near rivers, streams, lakes, and wetlands and occur along all the major river systems in Nebraska. The bald eagle southward migration begins as early as October and the wintering period extends from December-March. Additionally, many eagles nest in Nebraska from mid-February through mid-July. Disturbances within 0.5-mile of an active nest or within line-of-sight of the nest could cause adult eagles to discontinue nest building or to abandon eggs. Both bald and golden eagles frequent river systems in Nebraska during the winter where open water and forested corridors provide feeding, perching, and roosting habitats, respectively. The frequency and duration of eagle use of these habitats in the winter depends upon ice and weather conditions. Human disturbances and loss of wintering habitat can cause undue stress leading to cessation of feeding and failure to meet winter thermoregulatory requirements. These effects can reduce the carrying capacity of preferred wintering habitat and reproductive success for the species. To comply with the Eagle Act, it is recommended that the project proponent determine whether the proposed project would impact bald or golden eagles. If it is determined that either species could be affected by the proposed project, the Service recommends that the project proponent notify this office as well as the Nebraska Game and Parks Commission for recommendations to avoid adverse impacts to bald and golden eagles.

Migratory Bird Treaty Act

Under the MBTA, (16 U.S.C. 703-712: Ch. 128 as amended) (MBTA) construction activities in grassland, roadsides, wetland, riparian (stream), shrubland and woodland habitats, and those that occur on bridges or culverts (e.g., which may affect swallow nests on bridge girders) that would otherwise result in the taking of migratory birds, eggs, young, and/or active nests should be avoided. Although the provisions of MBTA are applicable year-round, most migratory bird nesting activity in Nebraska occurs during the period of April 1 to July 15. However, some migratory birds are known to nest outside of the aforementioned primary nesting season period. For example, raptors can be expected to nest in woodland habitats during February 1 through July 15, whereas sedge wrens, which occur in some wetland habitats, normally nest from July 15 to September 10.

The Service recommends that the project proponent avoid removal or impacts to vegetation during primary nesting season of breeding birds. In the event that construction work cannot be avoided during peak breeding season, the Service recommends that the project manager (or construction contractor) arrange to have a qualified biologist conduct an avian pre-construction risk assessment of the affected habitats (grassed drainages, streamside vegetation) to determine the absence or presence of breeding birds and their nests. Surveys must be conducted during the nesting season. Breeding bird and nesting surveys should use appropriate and defensible sampling designs and survey methods to assist the proponent in avoiding the unnecessary take of migratory birds. The Service further recommends that field surveys for nesting birds, along with information regarding the qualifications of the biologist(s) performing the surveys, be thoroughly documented and that such documentation be maintained on file by the project proponent (and/or construction contractor) until such time as construction on the proposed project has been completed.

The Service requests that the following be provided to this office prior to the initiation of the proposed project if the above conditions occur.

a. A copy of any survey(s) for migratory birds done in conjunction with this proposed project, if any. The survey should provide detail in regard to survey methods, date and time of survey, species observed/heard, and location of species observed relative to the proposed project site.

b. Written description of specific work activity that will take place in all proposed project areas.

c. Written description of any avoidance measures that can be implemented at the proposed project site to avoid the take of migratory birds.

We appreciate the opportunity to review and comment on this proposed project. Should you have questions, please contact Mr. Jeff Runge within our office at jeff_runge@fws.gov or (308) 382-6468, extension 209.

Sincerely,

Eliza Hines
Nebraska Field Supervisor

cc: NGPC; Lincoln, NE (Attn: Frank Albrecht)
USACE; Omaha, NE (Attn: Rebecca Podkowka)

REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
1616 CAPITOL AVENUE
OMAHA NE 68102-4901

November 1, 2016

CENWO-PM-AC

MEMORANDUM FOR U.S. Fish and Wildlife Service (USFWS), Nebraska Ecological Services, ATTN: Jeff Runge, 9325 South Alda Road, Wood River, Nebraska 68883

AND

MEMORNADUM FOR Nebraska State Game and Fish (NGPC), ATTN: Frank Albrecht, 2200 N 33rd Street, Lincoln, Nebraska 68503

SUBJECT: Deadmans Run, Lincoln, Nebraska Section 205, Avoid, Minimize, Mitigate Activities from Potential Recommended Plan

1. During the Plan Formulation Process, the Product Delivery Team (PDT) discussed an array of structural and non-structural measures. These measures were assessed alone, or in combination with other measures. From those measures, Alternatives were formed. Please refer to the Memorandum dated June 10, 2016 for further information summarizing the proposed components of those Alternatives.

2. Presently, the PDT, in coordination with the non-federal Sponsor (the City Of Lincoln and the Lower Platte South Natural Resources District (NRD) are anticipating selecting Structural Alternative 1 as the Recommended Alternative. This alternative includes the following major components:

- Channel widening either side of railroad bridges, Cornhusker Ave to Huntington Ave
- Widen channel, Huntington Ave to 48th Street, within Lower Platte South NRD easement and wider if economically justified
- Installation of a concert flume beneath the BNSF Rail Spur Bridge
- Replace 48th Street Bridge with wider span.

Typical cross sections of the existing channel top-width are approximately 120 feet. Utilizing the typical cross section, channel widening would generally enlarge the width of Deadmans Run to an approximate top-width of 177 feet from Cornhusker Highway to Huntington Avenue and from Huntington Avenue to 48th Street (see Figure 1). Within the channel widening cross section, a native seed buffer approximately 25 feet would be utilized for native vegetation plantings directly adjacent to the channel. This would equate to approximately 5 acres designated along the channel for native seeding. Additionally, areas designated with a turf reinforced mat will also host native grass species (approximately 19 acres of the new channel footprint).

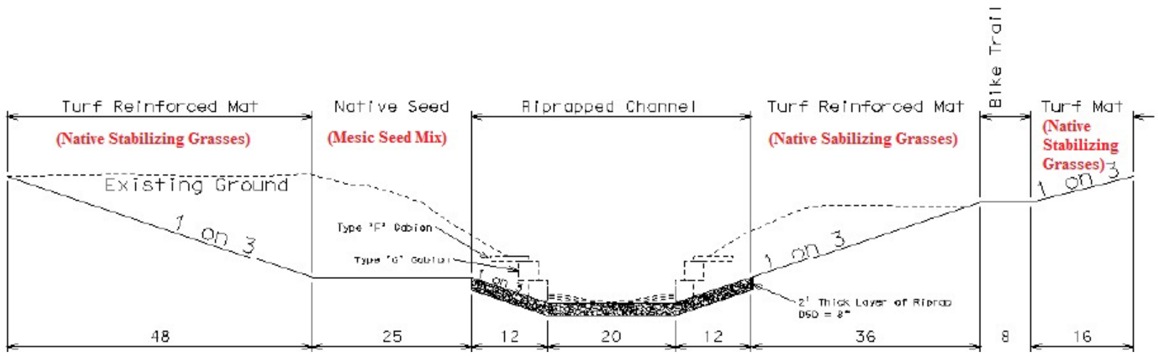


Figure 1. Typical cross section of proposed channel widening throughout Deadmans Run

As noted in the Memorandum dated June 10, 2016, two variations of channel widening were discussed for the East Campus portion at UNL where approximately 0.4 miles of trees on both banksides exists. The channel widening footprint for Variation I would require the removal of all trees on both the north and south bank, whereas Variation II shifts the channel footprint and would require only the removal of the trees on the north bank (see Figure 2).

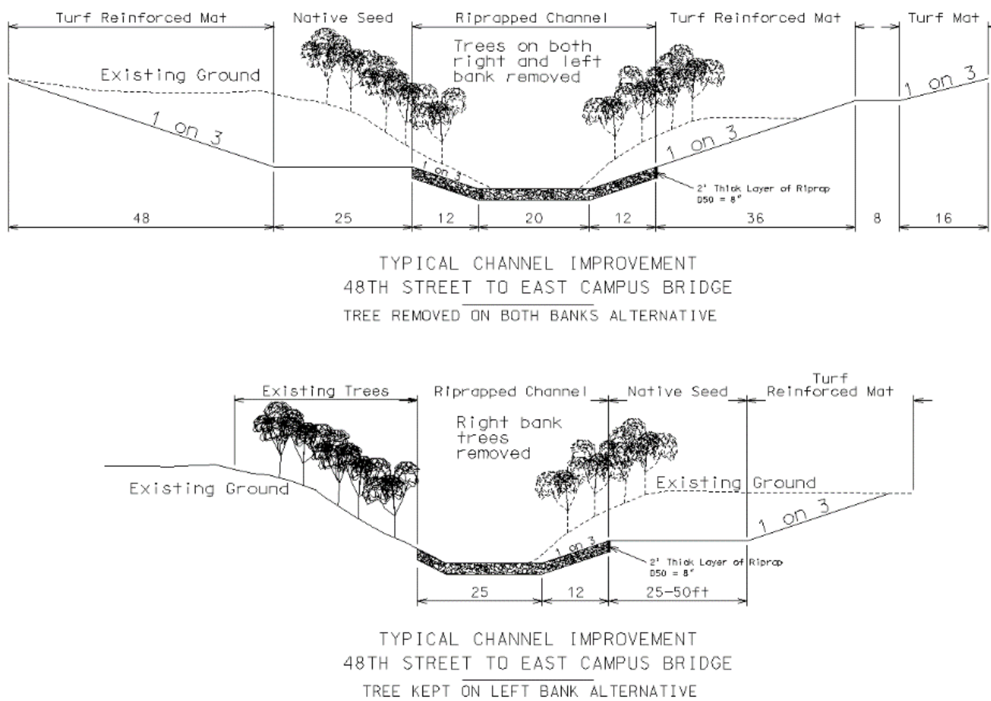


Figure 2. Typical cross section of Variation I (top image) and Variation II (bottom image) on Deadmans Run through East Campus.

3. For the hydraulic modeling, trees were simulated in the HEC-RAS model by increasing the roughness on either or both the right and left bank. Results of the modeling indicated that despite how much the channel was expanded into the right bank, the slower flows induced by an expanding channel, and a higher roughness of leaving the trees in the channel, caused the waters to rise approximately two feet higher at East Campus Bridge.

The removal of the East Campus Bridge may be required if trees are maintained on either the right or left bank of the upstream channel. If the East Campus Bridge is removed (or widened/replaced), a stage up to 4 feet lower than existing conditions would be possible at the current bridge location. However, if it is not removed, then leaving trees in the upstream channel will cause overbank flooding at higher flood frequencies such as the 100 year event and potentially the 50 year event. Based on these results, the PDT is recommending removing both banks of trees (Variation I) (approximately 5 acres) in the East Campus area.

4. For Environmental Impact Analysis, the Nebraska Stream Condition Assessment Procedure (NESCAP) was utilized. This hydrogemorphic model assesses six variables (two aquatic: hydraulic conveyance and sediment dynamics and in-stream habitat/available cover and four riparian measures: floodplain interaction/connectivity, riparian vegetation composition [above and below the floodprone zone], riparian buffer continuity and width and riparian land use). Each variable receives a Condition Index Rating (CIR) between 0.10 and 1.00 based on conditions observed or measured at the project site in conjunction with off-site information. The most degraded, culturally disturbed conditions are assigned a 0.10, and the reference standard condition is assigned a 1.00. Both Variation I and II alignments were compared against existing conditions. Existing condition CIR was 0.26, Variation I CIR was 0.24 and Variation II CIR was 0.26. However, the model shows net gain from both variations as a result of increased area (from widening the channel). Stream condition index area for Variation I shows a net gain in 397.72 “units” and Variation II shows a net gain of 507.44 “units” (CIR multiplied by area).

5. Based on limitations of the model, specifically regarding sensitivity to riparian vegetation and stratum layers, no distinguished weight or value is assumed for the riparian vegetation composition variable. I made assumptions, based on the urbanized setting of Deadmans Run, to elevate the mature trees within the East Campus area to a higher weight than the herbaceous stratum. This makes the model show a more significant and accurate impact from the proposed removal of nearly 5 acres of mature, deciduous hardwood. This assumption rests on the fact that the dominant indicator species indicate an Eastern Riparian Forest- community, which is historic to the area prior to urbanization and channelization. This community is considered “State Vulnerable” (S3) in Nebraska by the National Heritage Program. Furthermore, literature justification based on the importance of woody debris, floodplain reinforcement, riparian corridor continuity, organic litter and general foodwebs support were also cited for higher qualitative value over an herbaceous layer as well as general rarity in the local urban area.

6. The two aquatic variables degrade through the East Campus area as a result of lining the channel bed with riprap, as well as stabilizing the banks with riprap and removing the trees which provide shade value, and some habitat cover. However, as noted in Item Number 4 above, the model shows overall gains of Deadmans Run as a result of the proposed recommended plan.

7. I am attempting to work with the PDT and replace some trees in the upland areas, within the right of way of the project footprint through East Campus (Figure 3). Approximately 2 acres of trees would be replaced, as a result of implementing the Variation I alignment which removes both banks of trees.

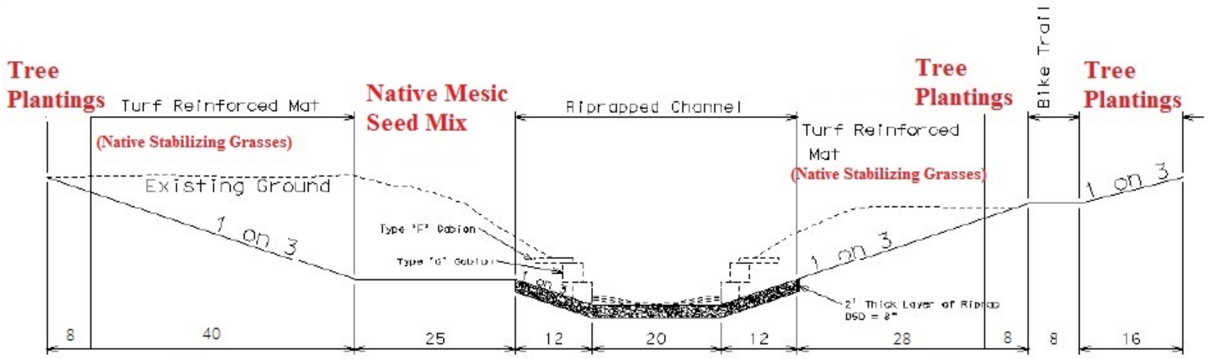


Figure 3

8. Deadmans Run is a Continuing Authorities Program, meaning approval of the recommended plan and implementation of planning and design and construction will be approved at our Division level. I am hoping to bolster my justification of assumptions to ensure that Division would not question the replacing of these trees.

9. Table 1 depicts the native grasses proposed for the turf mats. The non-federal Sponsor wants to maintain these areas as mowed embankments. Therefore, native grasses that will not reduce hydraulic conveyance but can still provide a level of environmental enhancement were selected. These grasses would be planted along the entire project footprint as designated in the cross section (Figure 1) above. This would total approximately 19 acres of native grasses.

Table 1. Stabilizing grass mix for upland reinforced turf mats. Derived from NDOR. "" indicates species preferable in NESCAP Appendix B.*

Scientific Name	Common Name
Lolium perenne	Perennial Ryegrass
Elymus trachycaulus	Slender Wheatgrass*
Pascopyrum smithii	Western Wheatgrass*
Schizachyrium scoparium	Little Bluestem*
Buckloe dactyloides	Buffalograss
Bouteloua curtipendula	Sideoats Grama
Sporobolus cryptandrus	Sand Dropseed*
Elymus canadensis	Canada Wildrye*

10. Table 2 depicts the native mesic seed mix that would be planted along the 25-foot wide buffer adjacent to Deadmans Run. This area, below the floodprone zone, would be constructed to undulate and capture pools of water. The gabion walls that will be replaced next to the stream are anticipated to allow some water leaching to this buffer strip and allow hydraulic interaction with the native plants on a fairly frequent basis (a bi-annual basis at a minimum). This mesic seed mix would be planted along the entire project footprint as designated in the cross section (Figure 1) above. This would total approximately 5 acres of a native mesic seed mix.

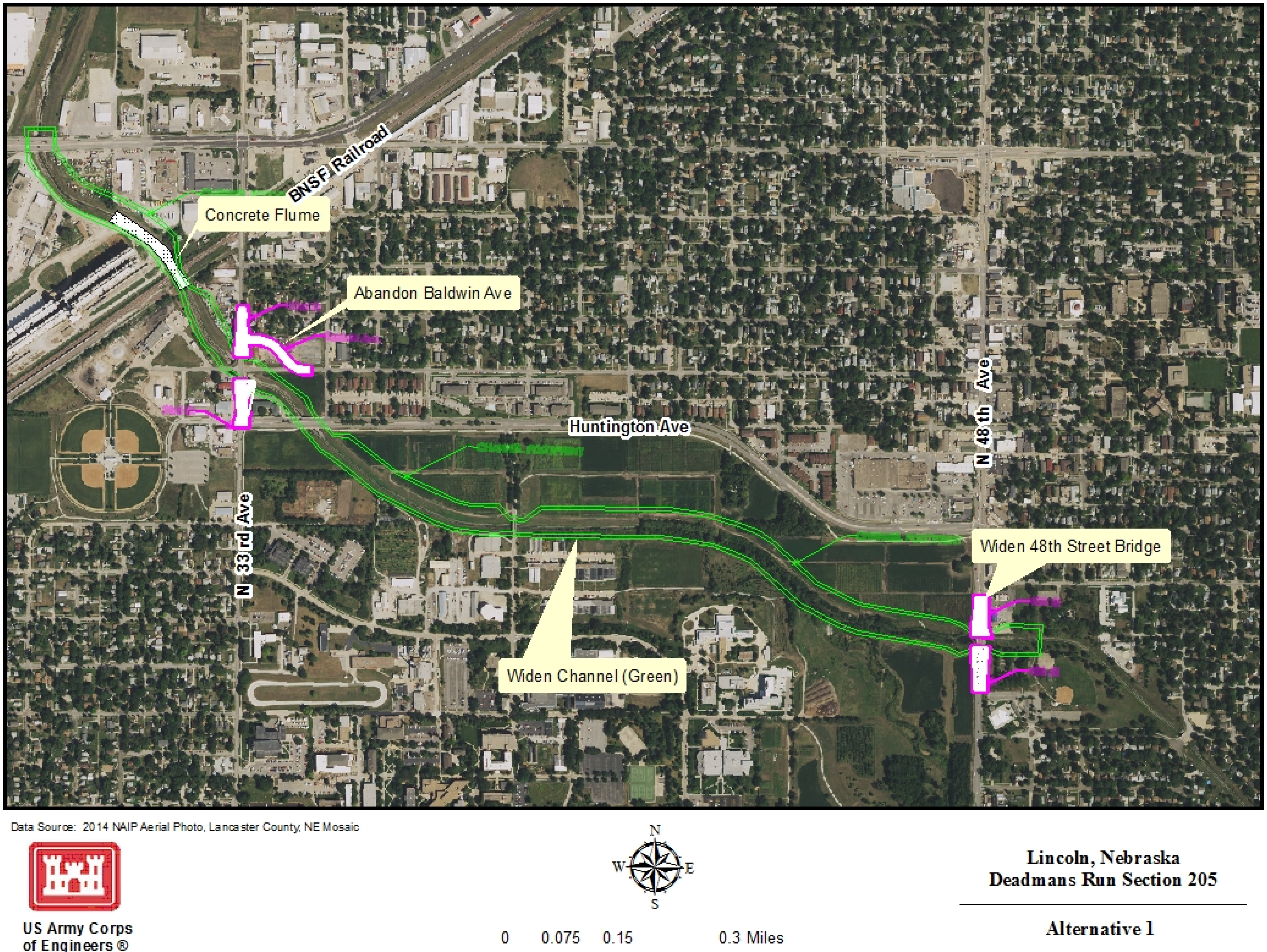
Table 2. Native seed mix for vegetative buffer below floodprone zone. Derived and modified from NDOR, the Guide to Prairie and Wetland Restoration in Eastern Nebraska, and NESCAP. "" indicates species preferable in NESCAP Appendix B.*

Scientific Name	Common Name	Scientific Name	Common Name
Asclepias incarnata	Swamp Milkweed	*Viola spp.*	Violet*
Calamagrostis canadensis	Blue Joint*	*Elymus canadensis*	Canada Wildrye*
Carex vulpinoidea	Fox Sedge*	*Elymus virginicus*	Virginia Wildrye*
Sorghastrum nutans	Indiangrass	*Coreopsis tinctoria*	Plains Coreopsis*
Panicum virgatum	Switchgrass*	*Solidago canadensis*	Canada Goldenrod*
Andropogen gerardii	Big Bluestem	*Helianthus grosseserratus*	Sawtooth Sunflower
Schizachyrium scoparium	Little Bluestem*	*Ratibida pinnata*	Grayhead Coneflower
Bouteloua curtipendula	Sideoats Grama	*Helianthus maximilianii*	Maximillian Sunflower
Desmanthus illinoensis	Illinois Bundleflower	*Pascopyrum smithii*	Western Wheatgrass*
Rudbeckia hirta	Black-eyed Susan	*Elymus trachycaulus*	Slender Wheatgrass*
Vitis riparia	Riverbank Grape*	Urtica dioica	Stinging Nettle*

11. Table 3 lists the proposed tree and shrub species that would replace a portion of the trees removed along Deadmans Run in East Campus (approximately 2 acres). As noted in Item Number 3, hydraulic analysis indicated that it is not feasible to replace the trees below the floodprone zone without inducing overbank flooding during higher frequency events. Due to this constraint, on-site and in-kind mitigation can still be achieved, however, species composition would vary based on wetness tolerance. Species within the Eastern Riparian Forest community that occur in the facultative categories of facultative-wet (FACW), facultative (FAC) and facultative-upland (FACU) were selected for replacement. It may be important to note that ash species (*Fraxinus* spp.) were not selected for proposed plantings as emerald ash borer (*Agrilus planipennis*) has been recently recorded in eastern. As such, the Nebraska Forest Service is currently recommending to refrain from new plantings of ash species.

Table 3. Native trees proposed for replanting in the upland areas of the East Campus area. "" indicates Eastern Riparian Forest- community indicator species.*

Scientific Name	Common Name	Wetness	Mature Height (ft)	Mature Spread (ft)	Shade Tolerant?
Acer saccharinum	Silver Maple*	FACW	65	40	Y
Acer negundo	Box Elder	FAC	30	40	N
Cornus drummondii	Rough-leaf Dogwood (shrub)*	FAC	15	15	Y
Ulmus americana	American Elm*	FAC	60	80	N
Populus deltoides	Cottonwood*	FAC	100	75	N
Gleditsia triancanthos	Honey Locust*	FAC	80	50	N
Celtis occidentalis	Hackberry*	FACU	50	50	Y
Morus rubra	Red Mulberry*	FACU	60	50	Y
Amorpha canescens	Leadplant (shrub)	UPL	4	4	Y
Rhus glabra	Smooth Sumac (Shrub)	UPL	10	10	Y



Enclosure 1. Features of Structural Alternative 1

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Nebraska Field Office
9325 South Alda Road
Wood River, Nebraska 68883

January 9, 2017

FWS-NE: 2016-089

Rebecca Podkowka
Department if the Army
U.S. Army Corps of Engineers, Omaha District
1616 Capital Avenue
Omaha, NE 68102-4901

RE: Section 205 Flood Risk Management Study, Deadmans Run, City of Lincoln, Lancaster County, Nebraska

Dear Ms. Podkowka:

This responds to your November 1, 2016, email requesting comments from the U.S. Fish and Wildlife Service (Service) on the U.S. Army Corps of Engineers (Corps) environmental plan for the subject project. The Service references prior comments on the proposed project in a technical assistance letter dated January 15, 2016 (FWS-NE: 2016-070), and in a December 7, 2016, email from Service biologist Jeff Runge.

The Service supports the planting of native grasses at disturbed portions within the project footprint. The species proposed for planting are appropriate for the local area. The Service also supports the replacement of trees that would be impacted by the proposed project and suggest that area of trees impacted be replaced using a ratio of 3:1. Onsite planting of trees is preferred, but the Service would also support off-site plantings as necessary.

The Service has concerns about the proposed project's effect to hydrology and sediment transport in the downstream segments of Salt Creek and the Platte River. The aforementioned Service letter and email detail the potential effects of the proposed project on downstream resources. The Service is also concerned about the aggregate effects of multiple Corps-sponsored flood control projects in the City of Lincoln. This includes the completed Antelope Valley Project as well as any anticipated future projects. In our January 15, 2016, letter, the Service proposed a watershed level evaluation that would assist the Corps with development of a long-term strategy to abate local flooding while minimizing downstream impacts. The Service requests that the evaluation be conducted to address section 7(a)(1) and 7(a)(2) of the Endangered Species Act and Fish and Wildlife Coordination Act obligations.

We appreciate the opportunity to review and comment on this proposed project. Should you have questions, please contact Mr. Runge at jeff_runge@fws.gov or (308)382-6468, extension 209.

Sincerely,

Eliza Hines
Nebraska Field Supervisor

cc: NGPC; Lincoln, NE (Attn: Michelle Koch)
NGPC; Lincoln, NE (Attn: Carey Grell)

NEBRASKA
GAME PARKS

2200 N. 33rd St. • P.O. Box 30370 • Lincoln, NE 68503-0370 • Phone: 402-471-0641

January 23, 2017

Rebecca Podkowka
U.S. Army Corps of Engineers
1616 Capital Avenue
Omaha, NE 68102

RE: Section 205 Flood Risk Management Study, Deadman's Run, City of Lincoln, Lancaster County

Dear Ms. Podkowka:

This is in response to your November 1, 2016 email requesting comments from Nebraska Game and Parks Commission (NGPC) staff on the proposed environmental plan by the U.S. Army Corps of Engineers with regard to the subject project. The environmental plan outlines measures as proposed to offset impacts to riparian vegetation that will occur as a result of the project. NGPC staff has previously commented on the overall project in emails dated June 11, 2015 and July 30, 2015.

The environmental plan states that a portion of the riparian trees and shrubs that will be impacted by the project will be replaced as described in the plan. The NGPC staff supports the proposed replacement of trees and shrubs where feasible, as described in the plan, as this effort will replace habitat functions that will be lost during project construction. We have reviewed the list of tree and shrub species proposed for replanting in the plan, and we would recommend that honey locust be removed from the list. The honey locust can become quite invasive, and it should not be planted as part of this project. We support the proposed native grass seed mixtures that will be used for riparian vegetation establishment, as described in the plan, as they will improve habitat function along the length of the entire project compared to pre-project condition.

Thanks for the opportunity to review the environmental plan, and for the opportunity to be involved in the review of the overall project. Please let us know if you have any questions regarding these comments at carey.grell@nebraska.gov or 402-471-5423.

Sincerely,

Carey Grell

Carey Grell
Environmental Analyst Supervisor
Planning and Programming Division

ec: Frank Albrecht, NGPC
Jeff Runge, USFWS

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Nebraska Field Office
9325 South Alda Road
Wood River, Nebraska 68883

April 19, 2017

FWS-NE: 2016-089

Rebecca Podkowka
Department of the Army
Corps of Engineers, Omaha District
1616 Capitol Avenue
Omaha, NE 68102-4901

RE: Section 205 Flood Risk Management Study, Deadmans Run, City of Lincoln, Lancaster County, Nebraska

Dear Ms. Podkowka:

This responds to your March 21, 2017, email request for concurrence from the U.S. Fish and Wildlife Service (Service) regarding the U.S. Army Corps of Engineers (Corps) Biological Assessment (BA) for Alternative 1, Deadmans Run, City of Lincoln in Lancaster County, Nebraska. Alternative 1 includes the following flood risk reduction measures: 1) channel and bridge improvements; and 2) channel conveyance improvements within the Deadmans Run watershed. In addition to the BA, the Service received a HEC-RAS output summary on April 17, 2017, where the effects of Alternative 1 on Salt Creek and Platte River hydrology were evaluated.

In the BA, the Corps made the determination of may affect, not likely to adversely affect, for the northern long-eared bat (NLEB)(*Myotis septentrionalis*). As a component of Alternative 1, the Corps has adopted the conservation measure for the NLEB where tree clearing would not occur from June 1 through July 31. The Service concurs with the Corps determination of may affect, not likely to adversely affect, determination for the NLEB as the adopted conservation measures would ensure that impacts to maternity colonies would be avoided.

The Corps also made the determination of may affect, not likely to adversely affect, for the Interior least tern (*Sternula antillarum*) and the piping plover (*Charadrius melodus*). In the Service's review of the HEC-RAS analysis, Alternative 1 is designed to quickly evacuate water from the Deadmans Run watershed which increases peak discharge and stage when compared to existing conditions. The stage difference associated with Alternative 1 attenuates downstream, and the model output identified no differences in stage at Salt Creek approximately six miles downstream from the Deadmans Run confluence. The Service concurs with the Corps' may affect, no likely to adversely affect, determinations as Alternative 1 is not likely to affect lower Platte River hydrology where the species reside.

We appreciate the opportunity to review and comment on this proposed project. Should you have questions, please contact Mr. Jeff Runge within our office at jeff_runge@fws.gov or (308)382-6468, extension 209.

Sincerely,

Eliza Hines
Nebraska Field Supervisor

cc: NGPC; Lincoln, NE (Attn: Frank Albrecht)
NGPC; Lincoln, NE (Attn: Carey Grell)

REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
1616 CAPITOL AVENUE
OMAHA NE 68102-4901

December 21, 2017

CENWO-PM-AC

MEMORANDUM FOR U.S. Fish and Wildlife Service (USFWS), Nebraska Ecological Services, ATTN: Jeff Runge, 9325 South Alda Road, Wood River, Nebraska 68883

AND

MEMORNADUM FOR Nebraska State Game and Fish (NGPC), ATTN: Frank Albrecht, 2200 N 33rd Street, Lincoln, Nebraska 68503

SUBJECT: Deadmans Run, Lincoln, Nebraska Section 205, Tentatively Selected Plan

1. During the Plan Formulation Process, the Product Delivery Team (PDT) discussed an array of structural and non-structural measures. These measures were assessed alone, or in combination with other measures. From those measures, Alternatives were formed. Please refer to the Memorandum dated June 10, 2016 for further information summarizing the proposed components of those Alternatives.

2. Presently, the PDT, in coordination with the non-federal Sponsor (the City Of Lincoln and the Lower Platte South Natural Resources District (NRD)) are selecting Structural Alternative 1 as the Recommended Alternative. This alternative includes the following major components:

- Channel widening from Cornhusker Ave to 48th Street, within Lower Platte South NRD easement
- Installation of a concert flume beneath the BNSF Rail Spur Bridge

Typical cross sections of the existing channel top-width are approximately 120 feet. Utilizing the typical cross section, channel widening would generally enlarge the width of Deadmans Run to an approximate top-width of 177 feet from Cornhusker Highway to Huntington Avenue and from Huntington Avenue to 48th Street (see Figure 1). Within the channel widening cross section, a native seed buffer approximately 25 feet would be utilized for native vegetation plantings directly adjacent to the channel. This would equate to approximately 5 acres designated along the channel for native seeding. Additionally, areas designated with a turf reinforced mat will also host native grass species (approximately 19 acres of the new channel footprint).

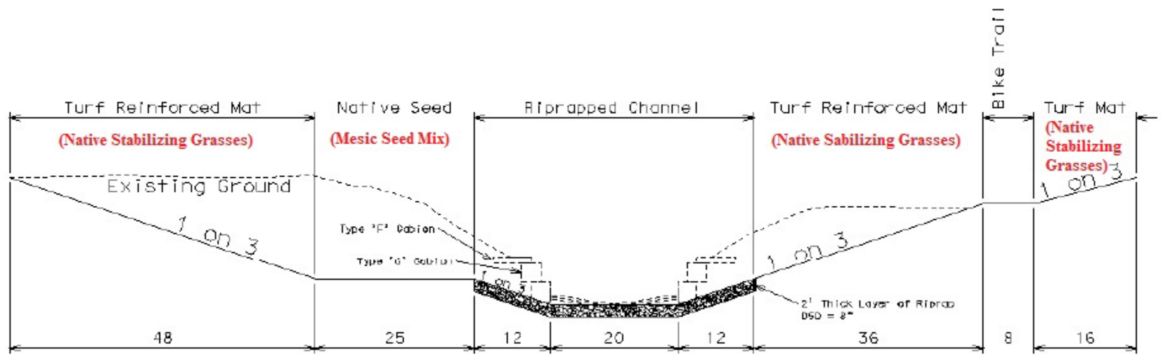


Figure 1. Typical cross section of proposed channel widening throughout Deadmans Run

Included in the 30-acre impacted vegetation is approximately 2.34 acres of mature trees classified as an Eastern Riparian Forest community on the south, right descending bank of Deadmans Run near the East Campus area. As shown in the typical cross section for East Campus tree (see Figure 2) plantings would be replaced in the upland right-of-way of the channel footprint throughout East Campus on the south bank. Replacing trees along this area would result in approximately 1 acre of tree plantings, which was calculated by taking the length of the stream impacted, approximately 2,600 feet by the 16 feet width of the proposed tree plantings. These trees would be placed in the upland zone of the new channel footprint and hydraulic modeling indicated that these tree plantings would not negatively impact conveyance.

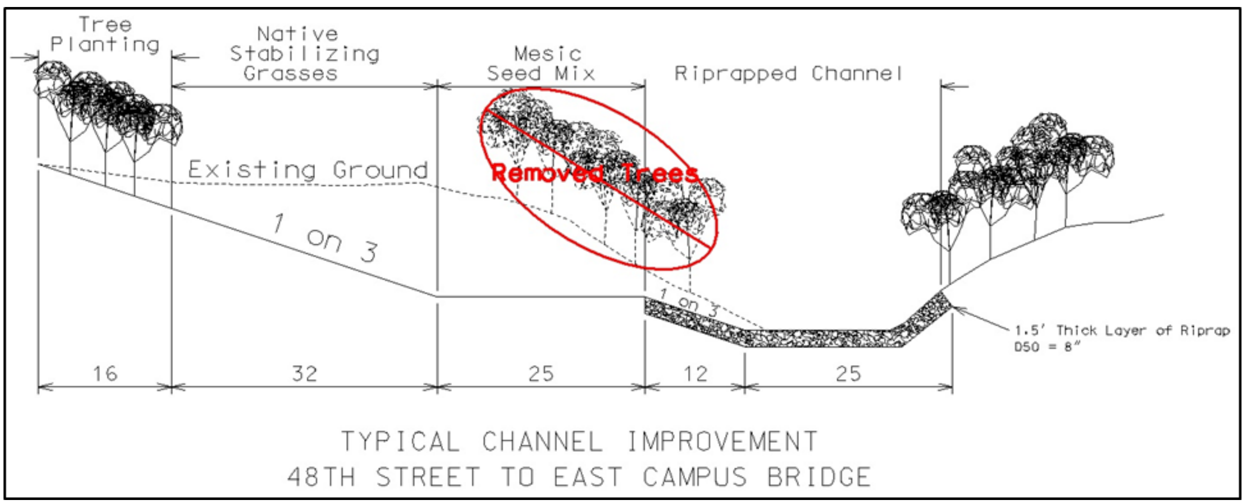


Figure 2. Typical cross section of Deadmans Run through East Campus.

Installation of a concrete flume would be constructed beneath both BNSF railroad structures. This flume would increase the hydraulic efficiency, allowing the channel to pass the flows from the one percent ACE event while retaining the existing railroad structures in place. To prevent erosion around the concrete flume and gradually contract and expand flows entering and exiting the flume, the flume will be gradually widened up and downstream from the bridges until the width of the flume matches the width of the proposed channel. Figure 3 depicts a similar flume designed and constructed by the Corps in the 1990's on the Big Papillion Creek in Omaha, Nebraska.

Figure 3. Example of a concrete flume beneath a railroad bridge in Omaha, Nebraska (Southeast of 84th Street and I-80)

3. In previous coordination with USFWS and NGPC, other measures were discussed in Alternative 1, these include bridge widening at 48th Street Bridge and 38th Street Bridge as well as replacement of the 33rd Street Bridge and subsequent abandonment of Baldwin Avenue. Additionally, an off-channel, 10-acre detention basin on the West Tributary to collect up to 90 acre-feet of flood flows from Deadmans Run during a four percent ACE event before slowly releasing those flows back into the West Tributary was also discussed (see Figure 4). These measures have been removed from the Section 205 Feasibility Study Federal project and will be done as part of a City project. Meetings between the Lower Platte South NRD, City of Lincoln, Corps Northwestern Division, Corps Headquarters and the Corps Omaha District PDT led to the development of a revised selected plan. This plan was developed due to the City of Lincoln and Lower Platte South NRD already having identified the 48th and 38th Street Bridges for replacement due to their age and condition and having started discussions of replacing the 33rd street culvert with a bridge to accommodate the future Railroad Transportation Safety District (RTSD) project. Additionally, the detention basin was removed from the Federal project because the City of Lincoln and Lower Platte South NRD are planning to begin the bridge replacement projects in the near future. When the larger structures are put in place, additional channel flow will make it further downstream in the project area, so the detention basin is needed to reduce the impacts of this additional conveyance.

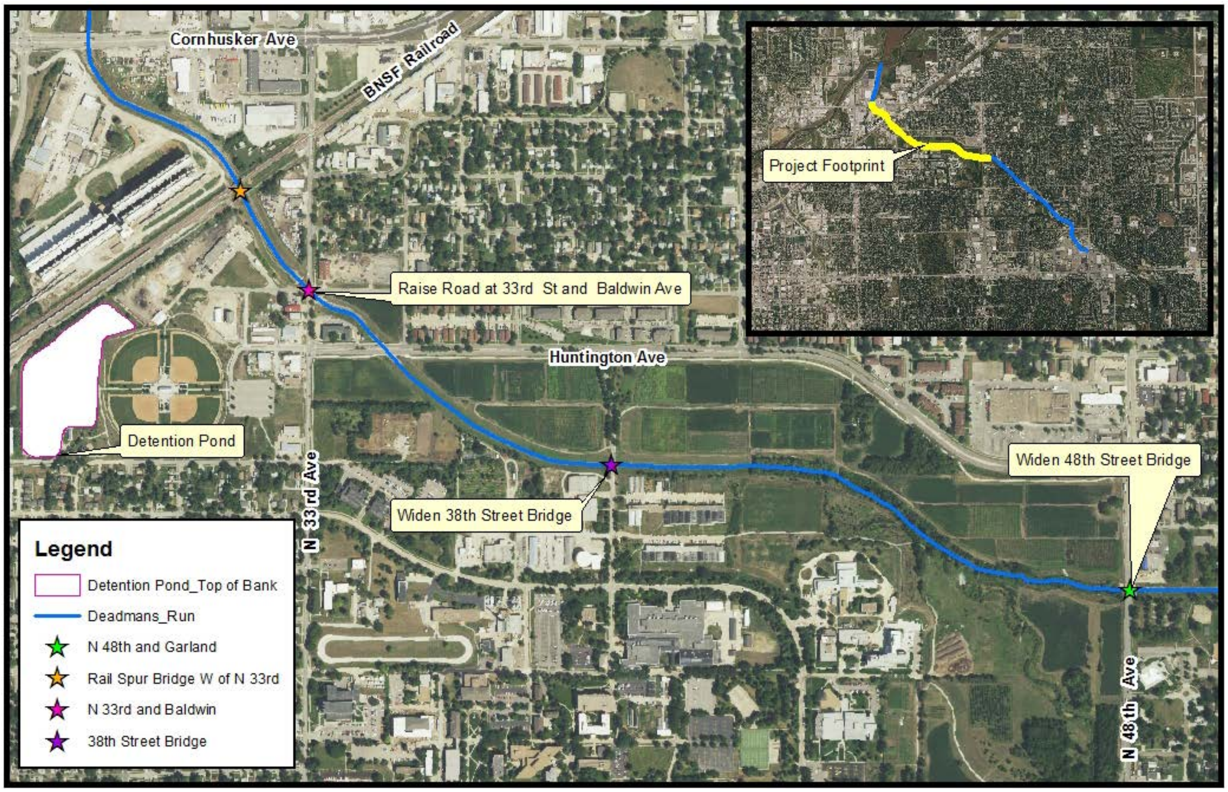


Figure 4. Components of the City project

4. Tentatively, the Corps is anticipating releasing the Draft Feasibility Report with the integrated Environmental Assessment for this Section 205 Feasibility Study for agency and public review at the end of February 2018.

From:	Albrecht, Frank
To:	Podkowka, Rebecca L CIV USARMY CENWO (US); Runge, Jeff; "Eliza_hines@fws.gov"; Grell, Carey
Cc:	Bohlken, Jeffrey C CIV USARMY CENWO (US)
Subject:	[EXTERNAL] RE: Deadmans Run Section 205 Project Update (UNCLASSIFIED)
Date:	Wednesday, January 17, 2018 10:26:39 AM

Rebecca,

NGPC staff members have reviewed the information you recently sent regarding the Deadmans Run Section 205 project. It is noted that the Corps, City of Lincoln and the LPSNRD have selected Alternative 1 as the recommended alternative which includes channel widening and the installation of a concrete flume. It was also outlined in the plan that the 10-acre detention basin has been removed from the 205 Study and will be done as part of a City project.

We have no objections to the Study and selected alternative as proposed, including the native grass buffers and tree mitigation. If changes are made to the plan, please let us know.

Thank you for the opportunity to review the Study. If you need additional information, feel free to contact me.

Frank

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-----Original Message-----
From: Podkowka, Rebecca L CIV USARMY CENWO (US) [mailto:Rebecca.L.Podkowka@usace.army.mil]
Sent: Thursday, December 21, 2017 10:00 AM
To: Runge, Jeff <jeff_runge@fws.gov>; 'Eliza_hines@fws.gov' <Eliza_hines@fws.gov>; Albrecht, Frank <frank.albrecht@nebraska.gov>; Grell, Carey <carey.grell@nebraska.gov>
Cc: Bohlken, Jeffrey C CIV USARMY CENWO (US) <Jeffrey.C.Bohlken@usace.army.mil>
Subject: Deadmans Run Section 205 Project Update (UNCLASSIFIED)

CLASSIFICATION: UNCLASSIFIED

Good Morning,

I wanted to touch base with USFWS and NGPC regarding the Deadmans Run Section 205 Feasibility Study as it has been several months since I last coordinated with your agencies. The Corps presented Alternative 1, as indicated in previous coordination, as the tentatively selected plan to reduce flood risks along Deadmans Run within the Study Area. The attachment provides details regarding the updated selected plan. Please review this and let me know if you have any questions or concerns with the proposed, updated preferred alternative.

Merry Christmas and Happy New Year!

Rebecca Podkowka
Environmental Resource Specialist
U.S. Army Corps of Engineers

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CLASSIFICATION: UNCLASSIFIED

U.S. Army Corps of Engineers
Omaha District

Section 205: Deadmans Run
Monitoring and Adaptive Management Plan
Lincoln, Nebraska
August 2018

Deadmans Run near East Campus, University of Nebraska-Lincoln

Prepared by:
U.S. Army Corps of Engineers, Omaha District
Environmental Resources and Missouri River Recovery Program Plan Formulation Section
Planning Branch, CENWO-PM-AC
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TABLES

No table of figures entries found.

APPENDIX

Attachment 1: Prescribed Seed Mix and Calculated FQAs

1 Introduction

The purpose of the Section 205 project is to reduce the flood risk of Deadmans Run within the project area in Lincoln, Nebraska. The need stems from the history of flooding which includes problems such as historical and future potential life loss, property damage, emergency response costs and transportation network disruptions economic.

The federal project will include widening the channel of Deadmans Run to an approximate top-width of 177 feet from Cornhusker Highway to just east of 48th Street, replacement of the existing concrete mat and gabions with riprap sized to mitigate streambed erosion and a hydraulic concrete flume would be placed beneath the BNSF bridges. Within the widened channel footprint, approximately 2.34 acres of mature trees would be removed from the south bank of the East Campus area, and one acre of trees would be planted in the upland zone of the new channel footprint within the same area. Furthermore, a native vegetation buffer approximately 25 feet wide would be established directly adjacent to the channel. This would equate to approximately five acres designated along the channel for native seeding. Additionally, areas designated with a turf reinforced mat will be planted with native grass species. Once implemented, this project would provide flood risk reduction at the one percent annual exceedence level to 487 structures within the 100-year floodplain. This would result in an expected reduction in annual damages of $1,425,990 and an estimated net annual benefit to the nation of $895,610 and a benefit to cost ratio of approximately 2.69:1.

After initial construction activities are complete, adaptive management (AM) and monitoring are necessary to address uncertainties of the integrated environmental features and ensure project success. Success criteria were defined based on specific hypotheses, which were formulated based on the goals of the project. Monitoring activities were identified to determine whether the project met these success criteria and AM actions were designed to redirect the restoration effort in a positive way in the event that the restored areas do not perform as predicted.

The Deadmans Run Feasibility Study and integrated Environmental Assessment can be found here: http://www.nwo.usace.army.mil/Missions/Civil-Works/Planning/Project-Reports/.

1.1 Integrated Environmental Features

As discussed in Section 8 of Appendix A: Section III and Section 5.1.4 of the main Feasibility Report, as defined in ER-1105-200-1 and in accordance with 40 CFR 1580.20, protection of the Nation's environment from adverse effects of each alternative plan, in missions other than ecosystem restoration, such as the flood risk reduction Feasibility Study at Deadmans Run, is to be provided by mitigation of those effects. As stated in Appendix C of ER-1105-200-1, consideration to assess the extent to which beneficial ecosystem management features of alternative plans offset adverse impacts (losses) before consideration is given to separable mitigation features was conducted. Removal of the north bank of trees through the East Campus portion of the project area, which is necessary to Section 205 Flood Risk Reduction project, would require mitigation to account for impacts to the environment. The integrated mitigation features include replacing approximately 1 acre of trees in the upland zone of the new, widened channel footprint (Figure 1).

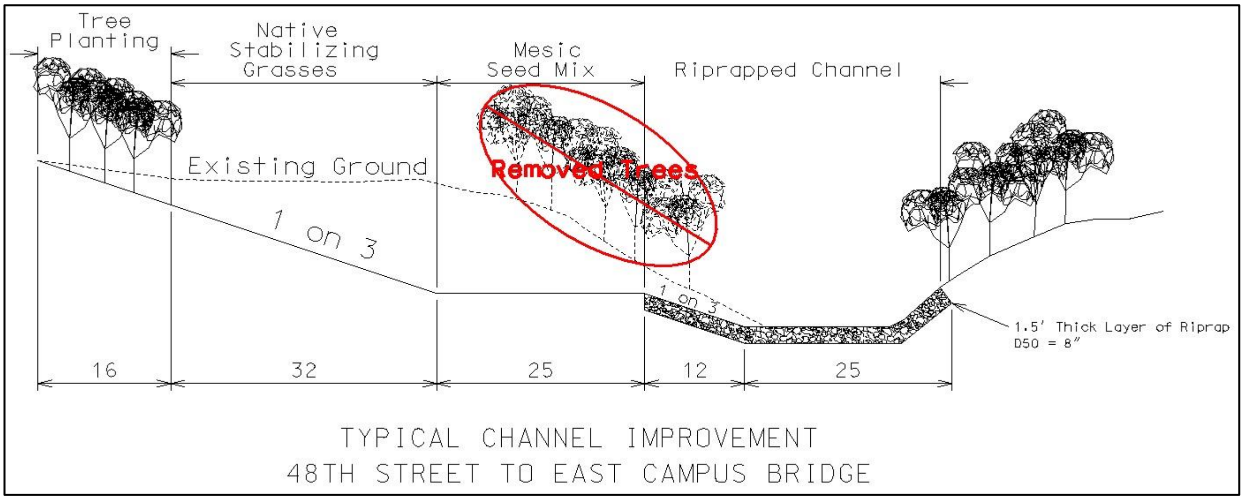

Figure 1. Typical cross section through East Campus, note the tree plantings on the upper banks of the channel footprint on the south bank, native stabilizing grasses placed on the reinforced turf mat, the mesic seed mix immediately adjacent to the channel and the undisturbed trees on the north bank

Species within the eastern riparian forest community that occur in facultative (FAC), facultative-upland (FACU) and upland (UPL) were selected for replacement of impacted trees. These species are recognized as occurring in both wetlands and uplands to varying degrees based on the hydrology of the site. No obligate (OBL) or facultative-wet (FACW) species were selected as water would not inundate these upland slopes on a frequent enough basis, nor would hydric soils be present, to support such hydrophytic communities. Ash species (*Fraxinus* spp.) were not selected for proposed plantings as emerald ash borer (*Agrilus planipennis*), an invasive insect detrimental to ash trees has been recently recorded in eastern Nebraska and is anticipated to continue to spread. As such, the Nebraska Forest Service does not recommend planting ash species. The species listed in Table 1 below are generally rapid-growing with a moderate to long life span.

Table 1. Eastern Riparian Forest community tree and shrub species selected for planting in the upper extent of the south bank. These species were cross-referenced with Appendix B-1 and B-2 of NESCAP.

Scientific Name	Common Name	C-Value	Wetness	Mature Height (ft)	Mature Spread	Shade Tolerant?
Acer saccharinum	Silver Maple*	4	FACW	65	40	Y
Acer negundo	Box Elder	2	FAC	30	40	N
Cornus drummondii	Rough-leaf Dogwood (shrub)*	3	FAC	15	15	Y
Ulmus americana	American Elm*	3	FAC	60	80	N
Populus deltoides	Cottonwood*	3	FAC	100	75	N
Celtis occidentalis	Hackberry*	4	FACU	50	50	Y
Amorpha canescens	Leadplant (shrub)	6	UPL	4	4	Y
Rhus glabra	Smooth Sumac (Shrub)	2	UPL	10	10	Y

*Indicates NESCAP diagnostic plant species

In addition to the mitigation at East Campus, the remainder of Deadmans Run within the project footprint would also feature ecosystem enhancement opportunities through establishment of vegetation of greater floristic quality than what currently exists. A typical cross section (Figure 2) for enhancement along Deadmans Run represents conceptual plantings from the BNSF Railroad upstream to 52nd Street with the exception of the East Campus area which will include tree plantings as previously discussed.

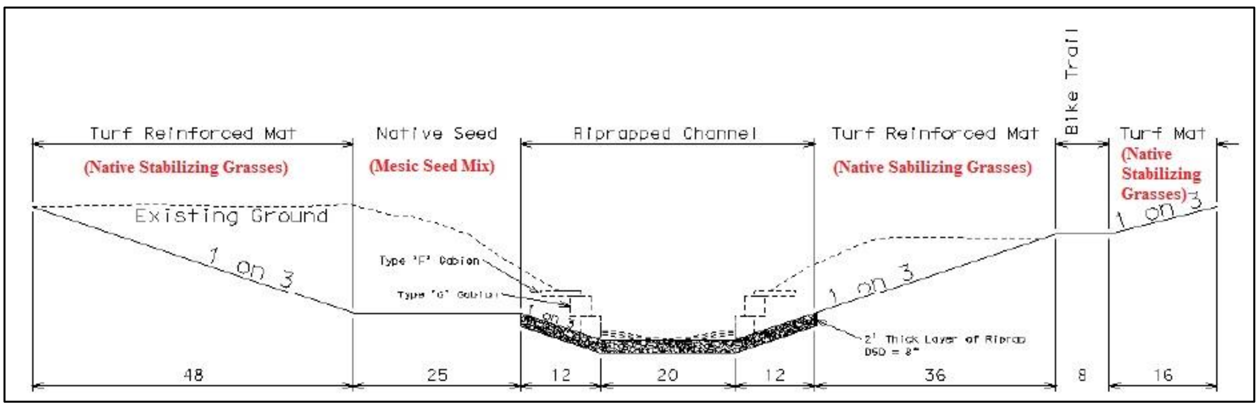

Figure 2. Typical cross section of mitigating actions along the impacted channel footprint of Deadmans Run, note the native stabilizing grasses placed on the reinforced turf mat and the mesic seed mix immediately adjacent to the channel.

A riparian vegetation composition above the floodprone area is anticipated to improve with a native seed mix on the turf mat areas. On both banks immediately adjacent to proposed tree plantings, native stabilizing grasses would be placed on top of the soil on the reinforced turf mats (see Table 2). This would create approximately 17.5 acres along the project area of native grasses that would contribute to riparian corridor. The *Nebraska Department of Roads* (NDOR) *Roadside Vegetation Establishment and Management Handbook* (2014) and the *Guide to Prairie and Wetland Restoration in Eastern Nebraska* (Steinauer et al., 2003) were consulted for seed mix recommendations. These native grasses would assist in bank stabilization and provide habitat.

Table 2. Stabilizing grass mix for upland reinforced turf mats. Derived and modified from NDOR

Scientific Name	Common Name	C-Value
Lolium perenne	Perennial Ryegrass	0
Elymus trachycaulus	Slender Wheatgrass*	5
Pascopyrum smithii	Western Wheatgrass*	3
Schizachyrium scoparium	Little Bluestem*	4
Buckloe dactyloides	Buffalograss	2
Bouteloua curtipendula	Sideoats Grama	5
Sporobolus cryptandrus	Sand Dropseed*	2
Elymus canadensis	Canada Wildrye*	5

*Indicates NESCAP diagnostic plant species

A modified wet-mesic prairie seed mix would be utilized for the area which would increase the percent concurrence of the identified diagnostic species in NESCAP. Within the 25 foot cross section, the topography would be undulated to capture varying depths of saturation and would include pools of water in lower areas. This would add approximately 5 acres of a modified wet-mesic prairie community which contributes to the continuity of the riparian corridor along Deadmans Run. Species for the buffer within the flood prone zone were chosen using the NDOR's guidebook (2014) and the *Guide to Prairie and Wetland Restoration in Eastern Nebraska* (Steinauer et al., 2003) as well as cross-referencing preferable plant species with Appendix B-1 and B-2 of NESCAP (Table 3).

Table 3. Native seed mix for vegetative buffer below floodprone zone. Derived and modified from NDOR, the Guide to Prairie and Wetland Restoration in Eastern Nebraska, and NESCAP

Scientific Name	Common Name	C-Value	Scientific Name	Common Name	C-Value
Asclepias incarnata	Swamp Milkweed	4	*Viola spp.*	Violet*	5
Calamagrostis canadensis	Blue Joint*	6	*Elymus canadensis*	Canada Wildrye*	5
Carex vulpinoidea	Fox Sedge*	4	*Elymus virginicus*	Virginia Wildrye*	4
Sorghastrum nutans	Indiangrass	5	*Coreopsis tinctoria*	Plains Coreopsis*	1
Panicum virgatum	Switchgrass*	4	*Solidago canadensis*	Canada Goldenrod*	2
Andropogen gerardii	Big Bluestem	5	*Helianthus grosseserratus*	Sawtooth Sunflower	4
Schizachyrium scoparium	Little Bluestem*	4	*Ratibida pinnata*	Grayhead Coneflower	4
Bouteloua curtipendula	Sideoats Grama	5	*Helianthus maximilianii*	Maximillian Sunflower	4
Desmanthus illinoensis	Illinois Bundleflower	5	*Pascopyrum smithii*	Western Wheatgrass*	3
Rudbeckia hirta	Black-eyed Susan	4	*Elymus trachycaulus*	Slender Wheatgrass*	5
Vitis riparia	Riverbank Grape*	3	Urtica dioica	Stinging Nettle*	1

*Indicates NESCAP diagnostic plant species

As noted in the technical analysis (Appendix A: Section III), these integrated mitigation features will result in a no net impact to the environment.

2 Goals

The goal of monitoring is to assess the performance of the integrated environmental mitigation features described above in Section 1.1 and to determine if the constructed replacement habitat is appropriately establishing based on defined success criteria within a given timeframe. The overall goal of the integrated environmental features is to ensure a no net negative impact or habitat loss to the habitat of the project area from construction of the flood risk reduction features.

3 Objectives

The overall project goal is achieved by meeting the objectives. The metrics of the objectives used to measure progress and their success criteria are listed below.

- Adequate vegetation percent coverage (≥ 75% of total mitigation sites should be vegetated)
- Adjusted Floristic Quality Index ([FQI]; ≥ 4.0)
- Invasive and undesirable vegetation percent coverage (≤ 25%)
- Native vegetation presence (≥ 60% recorded species are native)
- Tree/shrub stem density (≥ 65%)

4 Monitoring

In accordance with ER-1105-2-100, monitoring is appropriate for all mitigation actions to insure those actions have achieved the objective. The level of monitoring should be consistent with the magnitude of the project and the degree of risk and uncertainty with the probable success of the mitigation. Following the first growing season after project construction, monitoring of the tree plantings and native grasses/mesic plantings would occur annually during the growing season (generally May 1 through October 31, optimally June 15 through August 1) and would be the responsibility of the project sponsor. Monitoring would occur not less than five subsequent years following the construction of the project on an annual basis. An evaluation of the condition of the constructed habitat features (notated as 25-foot mesic seed vegetative buffer, native stabilizing grasses and tree/shrub plantings) and subsequent Monitoring Reports would include at a minimum:

- General site condition observations
- A brief summary of climate conditions for the growing season
- Species composition (identified to species level)
- Percent vegetative cover of each species

- Identify observed species with Coefficient of Conservation (C) value in accordance with the Nebraska Natural Heritage Program (2006) or the Universal Floristic Quality Assessment (FQA) Calculator (http://universalFQA.org)
- Photographs from established photo stations
- Identification of factors, if any, limiting success of constructed features
- Stem count (tree/shrub plantings only)
- A list of all invasive, non-native and undesirable vegetation present and growing
- Discussion of plant loss
- Discussion of survivability of seedings and plantings
- Estimate of bare ground in planted areas
- Soil profile descriptions
- Species diversity (Shannon-Wiener index value 'H)
- Species diversity (Shannon-Wiener index value E)

Monitoring reports will be due to the U.S. Army Corps of Engineers ([Corps]; 1616 Capitol Avenue, ATTN: CENWO-PM-AC, Omaha, NE 68102) by December 31 in any given year for at least five years after the initial growing season to determine the success of the constructed mitigation features. The local sponsor shall be responsible for monitoring the establishment of the mitigation areas and submitting annual mitigation monitoring reports to the Corps. Following the first year after planting, the upland vegetation mitigation site should be monitored once annually during the growing season for five years to document vegetation establishment, progress and to identify if any adaptive management measures are warranted. At that time success will be determined using the criteria listed above in Section 3.

If, after five years of monitoring and adaptively managing the site, the areas do not meet the above success criteria, more significant adaptive management measures may need to be implemented. It can often take three years for native species to begin to dominate. The site would be considered successful if after five years the sites are dominated by native, non-invasive species and with adequate vegetation establishment and stem density as measured by the performance metrics listed above in Section 3. No differentiation to distinguish between flora that are endemic to the site and native species that were planted as part of the mitigation process needs to occur.

4.1 Vegetation Coverage and Presence

Sample points along a transect can capture community composition and coverage and may be collected as relative percentages, or by utilizing the Daubenmire Method cover class categories. In addition to Daubenmire cover classes, total vegetation cover, regardless of species type, relative to the amount of space that contained leaf litter, dead vegetation, bare soils or any other cover should also be recorded. Helpful guidance for sampling methods may also be found in the *1987 Corps of Engineers Wetland Delineation Manual*. Typical plot sizes for vegetation observations of multi-layered communities is usually accomplished utilizing a series of plots for each stratum. An approximate 5-foot radius is used for the herbaceous layer, a 15-foot radius for saplings/shrubs and a 30-foot radius for trees and vines.

Relative presence and percent coverage were determined for the existing conditions within the construction footprint. Currently, the homogenized average native species coverage is 51%, meaning, on average 51% of the project area is covered by native species (Figure 3). As such, the target performance metric for the constructed habitats require that invasive species coverage cannot exceed 25% (or native species are ≥ 75%). The homogenized average invasive species presence for the existing conditions of the construction footprint is 65%, meaning, on average, 65% of the observed species were native (Figure 4). As such, the target performance metric for the constructed habitat types will be ≥60% recorded species are native (or invasive species presence cannot exceed 40%).

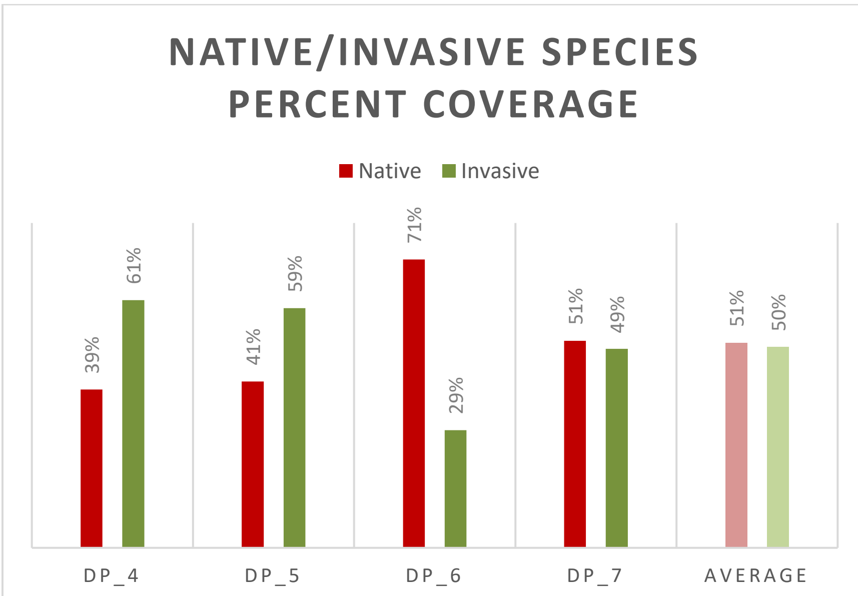

Figure 3. Native and invasive species percent coverage of pre-project conditions of DP4, DP5, DP6 and DP7 within the construction footprint

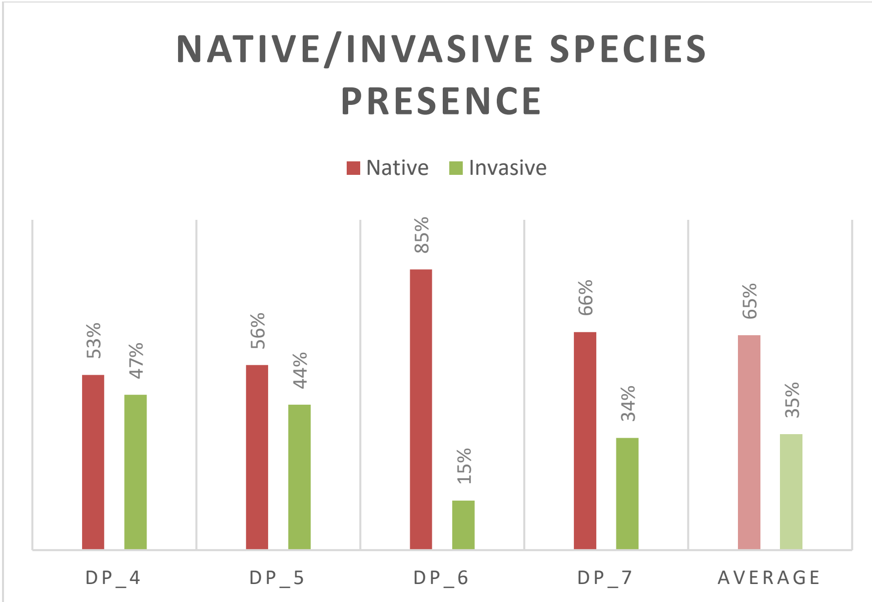

Figure 4. Native and invasive species presence of pre-project conditions of DP4, DP5, DP6 and DP7 within the construction footprint

4.2 Floristic Quality Assessment

FQAs are measurements of a natural area's ecological integrity, based on their plant species composition. FQA's are based on C values assigned to the individual plant species based on their tolerance to degradation and the degree to which the species is faithful to natural remnant habitats (Swink and Wilhelm, 1994). C values range from 0 to 10, with the most highly conservative species, >7, that are typically found associated under long, unchanged conditions similar to those under which such species would evolve. The least conservative species, <3, are adapted to extreme anthropogenic or natural degradation of kinds that eliminate both high and mid conservatives.

FQA metrics generally reflect the degree to which the plot or site approximates the vegetative composition of a high quality natural area. Falling values would suggest that quality and biodiversity would be declining (Freyman et al., 2015). The C values for individual species in this region may be found using the Nebraska Natural Heritage Program (2006) plant list or Rolfsmeier and Steinauer (2003) updated list in 2013 (https://universalfqa.org). The C values are used to calculate metrics such as mean C, Floristic Quality Index (FQI) and Adjusted FQI. Mean C is the average C value for all species within the assessment area and FQI weights the mean C by species richness. The mean C and FQI are calculated with all non-native species omitted or assigned a C value of 0. The Adjusted FQI was developed to reduce sensitivity to species richness and include the contribution of nonnative species when assessing sites with high levels of human disturbance. As Deadmans Run is a highly and continuously disturbed site, the performance metric will take that into account. The average homogenized FQI for existing conditions within the construction footprint is currently 3.75 (Figure 5) with a mean C value of

0.97 and an Adjusted FQI of 1.45 (Figure 6). The target performance metric for the constructed habitat will have a target of an Adjusted FQI of ≥ 4.0.

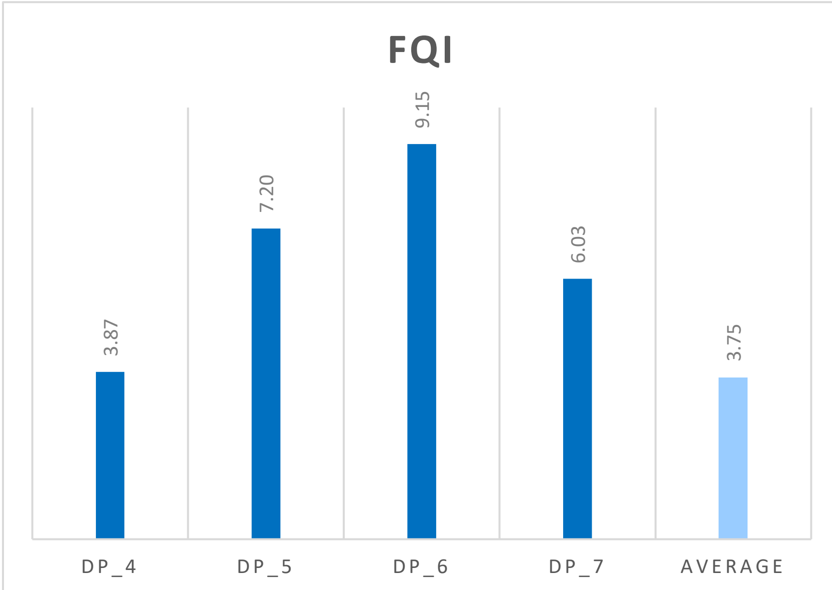

Figure 5. FQI of pre-project conditions of DP4, DP5, DP6 and DP7 within the construction footprint

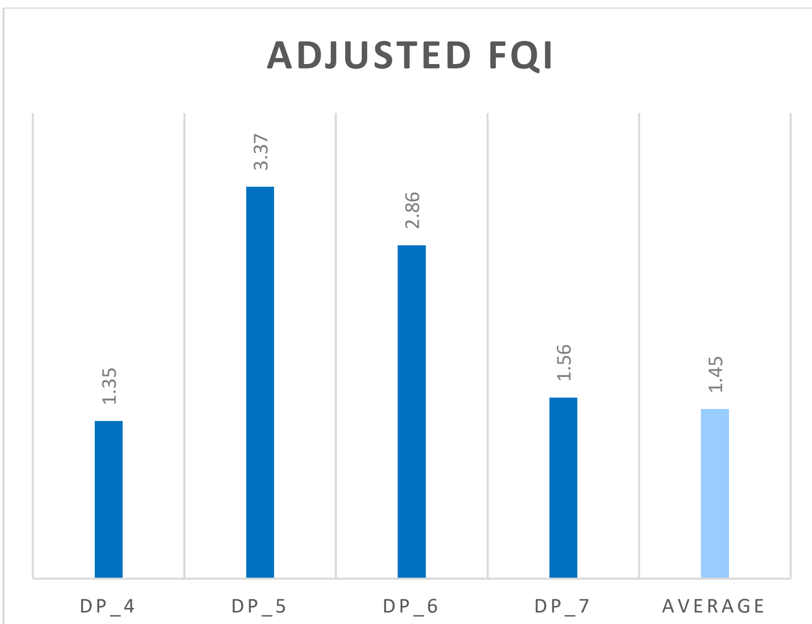

Figure 6. Adjusted FQI of pre-project conditions of DP4, DP5, DP6 and DP7 within the construction footprint

4.3 Sapling Measurements

Performance metrics for saplings were based off a Natural Resource Conservation Services (NRCS) Technical Note (Ogle et al., 2012) which recommend a 65% or more density planting plan when the objective is for habitat and wildlife. Density is simply the number of trees and shrubs per unit area. For plantings of the tree saplings and shrubs, it is recommended that a 15 foot radius, as suggest in Section 4.1 above, be used as the standardized sampling plot to derive the overall density of the constructed habitat. Therefore, the target performance metric of the tree and shrub plantings within the one acre of area in the upland zone of constructed flood risk reduction project will require a 65% density.

4.4 Shannon-Weiner Index

Shannon-Weiner diversity index is a mathematical measure of species diversity in a community. Diversity indices provide more information about community composition than just species richness (e.g. the total number of species present). The Shannon-Weiner index takes both the richness and the relative abundance of each of these species in a community into account to determine the uncertainty that an individual picked at random would be of a given species. $H' = -\Sigma (p_i)(\ln p_i)$, where pi = proportion of individuals of species **i** in community (= **ni** /**N**; where **n** is the number of individuals of a given species and **N** is the total number of individuals in a sample) and $E = H/H_{max}$ where $H_{max} = \ln S$ (S= number of species or species richness). E assumes a value between 0 and 1, with 1 being complete eveness. As Deadmans Run is a highly and continuously disturbed site, this measurement is only calculated to indicate the condition of diversity and will not be used as a performance metric. The average homogenized H' for existing conditions within the project footprint is 0.86 (Figure 7) and the average homogenized E for existing conditions within the project footprint is 0.32 (Figure 8). It is anticipated that these values for the constructed habitat will improve from current conditions.

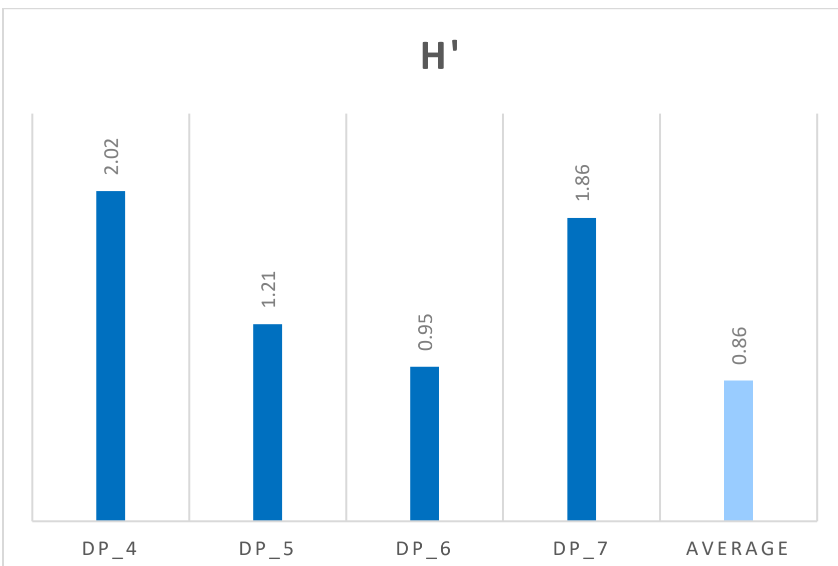

Figure 7. H' of pre-project conditions of DP4, DP5, DP6 and DP7 within the construction footprint

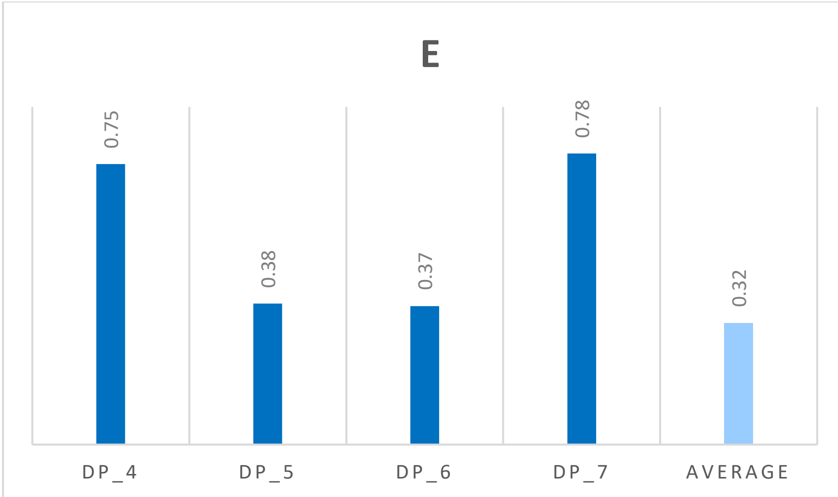

Figure 8. E of pre-project conditions of DP4, DP5, DP6 and DP7 within the construction footprint

5 Maintenance Activities

The sponsor would be responsible for operation, maintenance, repair, replacement and rehabilitation (OMRR&R) of these mitigation features in perpetuity for the life of the project. There shall be no filling, excavating, mining or drilling; no removal of natural materials; no dumping of materials; and, no alteration of the topography in any manner except as shall be necessary to maintain the constructed habitat. There shall be no draining, dredging, damming or impounding; no changing the grade or elevation, impairing the flow or circulation of waters, reducing the reach of waters; and, no other discharge or activity requiring a permit under applicable clean water or water pollution control laws and regulations, as amended. There shall be no clearing, burning, cutting or destroying of trees or vegetation, except for undesirable, invasive species; brush-cutting may be permitted on the native turf mats and the mesic seed mix areas only to prevent the establishment of woody vegetation, as woody vegetation within these areas may hinder the efficacy of the flood risk reduction project. A brush cutter may be used on the native turf mats and mesic seed mix habitats, but should leave the vegetation within these habitat types at a minimum of six inches tall. Operation and maintenance costs associated with maintaining the environmental sites were assumed to be $11,538/year which would include removal of woody vegetation from the native stabilizing grass area and mesic seed mix area as well as assumed control of invasive species. These costs will be further refined in the Design and Implementation phase.

There shall be no planting or introduction of non-native or exotic species of trees or vegetation. No agricultural, industrial, or commercial activity shall be undertaken or allowed which would interfere with or damage the mitigation habitat types. Furthermore, no placement of utilities or related facilities shall be constructed. There shall be no construction, erection, or placement of buildings, billboards, or any other structures, nor any additions to existing structures. There shall be no construction of new roads, trails or walkways within the constructed habitat areas.

6 Adaptive Management

As noted in Section 4 above, it is a Corps requirement that monitoring occur for mitigation to assess performance and determine whether AM is need to attain project objectives. Monitoring would be used by the Corps- Omaha District, in consultation with the sponsor, federal and state agencies, and the Corps' Division office to determine any changes that may be needed. Changes would need concurrence from the sponsor and would be cost shared with the sponsor. Monitoring and adaptive management are not the same as inspections or operation and maintenance, for which the sponsor would be responsible even during the monitoring period.

Monitoring sampling would occur annually for up to 5 years, and would include vegetation monitoring. Monitoring is estimated to cost $36,825 for the monitoring period ($7,365 per year). This is part of the total project cost shared between the Corps and the sponsor. Implementation responsibilities for the monitoring plan will be identified in the Project Partnership Agreement.

The adaptive management (contingency) plan assumes potential minor project adjustments, in accordance with the moderate scale of the project. The nature and cost of potential adjustment measures assumes replanting failed vegetation, approximately 1/4 of the total ($128,325), at a cost of $32,081. These costs will be further refined in the Design and Implementation phase.

These adjustment measures would be dependent on appropriations from Congress for the Section 205 Program and on the rules applicable at that time regarding funding of adjustment measures. Corps project closeout would occur 4 to 5 years after completion of construction, under the expected scenario that monitoring indicates that ecological success had been reasonably achieved.

7 Literature Cited

Freyman, W.A., L.A. Masters, S. Packard. 2015. The Universal Floristic Quality Assessment Calculator: An Online Tool for Ecological Assessment and Monitoring. Methods in Ecology and Evolution. 7(11):1424. http://onlinelibrary.wiley.com/doi/10.1111/2041-210X.12491/full. Accessed December 28, 2017.

Ogle, D., L. St. John, C. Strange and D. Tilley. 2012. Tree and Shrub Planting, Care and Management. TN Plant Materials No. 43. USDA-NRCS.

Rolfsmeier, S. and G. Steinauer. 2003. Vascular Plants of Nebraska (Version 1- July 2003: Updated 2013). Nebraska Natural Heritage Program, Nebraska Game and Parks Commission. Lincoln, Nebraska, 57 pp.

Swink , F. and G. Wilhelm. 1994. Plants of the Chicago Region, 4th Edition. Indiana Academy of Science, Indianapolis, Indiana.

USACE (U.S. Army Corps of Engineers). 2010. Regional supplement to the Corps of Engineers wetland delineation manual: Midwest region (Version 2.0). ERDC/EL TR-10-16.

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DEADMANS RUN
LINCOLN, NEBRASKA

SECTION 205 – FLOOD RISK MANAGEMENT

FEASIBILITY REPORT

APPENDICES VOLUME II:
APPENDICES B - G

AUGUST 2018

US Army Corps of Engineers ®
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DEADMANS RUN
LINCOLN, NEBRASKA

SECTION 205 – FLOOD RISK MANAGEMENT

FEASIBILITY REPORT

APPENDIX B
CIVIL ENGINEERING

AUGUST 2018

DEADMANS RUN – LINCOLN, NE
SECTION 205 - FEASIBILITY STUDY

APPENDIX B – CIVIL ENGINEERING

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DEADMANS RUN – LINCOLN, NEBRASKA
SECTION 205 – FEASIBILITY STUDY

APPENDIX B – CIVIL ENGINEERING

1. INTRODUCTION

1.1 Purpose and Scope of Appendix B. The purpose of this appendix is to present the Civil Engineering investigations/studies conducted for the Section 205 Feasibility Study, Deadmans Run, Lincoln, Nebraska. Appendix B consists of: (1) an introduction, (2) a discussion of existing conditions in the study area, (3) a discussion of the applicable design criteria and standards, (4) a discussion of the evaluated alternatives, (5) alternative update, and (6) references. This Civil Engineering analysis was prepared by the Design Branch of the U.S. Army Corps of Engineers-Omaha District.

2. EXISTING CONDITIONS

2.1 Study Area. The study area covered by this Appendix includes the reach of Deadmans Run from Cornhusker Highway to approximately 50th Street in Lincoln, Nebraska. 33rd, 38th and 48th Streets and Baldwin Avenue carry vehicular traffic over Deadmans Run via a variety of structures: A large concrete box culvert conveys Deadmans Run under the intersection of 33rd Street and Baldwin Ave.; a steel truss bridge over Deadmans Run at 38th Street; and a concrete–girder bridge at 48th Street. Additionally, entrance to the grain elevators near State Fair Park Drive and Cornhusker Highway carries traffic over a channel that drains a portion of the Deadmans Run watershed and is within the study area. The general location of the study area is shown in Figure 1.

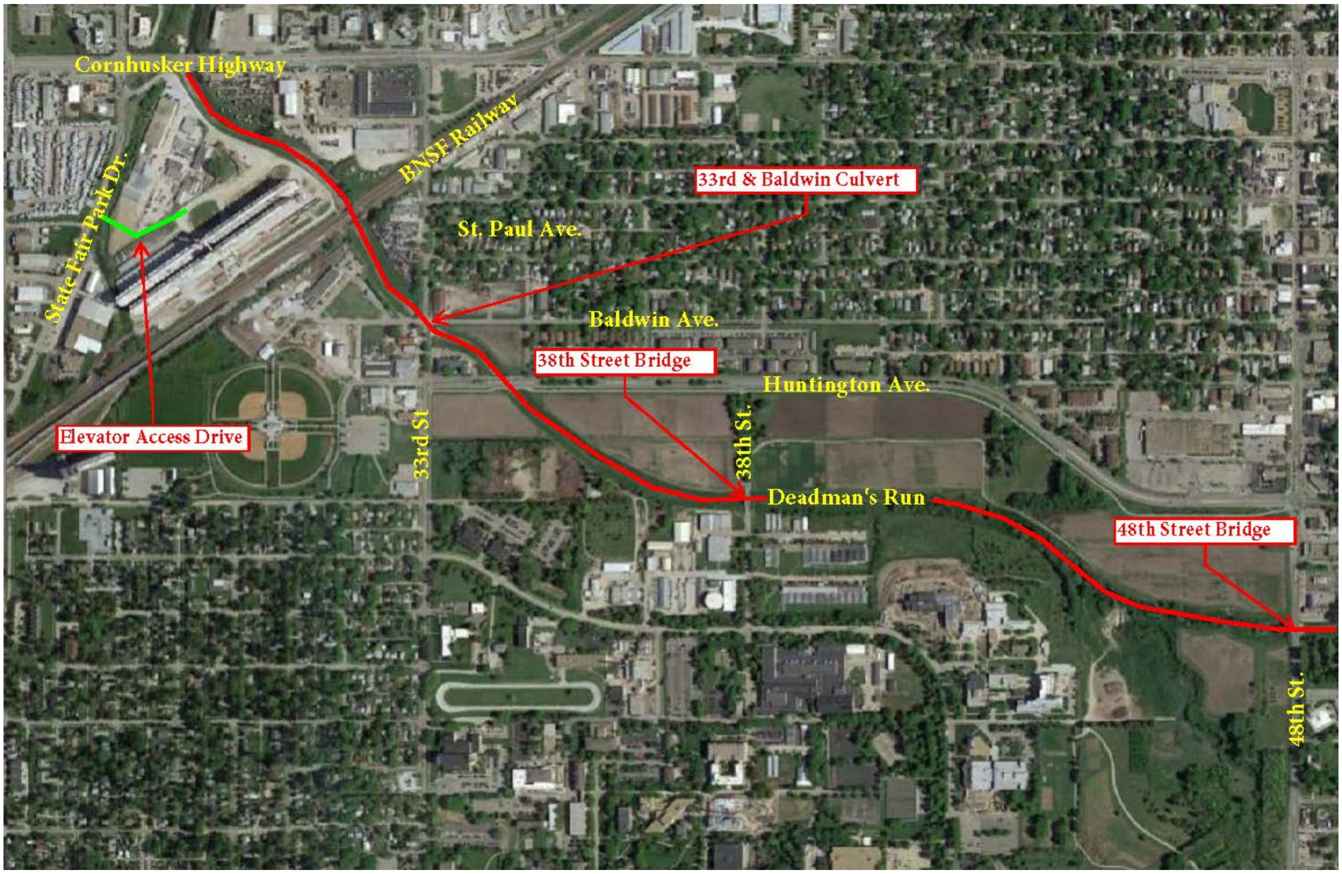
2.2 Site Description. The horizontal alignments of the existing surface streets are generally in a north-south or east-west orientation and existing vertical profiles are generally flat. Existing roadway sections, assumed functional classification (per the State of Nebraska Minimum Design Standards) and design speed are as follows:

33rd Street: Three-lane section, asphalt pavement, concrete curb and gutter, no on-street parking, sidewalk on east side of street, Collector, 35mph.

Baldwin Avenue: Two-lane section w/ on-street parking, asphalt pavement, concrete curb and gutter, no sidewalks, Local, 25mph.

St. Paul Avenue: Two-lane section w/ on-street parking, asphalt pavement, concrete curb and gutter, sidewalks on both sides, Local, 25mph.

Figure 1 – Study Area



<u>38th Street:</u> Two-lane section, asphalt pavement w/ concrete curb & gutter to the north of Deadmans Run and concrete pavement with integral curb and gutter to the south, adjacent sidewalk on east side of street, no on-street parking, Local, 25mph.

<u>48th Street:</u> Four-lane section, asphalt pavement w/ concrete curb & gutter, adjacent sidewalk on east side of street, no on-street parking, Other Arterial, 35mph.

<u>Elevator Access Drive:</u> Two-lane section, concrete pavement, uncurbed, 15mph.

3. APPLICABLE DESIGN STANDARDS AND CRITERIA

3.1 General. Improvements to the transportation infrastructure are required to follow federal, state, and local standards. Design standards and criteria for improvements to transportation infrastructure in Nebraska can be found in the Nebraska Minimum Design Standards developed by the Nebraska Board of Public Roads Classifications and Standards in addition to “A Policy on

Geometric Design of Highways and Streets" ("Green Book") by the American Association of State Highway and Transportation Officials. Applicable standards are determined by the functional classification of the transportation facility. The Nebraska Minimum Design Standards for Local Roads and Streets can be found in Figure 2:

Figure 2 – Nebraska Minimum Design Standards for Local Roads and Streets

MINIMUM DESIGN STANDARDS - PART TWO
LOCAL ROADS AND STREETS

001.15 MINIMUM DESIGN STANDARDS — MUNICIPAL STREETS (1)

(2) State Functional Classification	(3) Design Year Traffic	(4) Design Speed (mph)	(5) Maximum Horizontal Curve (Degree)	Maximum Grade (Percent)	(6) Number of Lanes	(7) Lane Width (Feet)	Median Width (Feet)	Non-Curbed Section Shoulder Width (Feet)	(8) Fixed Obstacle Clearance (Feet)	Lighting	New and Reconstructed Bridge Design Loading
Other Arterial	–	30	15	8	2	11	0 - As Required	8	–	Full	HL93
Collector	–	25	20	10	2	11	None	6	–	Desirable	HL93
Local	–	25	30★	10	2	11	None	6	–	Desirable	HL93

(1) The 2001 edition of AASHTO "A Policy on Geometric Design of Highways and Streets" should be used for other design criteria.
(2) Refer to NDOR "State Functional Classification Maps."
(3) "Design Year" shall be year of initial construction plus 20 years.
(4) The design speed should be equal to or greater than the anticipated posted speed limit. Stopping sight distance is a critical component of design speed.
(5) 0.06 feet per foot maximum superelevation rate. The superelevation rate should match the design speed.
(6) The actual number of lanes for design shall be based on a capacity analysis using design year traffic and the selected level of service to be obtained.
(7) Lane width shall not include width of curb or curb offset.
(8) Minimum fixed obstacle clearance for a curbed section shall be 2 feet as measured from the back of the curb, or for a non-curbed section shall be 8 feet as measured from the edge of the through driving lane. This area shall be free of obstacles except: (a) Traffic signals, railroad signals and railroad tracks; (b) Other obstacles including, but not limited to: ditches, slopes, driveways, intersections, earth dikes, curbs, guardrails, median barriers, crash cushions, drainage inlets, drainage flumes, culverts, bridges, roadway lighting, and traffic control devices if the municipality, through an engineering study, has determined that such obstacles are acceptable and are necessary for the operation and use of the street system; (c) Other obstacles if the municipality, through an engineering study and based upon a cost benefit analysis, has determined that the cost to remove or treat such obstacle exceeds the benefits from such removal or treatment. Fixed obstacle clearance for a non-curbed section may be reduced further for a turn-out lane, provided a minimum clearance of 2 feet is maintained from any paved surface.
★ Local street radii can be reduced to 100 feet if compatible with overall development and a design speed study.

3.2. Design Criteria. Design criteria not provided in the Nebraska Minimum Design Standards can be found in the Green Book. The design criteria used in the alternatives development are a function of the functional classification and design speed. Because the design speed per the Nebraska Minimum Standards is lower than the existing posted speed limits, the existing posted speed limits are being used for the design speeds. The design criteria used is as follows:

Local:
Design Speed: 25mph
Stopping Sight Distance: 155 ft.
Maximum Horizontal Curve: 30 degrees
Maximum Grade: 10%
Minimum Lane Width: 11 ft.
Crest Vertical Curve "K" value: 12
Sag Vertical Curve "K" value: 26

Collector:
Design Speed: 35mph
Stopping Sight Distance: 250 ft.
Maximum Horizontal Curve: 20 degrees
Maximum Grade: 10%
Minimum Lane Width: 11 ft.
Crest Vertical Curve "K" value: 29
Sag Vertical Curve "K" value: 49

Other Arterial:
Design Speed: 35mph
Stopping Sight Distance: 250 ft.
Maximum Horizontal Curve: 15 degrees
Maximum Grade: 8%
Minimum Lane Width: 11 ft.
Crest Vertical Curve "K" value: 29
Sag Vertical Curve "K" value: 49

The "K" values and required Stopping Sight Distances for crest and sag vertical curves are provided in Figure 3 and Figure 4.

Figure 3 – Crest Vertical Curve Design Controls for Stopping Sight Distance
(Source: 2011 Green Book)

Metric				U.S. Customary			
Design Speed (km/h)	Stopping Sight Distance (m)	Rate of Vertical Curvature, K^a		Design Speed (mph)	Stopping Sight Distance (ft)	Rate of Vertical Curvature, K^a	
		Calculated	Design			Calculated	Design
20	20	0.6	1	15	80	3.0	3
30	35	1.9	2	20	115	6.1	7
40	50	3.8	4	25	155	11.1	12
50	65	6.4	7	30	200	18.5	19
60	85	11.0	11	35	250	29.0	29
70	105	16.8	17	40	305	43.1	44
80	130	25.7	26	45	360	60.1	61
90	160	38.9	39	50	425	83.7	84
100	185	52.0	52	55	495	113.5	114
110	220	73.6	74	60	570	150.6	151
120	250	95.0	95	65	645	192.8	193
130	285	123.4	124	70	730	246.9	247
				75	820	311.6	312
				80	910	383.7	384

[a] Rate of vertical curvature, K, is the length of curve per percent algebraic difference in intersecting grades (A), $K = L/A$.

Figure 4 – Sag Vertical Curve Design Controls for Stopping Sight Distance
(Source: 2011 Green Book)

Metric				U.S. Customary			
Design Speed (km/h)	Stopping Sight Distance (m)	Rate of Vertical Curvature, K^a		Design Speed (mph)	Stopping Sight Distance (ft)	Rate of Vertical Curvature, K^a	
		Calculated	Design			Calculated	Design
20	20	2.1	3	15	80	9.4	10
30	35	5.1	6	20	115	16.5	17
40	50	8.5	9	25	155	25.5	26
50	65	12.2	13	30	200	36.4	37
60	85	17.3	18	35	250	49.0	49
70	105	22.6	23	40	305	63.4	64
80	130	29.4	30	45	360	78.1	79
90	160	37.6	38	50	425	95.7	96
100	185	44.6	45	55	495	114.9	115
110	220	54.4	55	60	570	135.7	136
120	250	62.8	63	65	645	156.5	157
130	285	72.7	73	70	730	180.3	181
				75	820	205.6	206
				80	910	231.0	231

[a] Rate of vertical curvature, K, is the length of curve (m) per percent algebraic difference intersecting grades (A), $K = L/A$.

4. ALTERNATIVES EVALUATED

4.1 General. The objective of this Feasibility Study was to determine if there is a feasible project [i.e. benefit-to-cost (B/C) ratio > 1.0] that could be constructed to reduce flood damages to Lincoln, Nebraska from Deadmans Run. Numerous flood damage reduction alternatives were evaluated during the study. Preliminary evaluations of two alternatives were performed by the Project Delivery Team. One alternative has been carried forward and optimizations have been performed on that alternative.

4.2 Alternative Development. For purposes of this appendix, the first alternative was the elimination of the concrete box culvert at 33rd Street & Baldwin Ave., replaced with a 180' span bridge on 33rd Street. The second alternative keeps the existing concrete box culvert at 33rd Street and Baldwin Ave. and constructs a levee along the right bank of Deadmans Run. The levee extends from Huntington Ave. to the BNSF Railway embankment. Both alternatives include improvements to the Deadmans Run channel in increase conveyance. Widening on the channel necessitates the replacement of the existing bridge at 48th Street with a longer bridge. An optimized channel alternative was evaluated. This optimized channel alternative necessitates the replacement of the bridge at 38th Street.

Terrain data used for the Alternatives Development was generated from a LiDAR survey conducted in May 2010 by Merrick & Company for the Nebraska Iowa Regional

Orthophotography Consortium (NIROC). The survey references the Nebraska State Plane coordinate system. The Horizontal Datum is NAD83 and the Vertical Datum is NAVD88. Storage units are US Survey Feet.

4.3 Description of Alternatives. Each alternative involves reconstruction of existing surface streets. Though Nebraska Minimum Design Standards require only 11' wide lanes, 12' lanes are provided in each alternative. This lane width best approximates the existing lane widths. New pavement materials will match the existing pavement type.

4.3.1 Alternative 1. Alternative 1 provides for a new 180' long bridge over Deadmans Run at 33rd Street to accommodate the channel widening of Deadmans Run and elimination of the existing concrete box culvert under the intersection of 33rd Street and Baldwin Ave. The bridge deck is approximately 5.5' above the existing roadway grade, necessitating a vertical realignment of 33rd Street. In order to bring 33rd Street up and over the new bridge vertical curves are introduced per the design criteria provided in Section 3.2. The vertical realignment begins at the intersection of 33rd Street and Huntington Ave. and returns to the existing profile at just north of the intersection with St. Paul Ave. 33rd Street will be constructed as a 3-lane section to match the existing roadway section, though the new bridge will accommodate two lanes of traffic. A sidewalk is provided on the east side of 33rd Street to perpetuate the existing sidewalk. The total length of improvement on 33rd Street is 815'.

As the new bridge will eliminate the existing intersection of 33rd Street and Baldwin Ave., the remaining east and west approaches of Baldwin Ave. towards 33rd Street will be dead-ended with a 60' radius turnaround per the Lincoln Municipal Code. The turn-arounds will incorporate existing driveways to maintain property access to the greatest extent possible. Loss of access to 33rd Street from Baldwin Ave. will not have a significant impact on local traffic. The maintenance yard on the northeast corner the intersection will lose an existing access point on the west end of the yard, potentially impacting access to the south end of the maintenance building, though aerial imagery indicates access to the south end of the building internal to the yard. Access to properties on the west side of 33rd Street can be maintained from Baldwin Ave. via the proposed turn-around.

Alternative 1 provides for a new 90' long bridge over Deadmans Run at 48th Street to accommodate the channel widening of Deadmans Run. The bridge deck is approximately 5' above the existing roadway grade, necessitating a vertical realignment of 48th Street. In order to bring 48th Street up and over the new bridge vertical curves are introduced per the design criteria provided in Section 3.2. 48th Street will be constructed as a 4-lane section to match the existing roadway section, though the new bridge will accommodate two lanes of traffic. A sidewalk is provided on the east side of 48th Street to perpetuate the existing sidewalk. The total length of improvement on 48th Street is 650'.

The access drive to the grain elevators will be relocated from the existing location near the intersection of State Fair Park Drive and Cornhusker Highway. An existing channel to the east of State Fair Park Drive will accommodate drainage from the west side of the Deadmans Run watershed, specifically draining the detention basin proposed at Fleming Fields. The relocated access drive allows for the improvement of conveyance of the existing channel in addition to improving traffic operations near the intersection of State Fair Park Drive and Cornhusker Highway.

4.3.2 Alternative 2. Alternative 2 retains the concrete box culvert under the intersection of 33rd Street and Baldwin Ave. A proposed levee along the right bank of Deadmans Run between Huntington Ave. and the BNSF Railway embankment intersects both Baldwin Ave. and 33rd Street. At these intersections, the vertical profiles of the streets are realigned to pass the transportation facility over the levee. In order to bring 33rd Street up and over the levee vertical curves are introduced per the design criteria provided in Section 3.2. The proposed levee height is 5' above existing grade. 33rd Street will be constructed to match the existing 3-lane section. The total length of the road raise on 33rd Street is 590'.

The levee crosses 33rd Street near the intersection of 33rd Street and St. Paul Ave. This intersection falls within the area of the road raise on 33rd Street. Therefore, the vertical alignment of St. Paul Ave. also is adjusted to maintain the intersection with 33rd Street. St. Paul Ave. will be constructed to match the existing 2-lane section. The total length of the improvements on St. Paul Ave. is 252'.

A similar road raise on Baldwin Ave. will be required to pass over the proposed levee. Baldwin Ave. will be constructed to match the existing 2-lane section. The total length of the road raise on Baldwin Ave. is 465'.

Improvements at 48th Street and the Elevator Access under Alternative 2 are the same as indicated under Alternative 1.

4.3.3 Alternative 1 Optimization. Optimization of Alternative 1 includes additional improvements to the Deadmans Run channel in the area of 38th Street. These channel improvements require the replacement of the 38th Street bridge spanning Deadmans Run. The deck of the proposed bridge is approximately 2' above the existing roadway grade, necessitating a vertical realignment of 38th Street. 38th Street will be constructed as a 2-lane section to match the existing roadway section, and the new bridge will accommodate two lanes of traffic. A sidewalk is provided on the east side of 38th Street to perpetuate the existing sidewalk. The total length of improvement on 38th Street is 575'.

5. ALTERNATIVE UPDATE

Although the optimized plan was economically justified, the project costs exceeded the Continuing Authorities Program Section 205 per project cost limit of approximately $15.3 million. Discussions between the Lower Platte South Natural Resource District (LPS NRD), City of Lincoln, Northwestern Division, HQ USACE, and the Omaha District PDT led to the development of a revised plan. The revised plan involves removing the three vehicle bridges and associated roadway and infrastructure improvements from the Federal project. This plan was developed due to the City of Lincoln and LPS NRD already having identified the 48th and 38th street bridges for replacement due to their age and condition and having started discussions of replacing the 38th street culvert with a bridge to accommodate the future Railroad Transportation Safety District (RTSD) project.

6. REFERENCES.

1. AASHTO, 2011. A Policy on Geometric Design of Highways and Streets, 6th Edition, American Association of State Highway and Transportation Officials, 2011.
2. Board of Public Roads Classifications and Standards, 2008. Nebraska Minimum Design Standards, Nebraska Department of Roads, 2008
3. City of Lincoln, Nebraska, 2017. Lincoln Municipal Code, Title 26, Chapter 26.23.

7. EXHIBITS

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SECTION 205 – FLOOD RISK MANAGEMENT

FEASIBILITY REPORT

APPENDIX C – GEOTECHNICAL ENGINEERING, SOILS AND GEOLOGY

AUGUST 2018

DEADMANS RUN – LINCOLN, NE
SECTION 205 - FEASIBILITY STUDY

APPENDIX C – GEOTECHNICAL ENGINEERING, SOILS AND GEOLOGY

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Exhibit C-1 - NRCS Soil Survey Maps – Deadmans Run Study Area

DEADMANS RUN, LINCOLN, NEBRASKA
SECTION 205 – FEASIBILITY STUDY

APPENDIX III – GEOTECHNICAL ENGINEERING, SOILS AND GEOLOGY

1. INTRODUCTION.

1.1 Purpose and Scope of Appendix III. The purpose of this appendix is to present the geotechnical and geological investigations/studies conducted for the Section 205 Feasibility Study, Deadmans Run (DMR), Lincoln, Nebraska. Also presented is limited information relating to Civil Design (selected alternative grading & impacted utilities) and available survey information. Appendix III consists of: (1) an introduction, (2) a discussion of existing conditions in the study area (3) a discussion of site geology, (4) available information from geotechnical investigations of the subsurface soils and bedrock formation, (5) an evaluation of the spoil bank materials, (6) a summary of the problem identification and future without project conditions, (7) a discussion of the evaluated alternatives, and (8) a discussion of further studies, testing, and analyses needed after the feasibility study phase. This geotechnical and geological analysis was prepared by the Geotechnical Engineering & Sciences Branch of the U.S. Army Corps of Engineers-Omaha District.

2. EXISTING CONDITIONS.

2.1 Study Area. Deadmans Run, a right bank tributary of Salt Creek, begins in the eastern part of the city of Lincoln near intersection of 84th and A streets. It flows northwesterly 7 miles to enter Salt Creek just below the Chicago and Northwestern Railway bridge in North-Central Lincoln. The watershed is bounded by Stevens Creek basin on the north and Antelope Creek basin on the south. Its 9.6 square miles of significantly urbanized drainage area lies entirely within Lancaster County and within the Lincoln City limits.

The area discussed in this study extends from the Cornhusker Highway bridge on the downstream end to just upstream of the 48th Street bridge on the upstream end. Figure 1 is a map showing the location of the study area along DMR.

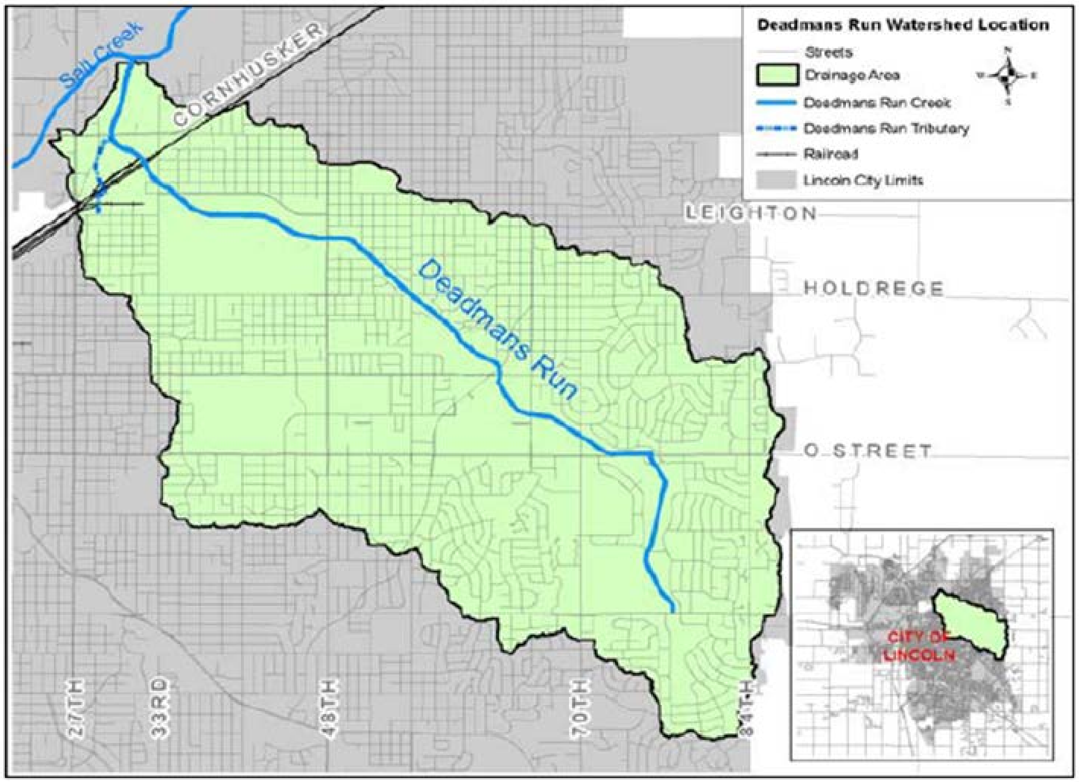


Figure 1. Deadmans Run Watershed Location

2.2 <u>Site Description</u>.

The DMR has a well maintained channel in general. The main channel is protected by a layer of fabric formed concrete mat lining for most of the stream except for the reach downstream of the Cornhusker Highway bridge to the confluence of the DMR with Salt Creek., and at the agricultural test field of University of Nebraska campus. Though somewhat aged, the fabric-formed concrete lining is still in good condition for most of the channel. Upward from the main channel, the embankments are typically covered by the fabric formed concrete mat up to the top edge of the main channel or higher. Then one or more steps of gabions cover the bank above the main channel. The rest of the embankment is typically covered by well-maintained grasses. The channel changes width from upstream to downstream. The unprotected channel just downstream of 48th St Bridge has been widened into a pool by erosion on the banks and the channel bed. The embankments in this segment of stream have severe erosion on both sides of channel. Sediments and debris block the flow in this stretch of the stream. Both banks are covered by dense woods and bushes.
Below is a summary of stream conditions at structures in the study area. Summaries are taken from URS Group's site visit report in <u>Deadmans Run Hydrologic Analysis</u>, April 2015.

1) <u>Upstream the Cornhusker Highway Bridge</u>. The channel bed is covered by fabric formed concrete linings up to the edge of main channel. Above the linings, the bank slope is covered by two steps of gabions and small bushes and grass up to one-quarter of slope. Then the slope

continues with fabric formed concreted linings on the banks up to three-quarter of the slope. Dense grasses cover the rest of the slope to the top of embankment. No visible sign of erosion on the bank or channel.

2) Railroad Bridges. Downstream: Channel is covered by fabric formed concrete linings and bank is protected by 2-step gabions on each side along the main channel. Channel is clean. Minor growth of vegetation on the bank slope. Upstream: Fabric formed concrete linings and bank is protected by 2-step gabions on each side along the main channel. Channel is clean. Minor growth of vegetation on the bank slopes. Channel becomes wider just upstream of the bridge and continues downstream.

3) North 33rd Street and Baldwin Road Box Culvert. Upstream: Channel is covered by fabric formed concrete linings on bed and both banks. No visible erosion. Downstream: Channel is protected by fabric formed concrete linings on bed and banks. No visible erosion.

4) Huntington Avenue Bridge, west of 35th Street. Upstream: Vertical erosion caused by high flood can be seen on banks above gabions at about 500 feet upstream of the bridge. One extra step of new gabion (< 1 year) was placed on top of the original gabion on both banks from 50 feet away from the bridge abutment toward upstream for about 60 feet long. Channel was widened by flow from about 250 feet upstream of bridge toward downstream. There are some deposit of sediment under the bridge. The deposit is about 6 inches deep in average. There is no sediment deposit upstream of the bridge. There is one culvert output right on the upstream edge of the bridge on south side. It is suspected that the sediment could be from the bank just upstream of the bridge or from the culvert. But the pipe in culvert is clean. It doesn't look like that it is from the culvert. There are some sign of erosion on the north bank just upstream of the abutment. It is the most likely source of sediment. Downstream: Downstream has no sign of erosion. Some sediment deposited on the channel bed downstream from the bridge. The deposit is about 6 inches deep in average.

5) East Campus Bridge (North 38th Street). Upstream: No erosion sign near the bridge. Fabric form mat protected channel and gabions. Stream upstream of DMR030 and below DMR035 has a confluence from a tributary. The channel in this part suffers severe erosion on earth banks. No protection measure exist. Ripraps were applied to two location on the north bank and south banks. Pools formed in the channel near the downstream of DMR035. Downstream: No erosion sign near the bridge. Mat and gabion.

6) North 48th Street Bridge, between Garland and Francis Streets. Downstream: Downstream channel suffered severe erosion on bed and the banks. The embankments retreated to form a pool in the channel downstream from the bridge about 250 feet long. The maximum channel width at this location is about 4 times of the original width. Further downstream, there is no protection on the channel bad and embankments. The embankment is covered by dense bushes. Sign of erosion is widespread in this reach all the way down the stream until the upstream of structure DMR030. Upstream: Upstream channel is covered by fabric formed concrete mat. After decades, the mat is still in a good condition. The embankment is covered by 3 steps of gabions

above the tope edge of the mat. No sign of erosion. Above the gabion, the embankment is covered by short grasses.

On January 19, 2016, the USACE Project Development Team (PDT) conducted a site visit to the study area. In general, the PDT concurred with the description of the study area as described above by URS Group.

The existing Deadmans Run Channel is approximately 100 feet in width throughout the study area. Exceptions to this width occur at the box culvert at 33rd Street and Baldwin Avenue, where the width is approximately 35 feet; and at the two railroad bridges, where the width is approximately 90 feet. Throughout most of the study area, the main channel is protected by a layer of fabric formed concrete mat lining for most of the stream except at locations near the downstream, between the Deadmans Run mouth and Cornhusker Highway, and at the agricultural test field of the University of Nebraska campus. Though somewhat aged, the fabric formed concrete lining is still in good condition for most of the channel. Upward from the main channel, the embankments are typically covered by the fabric formed concrete mat up to the top edge of the main channel or higher. Then one or more steps of gabions cover the bank above the main channel. The rest of the embankment is typically covered by well-maintained grasses. Typical photos of the channel are provided within Figure 2.

Figure 2. Typical Deadmans Run Channel Photo

2.3. Physiography, Topography and Drainage.

The watershed in this area is generally mild in ground surface slope. The channel bed is mild at the downstream end near the confluence at Salt Creek. The highest elevation is about 1,520 feet in the northwestern part of the county and the portion with the lowest elevation, 1,080 feet is in the northeastern part of Lancaster where Salt Creek leaves the county. The relief is dominantly gentle to strong slopes. Three physiographic areas exist within Lancaster County, uplands (approximately 80 percent of the county) consist of glacial till covered with loess which are generally moderately to well-drained. The second, stream terraces, exist mainly along Salt Creek and larger tributaries and the third, bottomlands which border major drainage ways, remnant channels and oxbows or areas which are more susceptible to flooding (NRCS, 1980).

2.4. Geology.

2.4.1. General. The geology in the Randolph area is described in "The Groundwater Atlas of Lancaster County, Nebraska" (Dana P. Divine, 2014). Generalized geologic cross sections of Lancaster County, one North-South, the other East-West, are shown in Figures 4&5. Figure 3 shows the approximate cross-section alignments and their relation to Deadmans Run. The stratigraphic sequence with geologic descriptions is provided in Figure 6.

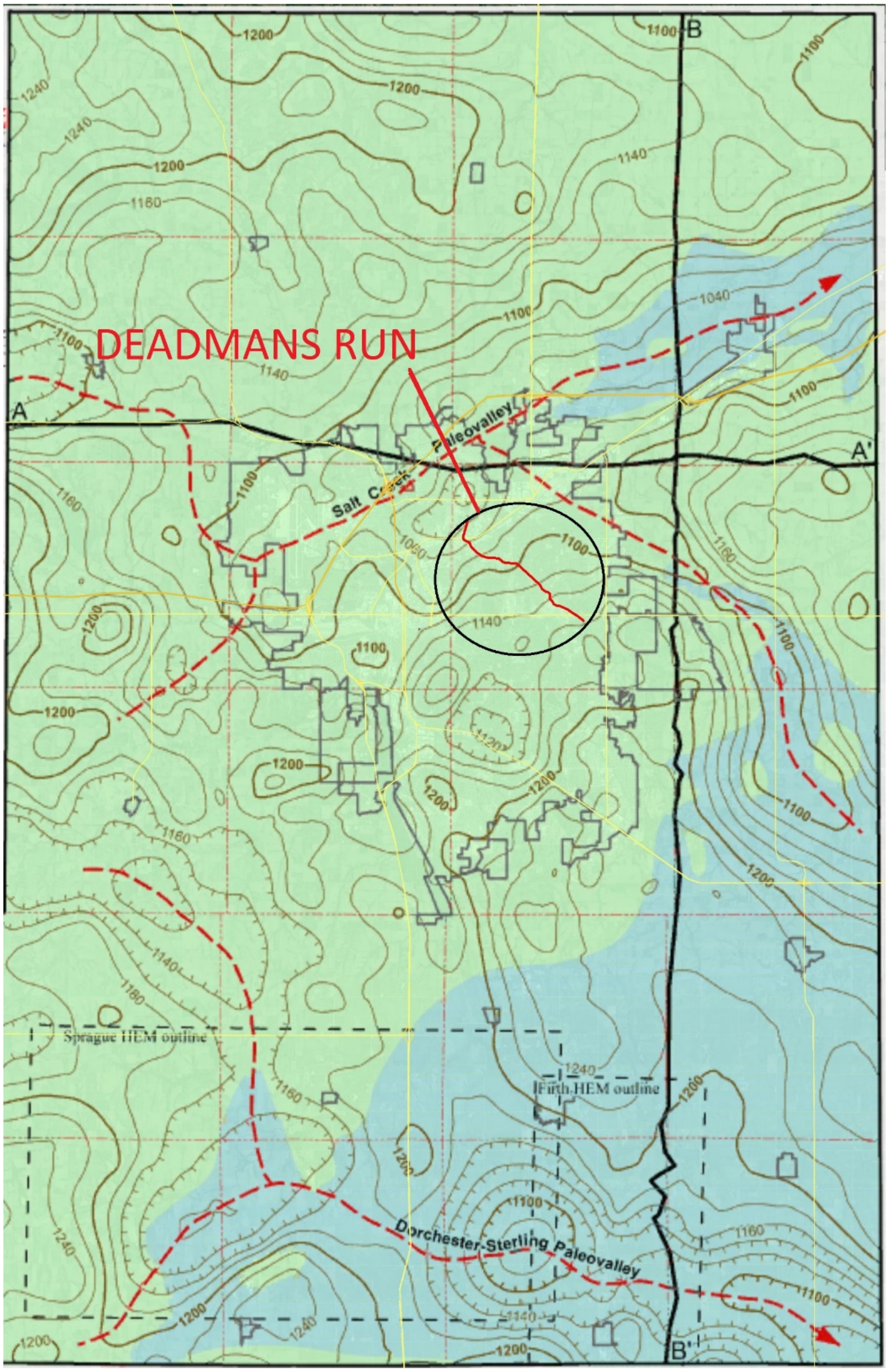


Figure 3. Lancaster County Geologic cross section location (Divine)

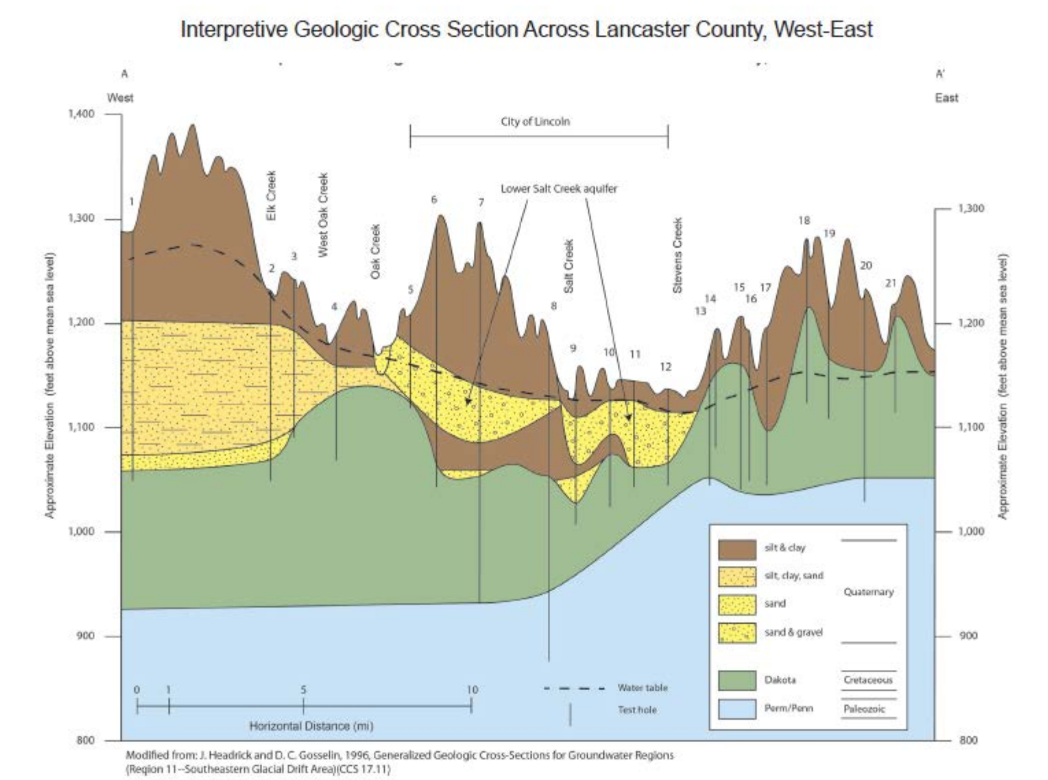


Figure 4. Interpretive Geologic Cross Section A-A', West-East. The location of this cross section is shown on Figure 3. The dashed horizontal line is an estimated water level elevation and the solid vertical lines represent the locations of bore holes or registered well logs. Loess, till, silt, and clay deposits are not subdivided (Divine).

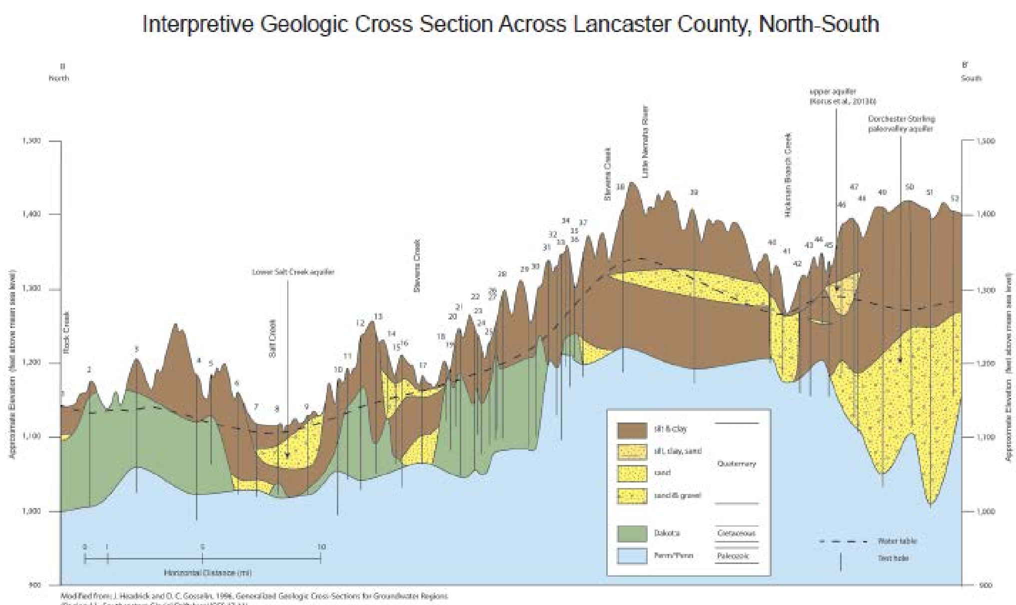


Figure 5. Interpretive Geologic Cross Section B-B', North-South. The location of this cross section is shown on Figure 3. The dashed horizontal line is an estimated water level elevation and the solid vertical lines represent the locations of bore holes or registered well logs. Loess, till, silt, and clay deposits are not subdivided (Divine).

Era	Period	Epoch	Group	Formation	Thickness (ft)	Lithology	Age (Ma)†
Cenozoic	Quaternary	Holocene			0 to 400+	Alluvium (silt, sand, gravel)	0.0117
		Pleistocene				Loess and glacial till (clay, silt, sand, gravel)	2.58
	Neogene				Absent		
	Paleogene						66.0
Mesozoic	Cretaceous	Late	Colorado	Greenhorn	20 to 30	Chalky limestone	
				Graneros	20 to 30	Gray shale	100.5
		Early	Dakota	Woodbury	0 to 400+	Sandstone and shale	
				Nishnabotna		Sandstone and shale	145.0
	Jurassic				Absent		201.3
	Triassic				Absent		252.2
Paleozoic	Permian	Big Blue	Chase		Absent		
			Council Grove		0 to 300+	Limestone and shale	
			Admire			Shale and thin limestone	299.0
	Pennsylvanian	Virgil	Wabaunsee		< 100 to 550	Shale, limestone, sandstone, coal	
			Shawnee			Limestone and shale	
			Douglas			Shale and limestone	
		Missouri	Lansing		200 to 250+	Limestone and shale	
			Kansas City			Limestone and shale	
		Des Moines	Marmaton		< 100 to 200+	Shale, limestone, coal	
			Cherokee			Shale, sandstone, coal	323.0
	Mississippian				Absent		359.0
	Devonian				0 to 175	Dolomite and limestone	419.0
	Silurian				50 to 350	Cherty dolomite	443.0
	Ordovician				525 to 650	Dolomite, shale, and sandstone	485.0
	Cambrian				0 to 225	Dolomite and sandstone	541.0
Precambrian						Igneous and sedimentary rocks	

The shaded rock units are exposed at or near land surface.
Chart modified from R. R. Burchett (unpublished) using information from Burchett et al. (1972), Wigley et al. (2004), and Cohen et al. (2014).

† Million years ago

Figure 6. Geologic Time Scale. Youngest deposits are shown at the top of the table, oldest at the bottom. The complete stratigraphic section is shown to provide context, although Permian and Pennsylvanian rocks are the oldest mentioned in this atlas (Divine).

2.4.2. Bedrock. Bedrock under the greater portion of the basin is the Dakota Group sandstone and shales of Cretaceous age. The Dakota Group was deposited approximately 100-145 million years ago at the migrating margin of the Cretaceous Western Interior Seaway. The near-shore, beach, and fluvial depositional environments there resulted in deposition of variable lithologies including sandstone, siltstone, mudstone, shale, sand, and gravel. Erosion of the Dakota Group occurred during the 98 million years that separate the deposition of the Dakota from the deposition of the overlying Quaternary deposits, producing an unconformable Quaternary-Cretaceous contact.

Some areas of the Deadmans Run drainage area may also be overlying Permian and Pennsylvanian limestone and shale bedrock. Permian and Pennsylvanian limestone, shale, mudstone, and evaporites, deposited approximately 252-323 million years ago when shallow seas covered Nebraska, directly underlie Quaternary and Cretaceous deposits in Lancaster County. Figure 5 shows the scale of geologic bedrock depositions in the Lancaster County.

2.4.3. Overburden. The Deadmans Run drainage basin lies within the Dissected Till Plains Section of the Central Lowlands Physiographic Province. Pleistocene deposits of glacial, interglacial and eolian origin overlie bedrock, which is at a maximum depth of over 200 feet. In this general area, a typical section of the Pleistocene deposits in descending order are as follows: Peorian Loess Formation, Loveland (loess-clay) Formation, Kansan Glacial Drift, Aftonian (interglacial) Formation and the Nebraskan Glacial Drift.

The Deadmans Run basin is an eroded and dissected till plain which was covered by two eolian deposits, Peorian Loess and Loveland (loess-clay) formations. Post-Loveland period erosion removed most of the Loveland soil and the remaining Loveland material was subsequently covered by the younger Peorian Loess. In many places, especially in the western half of the basin, all the loess, both Loveland and Peorian, was removed by erosion exposing the underlying glacial drift. In a few local areas, notably in the eastern part of Seward County, south-central and northeastern part of Lancaster County and southeastern part of Saunders County, all of the Pleistocene deposits have been removed by erosion exposing the underlying bedrock.

2.4.4. Groundwater. In Lancaster County, the primary aquifers are relatively young unconsolidated sediments of the Quaternary System (2.58 million years old or younger). The thickest accumulations of saturated Quaternary material occur in two paleovalleys eroded into bedrock. The largest paleovalley is the Dorchester-Sterling paleovalley in the southern part of the county where the saturated thickness of sand and gravel ranges from approximately 70 to 220 feet and transmissivity values can be greater than 50,000 gallons per day per foot (gpd/ft). The other paleovalley is northeast of Lincoln underlying the Salt Creek valley. The saturated thickness in this paleovalley ranges from approximately 10 to 100 feet with maximum transmissivity values greater than 20,000 gpd/ft. In addition to the primary Quaternary aquifers, the Dakota Group serves as a secondary aquifer in places. The transmissivity of the Dakota aquifer appears to be greatest in and around Lincoln, however the transmissivity values calculated for the Dakota aquifer in this atlas should be considered minimums because many of the bore holes and wells probably do not penetrate the entire thickness of the aquifer.

2.5 <u>Available Soil Survey and Boring Information in the Project Area</u>. No new borings where conducted as part of this Feasibility Study. Soil Surveys and available boring information in the area of evaluated alternatives for this study are summarized in the paragraphs below:

2.5.1 <u>Natural Resources Conservation Service (NRCS) Soil Surveys</u>. A custom soil survey report was generated for the Deadmans Run study area at the NRCS soil survey website (http://websoilsurvey.nrcs.usda.gov/app/). NRCS Soil Surveys provide soil types and characteristics for the upper surface soils (soils to a depth of 5 ft.). The complete report is included in Exhibit III-1.

Brief descriptions for each of these soil groups, extracted from the 1980 Lancaster County NRCS Soil Surveys text, are discussed in the paragraphs below:

<u>Cr (Crete) – silt loam, terrace, 0-1 percent slopes.</u> This deep, nearly level, moderately well-drained soil is on loess stream terraces. Areas are irregular in shape. Typically, the surface layer is about 13 inches thick. The upper part is very dark brown, friable silt loam, and the lower part is black, friable silty clay loam. The subsoil is about 27 inches thick. The upper part is very dark grayish brown, very firm silty clay, the middle part is brown, very firm silty clay, and the lower part is very dark grayish brown, firm silty clay loam. The underlying material, to a depth of 60 inches, is pale brown. The upper part is silty clay loam that has a few small lime concretions, and the lower part is silt loam with reddish brown mottles. In places, the surface layer is silty clay loam. On stream terraces of small tributaries, the subsoil is dark grayish brown or olive brown. In places, the underlying material is slightly affected with salinity or alkali. Stratified alluvial material is between a depth of 1 and 2 feet.

<u>Sa (Salmo) – silt loam, occasionally flooded.</u> This nearly level, somewhat poorly drained soil is on bottom lands. Micro-depressions are common. The soil is occasionally flooded. Areas are long and range from 5 to 100 acres. Typically, the soil has about 18 inches of very dark grayish brown silt loam overwash that is stratified with dark grayish brown material. The buried surface layer is about 25 inches thick. The upper part is very dark brown, friable silt loam and the lower part is black, friable light silty clay loam. The next layer is very dark grayish brown friable silty clay loam. The underlying material, to a depth of 60 inches, is dark grayish brown silt loam. The buried soil is generally calcareous. In places the overwash material is 20 to 40 inches thick. The soil is better drained and is deeper to lime than is described for the Salmo series because of overwash material.

<u>JfC, JuC (Judson) – silty clay loam, silt loam, 1-3 percent slopes.</u> This gently sloping, moderately well-drained soil is on colluvial foot slopes. Areas are long and narrow and range from 5 to 200 acres. Typically, the surface layer is about 29 inches thick. The upper part is very dark brown, friable silt loam; the next part is black friable silt loam; and the lower part is very dark grayish brown, friable silty clay loam. The subsoil is dark brown, firm silty clay loam. The sub-soil is dark brown, firm silty clay loam about 26 inches thick. The underlying material, to a depth of 60 inches, is brown silty clay loam. In places the surface layer is silty clay loam.

Included with this soil in mapping are small areas of Nodaway soils and Sharpsburg soils. Nodaway soils are in natural drainage ways and are occasionally flooded. Sharpsburg soils are generally higher in elevation than Judson soils and have a finel textured subsoil.

Ke (Kennebec) – silt loam, 0-2 percent slopes. This nearly level, moderately well drained soil is on bottom lands. It is occasionally flooded. Typically, the surface layer is very dark gray, friable silt loam in the upper 19 inches and black, firm silty clay loam in the lower part. The bottom layer, to a depth of 60 inches is very dark gray, firm silty clay loam. In places the surface layer is 15-30 inches thick.

WtC2 (Wymore) – silty clay loam, 3-7 percent slopes. This deep, gently sloping, moderately well drained soil is on narrow ridgetops and side slopes of loess uplands. Cracks at the surface 1to 2 inches deep are common when the soil is dry. Areas are irregular in shape and range from 3 to 600 acres. Typically, the surface layer very dark brown, firm silty clay loam about 8 inches thick. The subsoil is about 30 inches thick. The upper part is dark brown, firm silty clay; the middle part is dark grayish brown, firm silty clay; and the lower part is olive brown, friable silty clay loam that has a few medium accumulations of lime. The underlying material, to a depth of 60 inches, is olive gray with many small accumulations of lime. The surface layer of this soil had more clay than other soils that are not eroded because the subsoil has been mixed with the surface layer.

2.5.2 State of Nebraska Registered Groundwater Well Data. The State of Nebraska requires that all water wells within the State be registered. Water well information, well drillers logs, and registrations are retained at Department of Natural Resources and may be accessed on the States Registered Groundwater Wells Data Retrieval website. Well drillers logs contain not only water well location information but also include depth and thickness of identified deposits drilled. The Nebraska Department of Natural Resources, Groundwater Home, New Interactive Map was reviewed to determine the presence of any wells in the vicinity of Deadmans Run. Numerous wells were found near the study area. The data of two wells were analyzed for this feasibility study; the location of the wells in relation to the Deadmans Run channel can be seen in Figure 7 below. Well G131749H is located southeast of the intersection of Garland Street and 48thth Street. Well G137203C is located near the grain elevator southeast of the intersection of State Fair Park Drive and Cornhusker Highway.

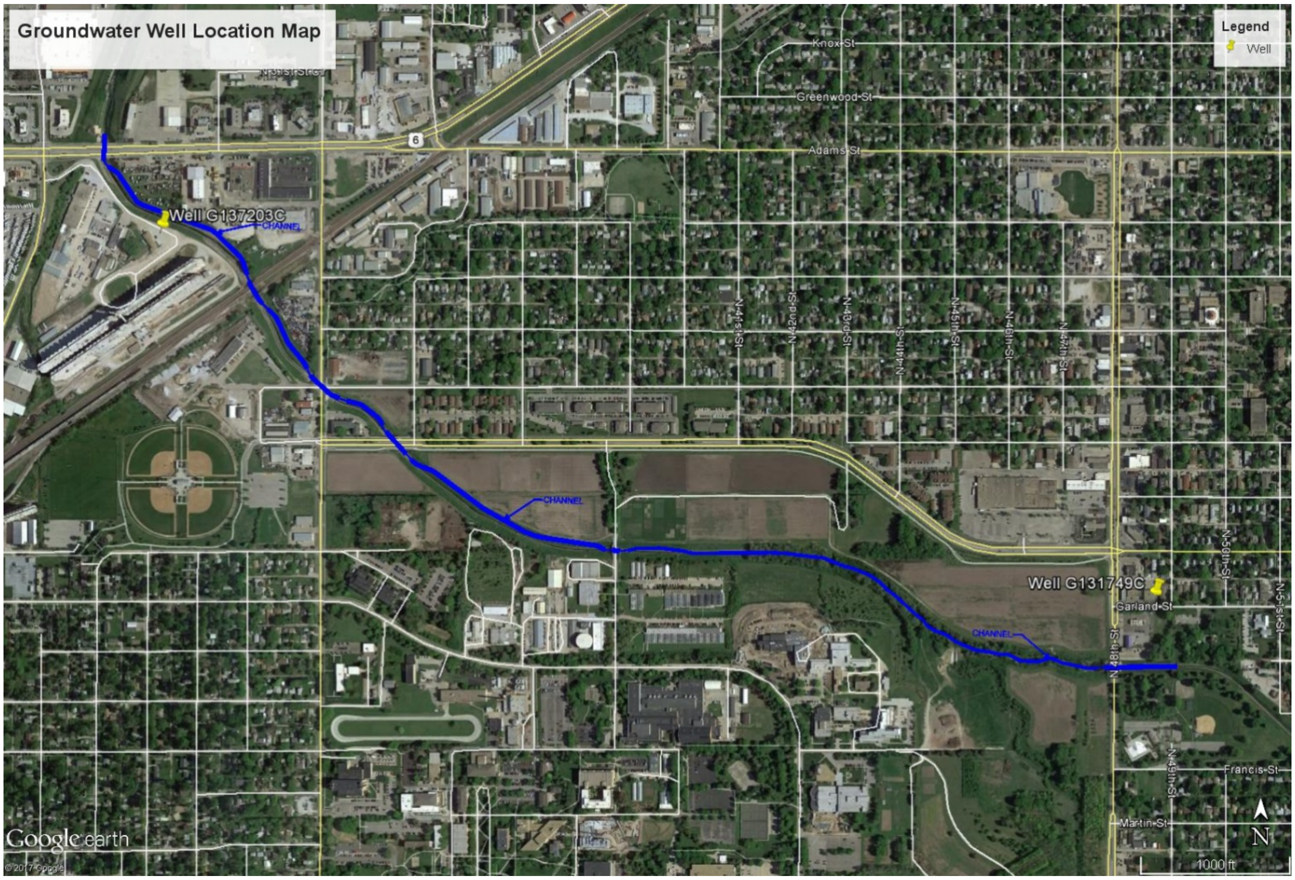


Figure 7. Groundwater well location map.

The quality and quantity of the log information presented is rudimentary, however it does provide some useful soil data. The subsurface soils encountered within Well G-131749H are shown in Figure 8 below. Clay was encountered to a depth of 12 feet. Silty clay was encountered below the clay to a depth of 16 feet. Between 16 and 18 feet sand was interbedded with silty clay.

G-131749 H

8. Pump Information
a. Is pump installed at this time [ ] Yes [•] No
Is pump installed by well owner in section 1? [ ] Yes [ ] No Is pump installed by contractor in section 2? [ ] Yes [ ] No
If pump installed by pump installer, please fill out license number below
b. Pump Installer's License No.______ Pump Installer's Name______
Pump Installer's Email Address______
Pump Installer's Firm Name______
Pump Installer's Firm Address______
City______ State ______ Zip______ Telephone ______
Pump Installer's Firm Email Address______
c. Pumping rate ______ gallons per minute [ ] Measured [ ] Estimated
d. Drop pipe diameter ______ inches e. Length of drop pipe ______ feet
f. Pumping equipment installed (m)__/(d)__/(y)__ g. Pump Brand______
h. This well is designed and constructed to pump less than 50 gpm [ ] Yes [ ] No

9. Well Construction Information.
a. Total well depth 25.0 feet. b. Static water level 20.0 feet.
c. Pumping water level ______ feet d. Well Construction began (month) 6 /(day) 29 /(year) 2004
e. Well Construction completed (month) 6 /(day) 29 /(year) 2004 f. Bore hole diameter in inches Top 8.00 Bottom 8.00
g. Casing and Screen Joints are Welded [ ] Glued [ ] Threaded [•] Other ______

10. Well Construction (Casing & Screen)- c, d, e, & g measurements should be in inches to three decimal places

a		b	c	d	e	f	g	h
Placement Depth in Feet		Casing or Screen	Inside Diameter	Outside Diameter	Wall Thickness	Screen Slot Size	Type of Material	Trade Name
From	To							
0.5	15.0	Casing	2.067	2.375	0.154		PVC	Horizon
15.0	25.0	Screen	2.067	2.375	0.154	0.010	PVC	Horizon

11. Grout and Gravel Pack

Placement Depth in Feet		Grout or Gravel Pack	Material Description
From	To		
0.5	13.0	Grout	3/8" Bentonite Chips
13.0	25.0	Gravel Pack	16-30 Silica Sand

12. Geologic Materials Logged

Depth in Feet From	To	Description	Depth in Feet From	To	Description
0.0	4.0	Dark Brown, Clay	18.0	25.0	Sands and Gravel
4.0	12.0	Brown, Clay			
12.0	16.0	Light Brown, Silty Clay			
16.0	18.0	Red Brown, Silty Clay, Interbedded sands			

(Additional sheets may be submitted)

13. I am familiar with the information submitted on this registration, and to the best of my knowledge it is true.

Water Well Contractor's Signature — Date 12/29/04 — Well Owner's Signature if Contractor is unknown or Deceased — Date

Figure 8. Subsurface soils encountered within Well G-131749H.

The subsurface soils encountered within Well G-137203C are shown in Figure 9 below. Fill material was encountered to a depth of 4.5 feet. Silty clay with sand was encountered beneath the fill to a depth of 21 feet. Between 21 and 50 feet, medium grained sand was encountered. Below the sand stiff clay was encountered.

G137203 C

8. Pump Information.

a. Is pump installed at this time [ ] Yes [■] No

Is pump installed by well owner in section 1? [ ] Yes [■] No Is pump installed by contractor in section 2? [ ] Yes [■] No

If pump installed by pump installer, please fill out license number below

b. Pump Installer's License No.____ Pump Installer's Name____

Pump Installer's Email Address____

Pump Installer's Firm Name____

Pump Installer's Firm Address____

City____ State____ Zip____ Telephone____

Pump Installer's Firm Email Address____

c. Pumping rate____ gallons per minute [ ] Measured [ ] Estimated

d. Drop pipe diameter____ inches e. Length of drop pipe____ feet

f. Pumping equipment installed (m)__/(d)__/(y)__ g. Pump Brand____

h. This well is designed and constructed to pump less than 50 gpm [X] Yes [ ] No

9. Well Construction Information.

a. Total well depth 51.5 feet. b. Static water level 20.5 feet.

c. Pumping water level____ feet d. Well Construction began (month) 8 /(day) 10 /(year) 2005

e. Well Construction completed (month) 8 /(day) 12 /(year) 2005 f. Bore hole diameter in inches Top 10.00 Bottom 10.00

g. Casing and Screen Joints are Welded [ ] Glued [ ] Threaded [■] Other____

10. Well Construction (Casing & Screen)- c, d, e, & g measurements should be in inches to three decimal places

a		b	c	d	e	f	g	h
Placement Depth in Feet		Casing or Screen	Inside Diameter	Outside Diameter	Wall Thickness	Screen Slot Size	Type of Material	Trade Name
From	To							
0.0	41.5	CASING	2.047	2.375	0.400		PVC	TRILOC
41.5	51.5	SCREEN	2.047	2.375	0.400	0.010	PVC	TRILOC

11. Grout and Gravel Pack

Placement Depth in Feet		Grout or Gravel Pack	Material Description
From	To		
0.0	37.0	GROUT	AQUAGUARD
37.0	38.0	BENTONITE	BENTONITE PELLETS
38.0	51.5	GRAVEL PACK	10/20 SILICA SAND

12. Geologic Materials Logged

Depth in Feet From	To	Description	Depth in Feet From	To	Description
0.0	4.5	fill,olive gray,dry,			
4.5	21.0	silty clay,dark gray with sand,moist			
21.0	50.0	medium grained sand,with silt,loose,wet,			
50.0	51.0	clay,stiff, high plasticity,black,wet,			

(Additional sheets may be submitted)

13. I am familiar with the information submitted on this registration, and to the best of my knowledge it is true.

Water Well Contractor's Signature 10/26/05 Date

Well Owner's Signature if Contractor is unknown or Deceased

Date

Figure 9. Subsurface soils encountered within Well G-137203C.

2.5.3 Dispersive Clays. Dispersive clay is a phenomenon where normally cohesive clay is rendered noncohesive when in contact with rainwater, snowmelt, floodwater, etc. These very fine particles go into suspension. If water is flowing over the particles, such as in a crack of an earth embankment, the particles are carried away and a piping-like erosion occurs. The presence of dispersive clays is well documented on the Salt Creek Flood Risk Reduction System. According to the Salt Creek Section 216 Study from December 1987, there was a high concentration of large erosion holes due to dispersive clay erosion on Salt Creek immediately upstream of the confluence with Deadmans Run. Large erosion holes were also present downstream of the confluence, though not as heavily concentrated.

Dispersive clays have not been observed to be a driver of erosion in the Deadmans Run channel, and are not expected to be a concern in the improved channel. The regular, low-flow channel will be protected by riprap. The grass-lined channel side slopes will only have water during high water events which will be short in duration. Depending on the results of soil tests, an impervious, non-dispersive clay blanket may be necessary on the embankment of the proposed detention basin. See Section 4.4.3 for more information on this feature. Non-dispersive clays to use as blanket material will likely be available from the channel excavation.

3. PROBLEM IDENTIFICATION AND FUTURE WITHOUT PROJECT CONDITIONS.

3.1 General. . The Deadmans Run watershed is almost completely urbanized, which has contributed to numerous past flood events throughout the city of Lincoln. Due to the close proximity of residential and commercial properties to the Deadmans Run channel, and the previous history of flooding associated with the channel, a request for the Army Corps of Engineers – Omaha District to analyze potential solutions to reduce flood damages within the city was received in April of 2012.

Without a continuous, designed flood control channel or other flood damage reduction measures, such as the removal of structures from the flood plain, flooding is expected to continue in the Deadmans Run vicinity.

4. ALTERNATIVES EVALUATED/SELECTED ALTERNATIVE.

4.1 General. The objective of this Feasibility Study was to determine if there is a feasible project [i.e. benefit-to-cost (B/C) ratio > 1.0] that could be constructed to reduce flood damages to Lincoln, Nebraska from Deadmans Run. Numerous flood damage reduction alternatives were evaluated during the study. Preliminary evaluations of two alternatives or and subsequent variations were performed by the Geotechnical Engineering and Sciences Branch. Two channel alternatives, one with a levee, were evaluated. An optimized channel alternative was determined as having the highest B/C ratio. See Appendix IV - Economics for the results of the B/C analysis.

4.2 Site Selection and Project Development. The approximately 2-mile-long study area for flood damage reduction extends upstream from the confluence of Deadmans Run with Salt Creek to the pedestrian bridge approximately 380 feet upstream of the 48^{th} Street bridge.

4.3 **Description of Alternatives Evaluated**. Several alternatives or combination of alternatives were considered to provide flood damage reduction in the principal flood damage reach. The alternatives evaluated in this appendix consisted of channel widening, channel velocity improvement, bridge widening, detention ponds and levees. A brief description of the alternatives is given below.

4.3.1 Alternative #1 – Channel and Bridge Widening, Channel Conveyance Improvements (Selected Alternative). The focus of this alternative was on increasing channel conveyance by increases in channel width and flow velocity. Substantial channel widening, bridge widening, and a flume to increase channel velocity in localized areas form the core of the effort to lower flood stages. This alternative does not contain levees. Figure 10 shows an overview of Alternative #1.

Alternative #1 was determined to meet all of the study objectives within the study area. This alternative would both reduce the potential for life loss and damages associated with flooding along the Deadmans Run channel. Furthermore, it is expected that the channel improvements would lead to a Letter of Map Revision (LOMR) along Deadmans Run within the study area, which in turn should reduce flood risk management expenses associated with the National Flood Insurance Program.

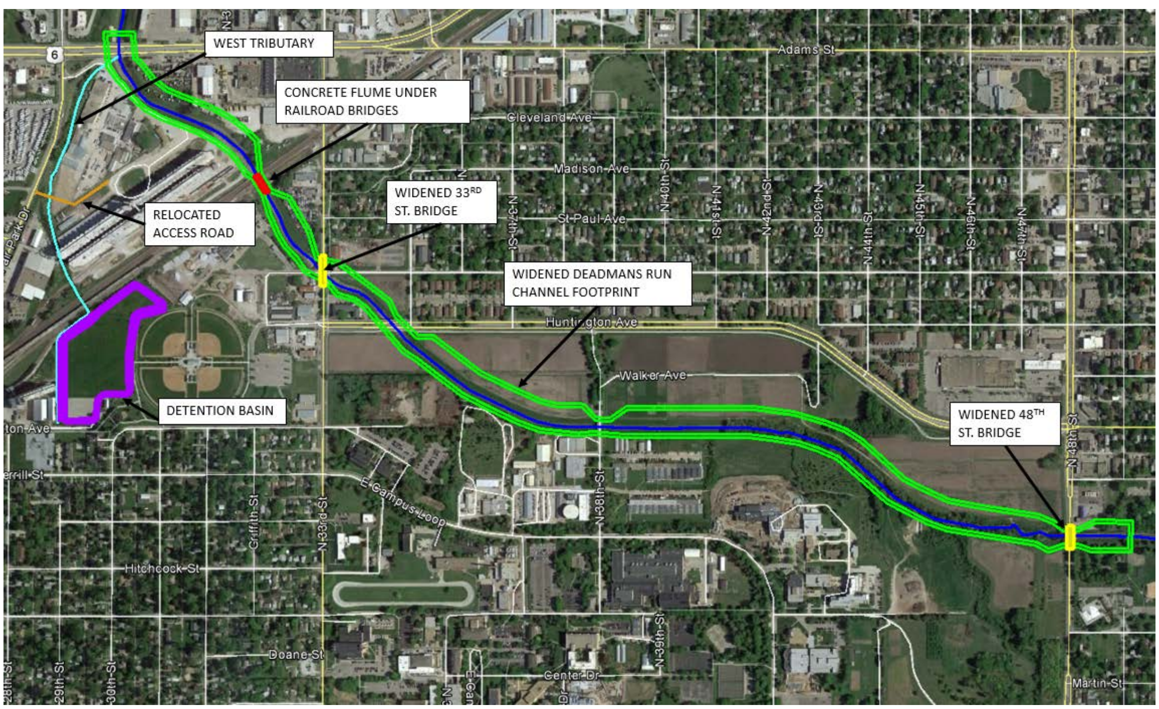


Figure 10. Alternative #1 Overview

Alternative #1 channel improvement consists of widening the channel to approximately 174 feet from the 48th Street bridge to the Cornhusker Highway bridge. The channel is comprised of a low flow channel, a 25 foot wide channel bench, and, in places, an 8 foot wide pedestrian path.

The channel is constricted at multiple points along the project. The 48th Street bridge will be replaced and channel width increased from approximately 65 feet to about 90 feet. The existing bridges over Deadmans Run at 38th Street and Huntington Street would remain in place. At the 38th Street bridge, the channel width decreases to approximately 130 feet. At the Huntington Street bridge the channel width decreases to approximately 100 feet. The box culvert at 33rd Street and Baldwin Ave would be replaced by a bridge which would dead-end Baldwin Ave on either side of 33rd Street, and increase the channel width from 35 feet to approximately 175 feet. At the two railroad bridges a concrete flume will be constructed to increase velocities through this constricted area. The flume will be approximately 45 feet wide with 9 foot high side walls. The Cornhusker Highway bridge will remain in place and decrease the channel width to approximately 145 feet. Refer to Appendix D (Structural Analysis) for detailed information of bridge improvements.

Using HEC-RAS modeling, it was determined that the channel improvements on Deadmans Run had increased flow velocities enough to cause backwater effects on the west tributary. After some additional analysis it was determined that the backwater effects along the tributary were being caused by coincidental hydrographs. These effects don't currently exist because the tributary's hydrograph peaks before the peak of the current Deadmans Run hydrograph. In order to mitigate the induced damages being caused by the improved Deadmans Run channel a detention basin was designed along the west tributary. The detention basin, shown in purple in Figure 9, was designed to accommodate approximately 90 acre-ft to "shave" the West Tributary hydrograph enough to eliminate all of the previously noted backwater effects.

In addition to the detention basin, it was determined that the existing access road to the grain elevator and other industrial facilities along the left bank of the West Tributary needed to be relocated. The reason for this relocation was the existing access road didn't have sufficient space to accommodate another culvert underneath it. This additional culvert is necessary to allow the West Tributary to release flows into the Deadmans Run channel faster, which in turn allows more of the flows from the tributary to escape before the water levels within the Deadmans Run channel rise and begin causing backwater effects. The relocated access road, shown in orange in Figure 15, will not only allow for increase flow underneath the roadway, but it should also provide for a safer and more geometrically friendly intersection between the access road and the State Fair Park Drive. It is worth noting that a "Texas Crossing," or low water crossing, was also considered for the access road, but due to the geometrics required for the tractor trailers accessing the grain elevator this type of crossing was determined to be infeasible. The overall extent of the fully developed Alternative #1 are depicted in Figure 15.

4.3.1.1 <u>Variations in Alternative #1.</u> Three variations of Alternative #1 were analyzed. In Variation #1 the proposed channel followed the alignment of the existing channel throughout the study area. In Variation #2 the alignment of the proposed channel deviated from the existing channel between the 48th St bridge and the 38th Street bridge. In an effort to preserve trees in this reach on either side of the channel for environmental mitigation reasons, the proposed channel alignment was shifted approximately 70 feet to the north of the existing channel alignment. Ultimately, Variation #2 was rejected because the proposed channel required the taking of a large section of the University of Nebraska's agricultural test fields.

Variation #3 was conceived as a solution to the inability to shift the channel to the north and still save trees on one of the channel banks. Hydraulic analysis showed that a smaller cross-section in the reach beginning approximately 850 feet upstream of the 38th Street bridge and ending at the 48th Street bridge could still hold the 100-yr flood event. It was determined leaving the right bank in its existing condition in this reach while constructing the low flow channel, channel bench, and 1V on 3H left bank side slope would meet the channel volume requirements to contain the 100-yr flood event.

4.3.2 <u>Alternative #2 – Channel and Bridge Widening With a Short Levee.</u> The focus of this alternative was on increasing channel conveyance by increases in channel width and flow depth. Substantial channel widening, the widening of one bridge, and a short levee to increase channel depth in localized areas form the core of the effort to lower flood stages. This alternative differs from Alternative #1 primarily by substituting a right bank levee between the Railroad Bridges and Huntington Avenue for replacing the 33rd Street and Baldwin Avenue ridge and installing a flume. Figure 11 shows an overview of Alternative #2.

Alternative #2 was determined to meet all of the study objectives within the study area. This alternative would both reduce the potential for life loss and damages associated with flooding along the Deadmans Run channel. Furthermore, it is expected that the channel improvements would lead to a Letter of Map Revision (LOMR) along Deadmans Run within the study area, which in turn should reduce flood risk management expenses associated with the National Flood Insurance Program. Although Alternative #2 satisfies the study objectives, this alternative doesn't produce the same level of positive benefits; this can be seen in the discussion of the NED account below.

When evaluating Alternative #2 under the NED account, the alternative was found to have an annualized project cost of approximately $845,000, producing an annualized benefit of approximately $791,000. Meaning that Alternative #2 would have a BCR of 0.94 and would produce annualized net benefits of approximately -$54,000. Due to Alternative #2 not meeting the requirements for the NED account, other account benefits were not calculated.

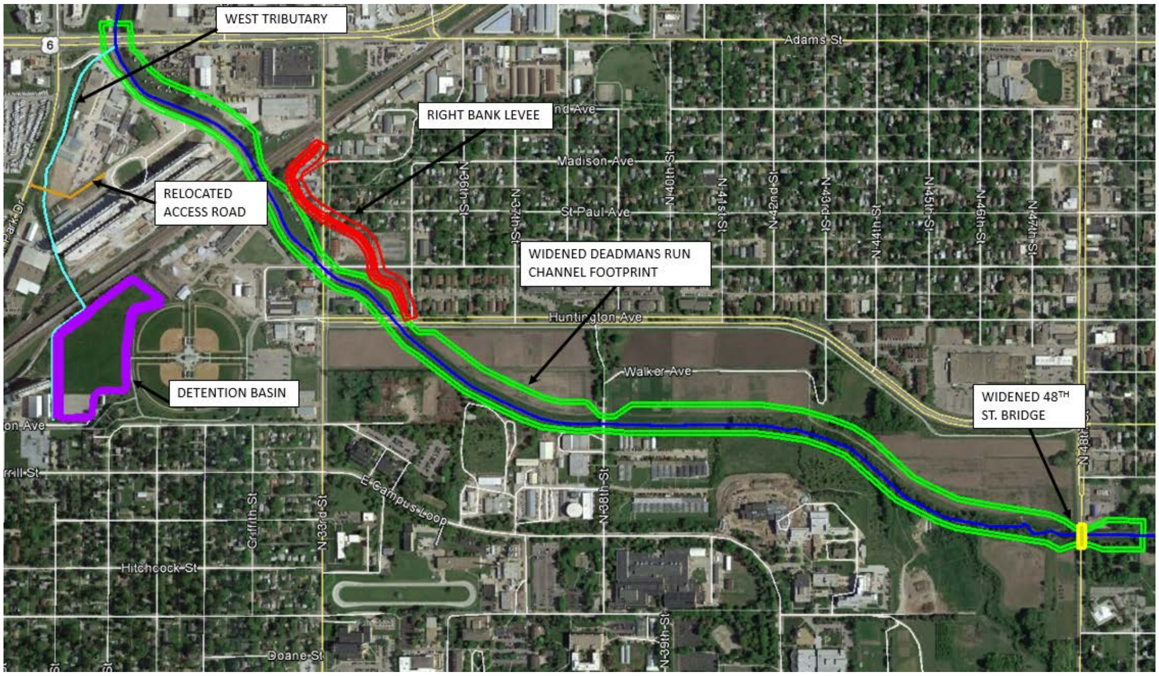


Figure 11. Alternative #2 Overview

Alternative #2 channel improvements consists of widening the channel to approximately 174 feet from the 48th Street bridge to the Cornhusker Highway bridge. The proposed channel is comprised of a low flow channel, a channel bench, and, in places, an 8 foot wide pedestrian path.

The channel would be constricted at multiple points along the project. The 48th Street bridge will be replaced and increase the channel width from approximately 65 feet to about 90 feet. The 38th Street bridge would remain in place and decrease the channel width to approximately 130 feet. The Huntington Street bridge west of 35th Street will remain in place and decrease the channel width to about 100 feet. The box culvert at 33rd Street and Baldwin Avenue will remain in place and decrease the channel width to approximately 35 feet. The two railroad bridges will remain in place and decrease the channel width to approximately 90 feet. The Cornhusker Highway bridge will remain in place and decrease the channel width to approximately 145 feet. Refer to Appendix D (Structural Analysis) for detailed information of bridge improvements.

A short levee segment is included in this alternative to reduce flood risk caused by leaving in place the existing box culvert at 33rd Street and Baldwin Avenue, and by not constructing a flume under the railroad bridges. The levee segment is shown in red in Figure 10. The levee segment ties into high ground on both ends; at approximately 1150 feet above mean sea level (MSL) near the railroad embankment on the downstream end, and approximately 1152 feet above MSL near Huntington Avenue on the upstream end. Along the length of the levee, the height varies between three and five feet. The levee crest is 10 feet wide, with 1V on 3H side slopes to the existing surface.

The detention pond on the west tributary described for Alternative #1in section 4.3.1 would also be required for Alternative #2.

4.3.2.1 <u>Variations in Alternative #2.</u> As with alternative #1, multiple variations of Alternative #2 were analyzed. See section 4.3.1.1 for descriptions of variations analyzed for Alternative #2.

4.3.3 <u>Alternative #3 – Stand-Alone Nonstructural Risk Reduction Measures.</u> A stand-alone nonstructural assessment was completed for the study area along Deadmans Run. The assessment looked at the 1% ACE design flood event. All of the structures within the 1% ACE floodplain were identified, and a nonstructural measure was selected for each structure. Nonstructural measures included elevating structures, removing basement areas, wet floodproofing, and dry floodproofing. Although relocation is another potential nonstructural measure that could have been identified, given the number of structures within the floodplain, relocation was not considered to be a cost-effective solution. The measures identified for each structure were selected based on the structure characteristics, and the depth of flooding at that structures location. The details of the methodology used in the assessment are located in the FRFM Appendix. Figure 12 shows an overview of Alternative #3.

Alternative #3 was determined to partially meet the study objectives within the study area. This alternative would reduce the potential for damages associated with flooding along the Deadmans Run channel. However, since the existing floodplain would remain unchanged it is hard to determine if there would be significant impact to life loss. Furthermore, flood risk management expenses associated with the National Flood Insurance Program wouldn't significantly change, as most structural measures only reduce insurance requirements, not eliminate the requirement altogether.

In regards to the NED account, Alternative #3 was found to have an annualized project cost of approximately $1.70M, producing an annualized benefit of approximately $1.43M. Meaning that Alternative #3 would have a BCR of 0.84 and would produce annualized net benefits of approximately -$272,000. Due to Alternative #3 not meeting the requirements for the NED account, other account benefits were not calculated.

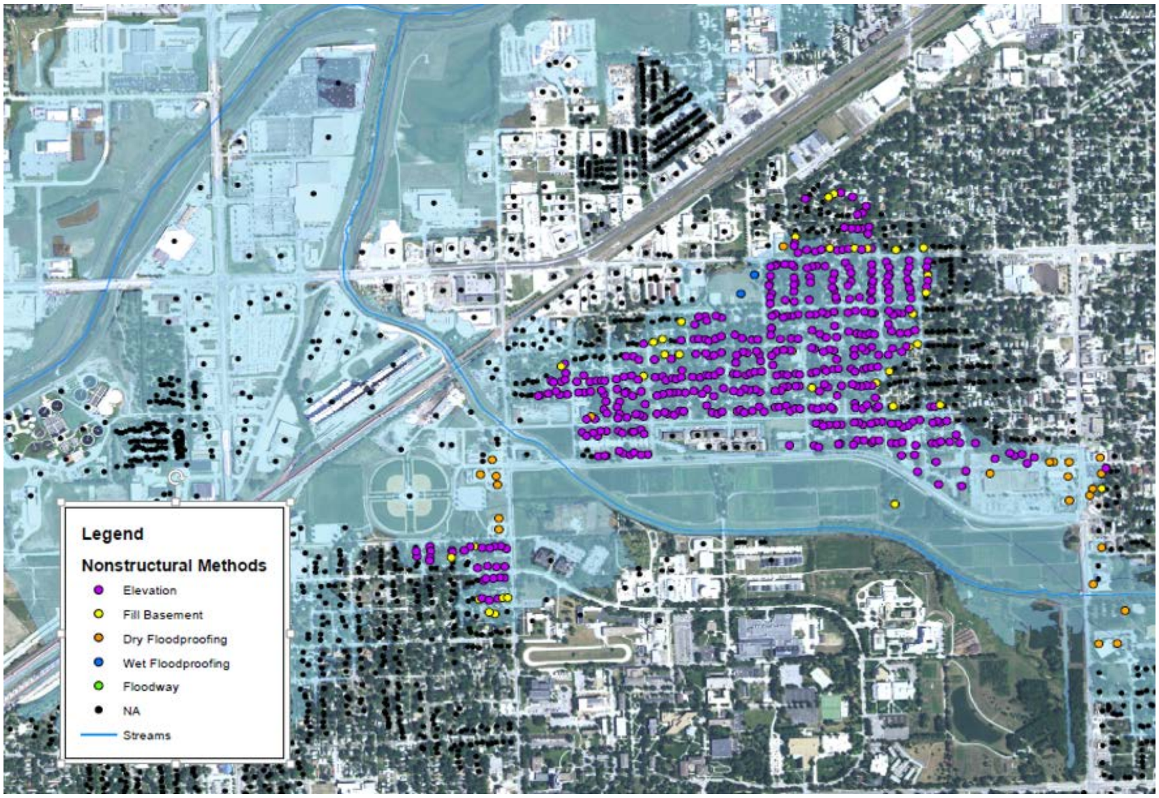


Figure 12. Alternative #3 Overview

4.3.4 <u>Alternative #4 – No Action.</u> Alternative #4 was determined to not meet any of the study objectives. Since this alternative involves no action, there would be no reduction to the potential for life loss and damage associated with flood events along Deadmans Run. Similarly, there would no change to the existing floodplain, and thus there would be no changes to the flood risk management expenses associated with the Deadmans Run Watershed. Additionally, Alternative #4 would not satisfy the requirements of the NED account, as there are no benefits associated with the alternative. Figure 13 shows an overview of Alternative #4.

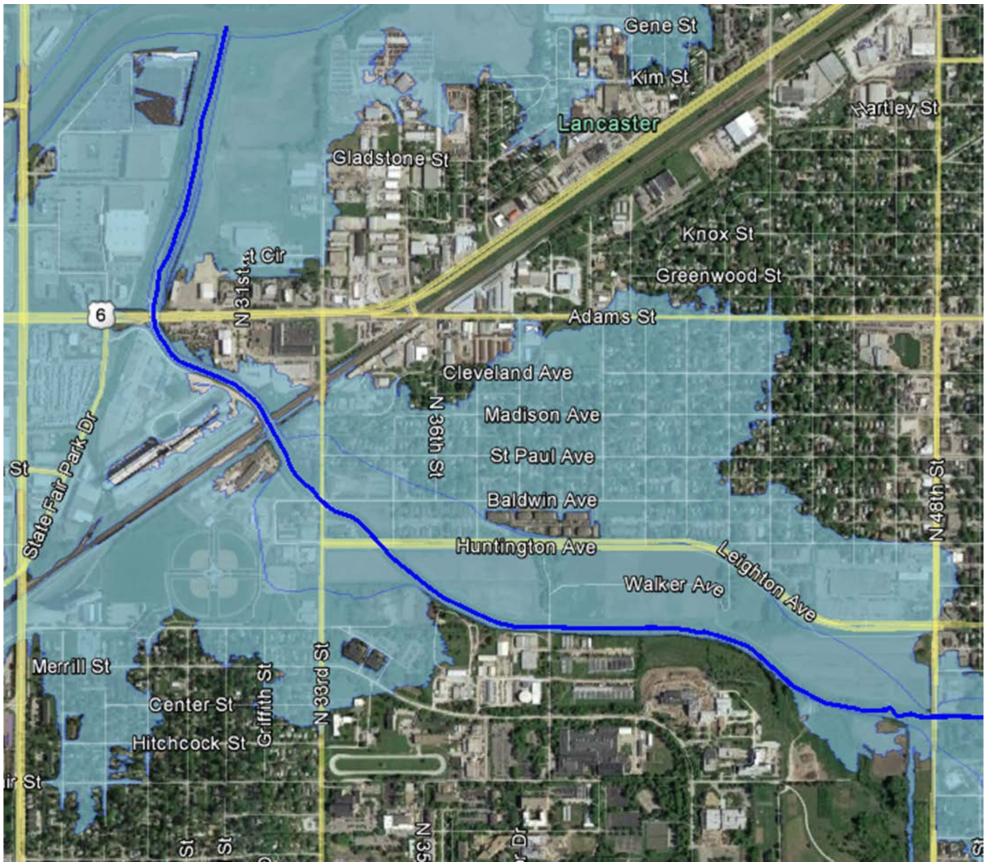


Figure 13. Alternative #4 Overview

4.4 <u>Preliminary Design of the Selected Alternative (Alternative #1 – Channel and Bridge Widening, Channel Conveyance Improvements).</u>

4.4.1 <u>Channel Profile.</u> The channel profile for the selected channel alternative was based on the hydraulic modeling presented in the Appendix VI, Hydraulic Analysis. The channel invert was set so that the preliminary design cross-section entirely contains the 100-yr. water surface elevation with 0 feet or more of freeboard.

4.4.2 <u>Channel Cross Section</u>. The preliminary design cross-section consists of an excavated channel with a riprap lined low-flow channel, a 25 foot wide channel bench, and, in some reaches, an 8 foot wide pedestrian path. The riprap lined low flow channel will have bottom width of 20 feet and 1V on 3H side slopes to an elevation of 4 feet above the bottom of the low flow channel. On the left side of the low flow channel 4 feet above channel bottom, there is a 25 foot wide bench. Above this bench, the bank slop will continue at 1V on 3H to the existing surface. Between Huntington Avenue and Cornhusker Highway, on the right side of the low flow channel, 6 feet above the channel bottom, there is 8 foot wide pedestrian path. Above the pedestrian path, the bank slope will continue at 1V on 3H to the existing surface. The pedestrian path will not be included in the channel cross section between 48th Street and Huntington Ave. As mentioned in Section 4.3.1.1, in the reach beginning approximately 850 feet upstream of the 38th Street Bridge and ending at the 48th Street bridge.

4.4.3 __Detention basin.__ The detention basin on the west tributary was designed with a hardened overtopping on the west berm. When an event at or above the 4% ACE event occurs on the west tributary, water will overtop the west berm and begin to fill the detention pond. After high flows pass through the west tributary, the water collected in the pond will drain back into the west tributary through a drainage pipe on the northern side of the pond. The detention basin was sized to accommodate the necessary volume to "shave" the west tributary hydrograph enough to eliminate all of the previously noted backwater effects – approximately 90 acre-ft.

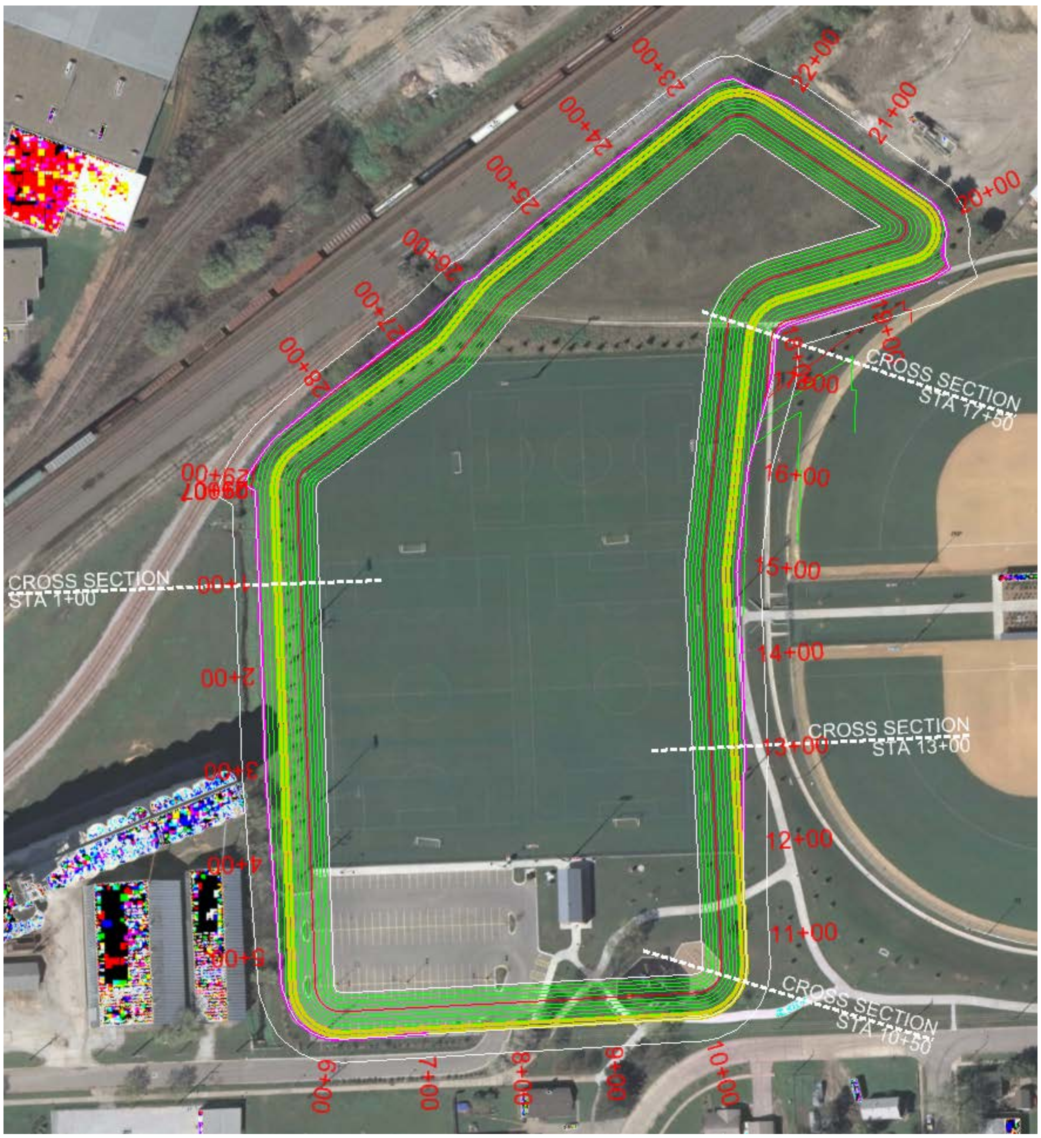


Figure 14. West Tributary Detention Basin.

The State of Nebraska Dam safety requirements indicate that a structure must be registered as a dam in the state if one or both of the following criteria are met: the embankment is greater than 25 feet in elevation, or the embankment holds more than 50 acre-feet of water. Preliminary design has the tallest point of the embankment at between six and seven feet as it crosses a drainage way near stations 17+50 and 26+00, as shown in Figure 14. A cross section of the embankments is shown in Figure 15. At this low point the embankment holds back a majority of the stored volume. More detailed modeling of the high water events on the west tributary will be conducted in the PED phase. There are indications in the hydraulic modeling that the footprint of the detention basin could be reduced to eliminate the crossing of the drainage ditch. In this case, much less than 50 acre-feet would be held by engineered embankments. The majority of water would instead be stored in the excavation below the existing ground surface, which may eliminate the requirement for the embankment to be registered as a dam be the State of Nebraska. The City of Lincoln has guidance for the design and construction of water storage facilities which will be referred to in the PED phase for the detention basin.

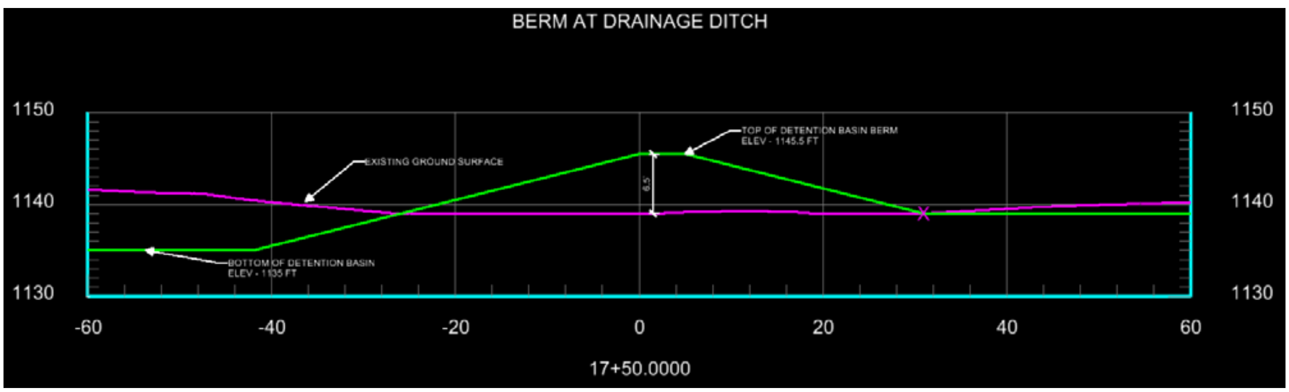


Figure 15. Detention Basin Embankment at Drainage Ditch.

In the preliminary design, in order to store 90 acre-ft of water within the proposed area, the embankment elevations were set at 1145.5 feet above mean seal level (MSL) at the top of the embankment, and 1135 feet above MSL at the embankment toe. The detention basin will be constructed primarily by excavating below the existing elevation to achieve required storage capacity. Along the north and west side of the pond, the embankment, or berm, will be between 3 and 4 feet above the existing ground surface. Along the south and east side of the pond the embankment will tie into existing high ground. The embankments will likely be constructed using excavated material from the basin area. Soil borings and analysis will be needed to confirm the suitability of the material.

More intensive modeling will be done on the detention basin during the Preconstruction Engineering and Design (PED) phase of the project to verify hydraulic calculations, storage capacity requirements, and drainage design. The University of Nebraska – Lincoln has expressed interest in locating a recreational-use baseball diamond in the detention area. Additional engineering disciplines would thus be included in PED phase for the detention pond.

4.4.4 Riprap Protection for Channel. The low-flow channel will be lined with riprap in place of the formed concrete matting in the existing Deadmans Run channel. The formed concrete lining appears to be in good condition, and options to keep the lining place were discussed in the optimization process. However, the efforts required to redesign and construct around the lining were considered to be too great for the project to remain viable. The need for riprap protection on the project will be further evaluated during the PED phase. Sources for stone protection that are currently known will be provided by the local sponsor. Final stone sources will be determined during the PED phase of the project. Final sources will be verified for available quantities and quality of stone.

4.4.5 Excavation Quantities. Preliminary modeling of the channel improvements indicate that there will be significantly more excavated material than fill material. For the channel widening portion of the project, more than 200,000 cubic yards of material will be excavated, of which approximately 17,000 cubic yard will be reused as fill material. Quantities were calculated by comparing the average end area volumes of the existing channel and the proposed channel.

The detention basin on the West Tributary requires the excavation of just under 120,000 cubic yards of material, of which approximately 5000 cubic yards will be reused to build up the berm. Volumes for the detention basin were calculated with Bentley PowerInRoads by comparing the existing surface elevations and the proposed pond elevations.

4.4.6 Borrow Sources/Fill Material/Spoil Areas. The descriptions of construction materials for the selected alternative are given below.

4.4.6.1 Borrow Source. No borrow sources will be required for the selected channel alternative. Any fill material needed for embankment construction will come from required excavation for the channel.

4.4.6.2 Random Fill. Any fill required for embankment or backfill will be a random fill material and will come from the required excavation of the channel widening. Random fill is defined as any or all sands, silts, and clays that are determined to be suitable from the standpoint of compacted stability for use in embankment construction.

4.4.6.3 Topsoil. Topsoil for use on the channel widening areas will be stripped from all areas to be graded, such as the channel widening excavation areas. The stripped topsoil will be stockpiled on project lands for later use on the channel slopes and other areas incidental to channel widening.

4.4.7 Disposal of Clearing and Grubbing Materials, Excess Excavated Soils, and Refuse. Suitable materials removed from required excavation areas will be utilized in the formation of the embankments, access ramps, haul roads, and as backfill. Excess suitable excavated soils and unsuitable excavated soils will be disposed in a disposal area provided by the local sponsor or by the construction contractor. For this feasibility study, a disposal site was not identified by the sponsor. The Corps of Engineers cost estimate has accounted for a disposal site five miles from the project site.

Debris and refuse materials removed as part of the channel widening work or from other required excavations will be disposed in a landfill that is licensed to accept the material. The construction contractor will be required to follow all federal, state, and local regulations when disposing these materials. The Lincoln landfill is approximately 7 miles north of the project site.

4.4.8 Bridge Foundation Design. Three vehicular bridges are planned to be demolished and replaced as part of the selected alternative. No preliminary foundation design was performed for these new bridges during this Feasibility Study. The cost of these new bridges were estimated by determining the approximate footprint of the bridge (in square feet) and multiplying this by an estimated per square foot cost for construction.

Design of the foundations for the new bridge will be performed during the Preconstruction Engineering and Design (PED) Phase.

4.4.9 Considerations During Construction. Construction will likely be required to take place in fall and winter months, when flows in Deadmans Run are at their lowest. Construction should begin at the downstream end of the study area and continue to the upstream extent of the study area. As the channel is widened at the downstream end, flow velocities in the narrower, upstream reaches will decrease. The reduced velocities may eliminate the need to divert flows or dewater in the channel during construction. Further analysis during the PED phase will determine the most appropriate method of water control.

If channel diversion and/or dewatering are deemed unnecessary or cost-prohibitive, construction during channel widening may be susceptible to significant, uncontrolled rainfall or snowmelt events. In these events the contractor will need to remove equipment from the channel and let the event pass through the construction area.

4.5 Update to Selected Plan. Although the optimized selected plan was economically justified, the project costs exceeded the Continuing Authorities Program Section 205 per project cost limit of approximately $15.3 million. Meetings between the Lower Platte South Natural Resource District (LPS NRD), City of Lincoln, Northwestern Division, HQ USACE, and the Omaha District PDT led to the development of a revised selected plan. The revised plan involves removing the three vehicle bridges from the Federal project, as well as the detention basin. This plan was developed due to the City of Lincoln and LPS NRD already having identified the 48th and 38th street bridges for replacement due to their age and condition and having started discussions of replacing the 38th street culvert with a bridge to accommodate the future Railroad Transportation Safety District (RTSD) project. Additionally, the detention basin was removed from the Federal project, and be taken on by the City of Lincoln and LPS NRD, which are planning to begin the bridge replacement projects in the near future. When the larger structures are put in place, additional channel flow will make it further downstream in the project area, so the detention basin is needed to reduce the impacts of this additional conveyance.

In light of this update to the selected plan, some of the geotechnical-related aspects of the project will be modified. The City of Lincoln will accept the cost of bridge foundation design, which is outlined in Sections 4.4.9 and 5.1.4. Excavation quantities on the main Deadmans Run Channel improvement will decrease, as the bridges and corresponding channel transitions are now being designed and constructed by the City of Lincoln. The City's design will not affect the geometry or alignment of the project channel improvement. However, with the removal of the West Tributary detention basin from the federal project, the detention basin excavation quantities and associated costs will be eliminated from the federal cost estimate, to be taken on by the City of Lincoln. Where discussed in relation to each alternative, including the Selected Alternative, descriptions of the de-scoped features (three vehicle bridges and detention basin) have been left in place in order to provide necessary project context and progression. The detention basin design is described in detail in Section 4.4.3. Excavation and fill quantities are discussed in Section 4.4.5.

5. FURTHER STUDIES, TESTING AND ANALYSES DURING PED PHASE

5.1 Engineering During Preconstruction Engineering and Design Phase. Several Geotechnical and Civil Design Engineering efforts to be conducted during the Preconstruction Engineering and Design (PED) phase are discussed below. Other engineering studies not listed below may also be required before completion of Contract Plans and Specifications.

5.1.1 Additional Subsurface Exploration, Laboratory Testing, and Analysis. No subsurface borings and soil sampling were completed as part of the feasibility study. As discussed above, the analysis of foundation conditions for the preliminary channel alternative was based on existing available soils information from NRCS Soil Surveys, UNL test holes, groundwater well data, existing bridges, etc.

Final design of the selected channel alternative will occur during the PED Phase of the project. Subsurface exploratory borings and laboratory testing of soil samples retrieved from the borings are needed to complete soil profiles, determine groundwater conditions, evaluate the stability of excavated channel slopes, design riprap slope protection, design the foundations for the bridge replacements and determine the disposition of excavated soils.

Two deep borings will be required at each bridge replacement location (6 borings total). It is estimated that each boring will be 100 feet deep. Disturbed samples will be taken every 5 feet or change in material. Standard Penetration Testing (SPT) blow count will be recorded every 5 feet.

One boring will be required every 500 feet along the centerline of the selected channel alignment. The borings will be 25 feet deep, 10 to 15 feet below the bottom of the new channel cross-section. Disturbed samples will be taken every 5 feet or change in material. Standard Penetration Testing (SPT) blow count will be recorded every 5 feet.

Laboratory testing will be performed on disturbed soil samples in accordance with American Society of Testing and Materials (ASTM) standards. To determine soil parameters, the following types of testing will be required: Atterberg limits, mechanical analysis, and moisture determination. Additionaly, triaxial strength tests, consolidation tests, permeability tests, and dispersion tests may be necessary to determine to suitability of the in-situ soils.

5.1.2 Additional Surveys. Additional surveys will be required during the PED Phase of the project. New topographic mapping will be obtained along a 300 to 400 feet corridor of the selected channel alignment and in the spoil area selected for the excess excavated material. The accuracy of the mapping will be sufficient to create 1 foot contour mapping for use during the PED Phase and for the development of plans and specifications. The surveys will include all planimetric features and above and below ground utilities. The survey will be provided in MicroStation and Inroads format. A digital terrain model (dtm) with breaklines will be provided.

Survey control monuments will be installed every 1000 feet along the channel and in the spoil area to control surveys during construction of the project. The survey will be tied to the Public Land Survey System (PLSS) to aid in determining property boundaries.

The coordinate system used for all surveys will be Nebraska State Plane. The horizontal reference will be NAD83. The vertical reference datum will be NAVD88. Units of measurement will be in US Feet.

5.1.3 Final Channel Design Analyses. During the PED phase, design analyses need to be performed to complete the final channel design. These analyses are: (1) channel slope stability, (2) channel bottom stability and (3) riprap protection design.

5.1.4 Final Bridge Foundation Design. During the PED phase, geotechnical design analyses will need to be performed to complete the design of the new bridges. These analyses will primarily include (1) pile design for the bridge foundation, (2) channel slope stability through the bridge opening and (3) riprap protection design.

6. **REFERENCES**.

1. Divine, Dana P., The Groundwater Atlas of Lancaster County, Nebraska, Conservation and Survey Division, School of Natural Resources, Institute of Agriculture and Natural Resources, University of Nebraska – Lincoln, August 2014.

2. Nebraska Registered Groundwater Wells Data. Nebraska Department of Natural Resources. Web site: http://dnrdata.dnr.ne.gov/wellscs, accessed 18 Jan 2017.

3. URS Group, Inc., 2015. Deadmans Run Hydrologic Analysis Report, URS Group, Inc., April 2015.

4. USDA, 1985. Custom Soil Resource Report for Lancaster County, United States Department of Agriculture, Soil Conservation Service, January 2017.

5. USDA, 1976. Soil Survey of Lancaster County, Nebraska, United States Department of Agriculture, Soil Conservation Service, 1980.

6. USGS, 1985. Water Quality Variations in Antelope Creek and Deadman's Run, Lincoln, Nebraska, Robert A. Pettijohn and Richard A. Enberg, United States Geological Survey. 1985.

Exhibit C-1

NRCS Soil Survey Maps – Lincoln, NE Area

United States Department of Agriculture

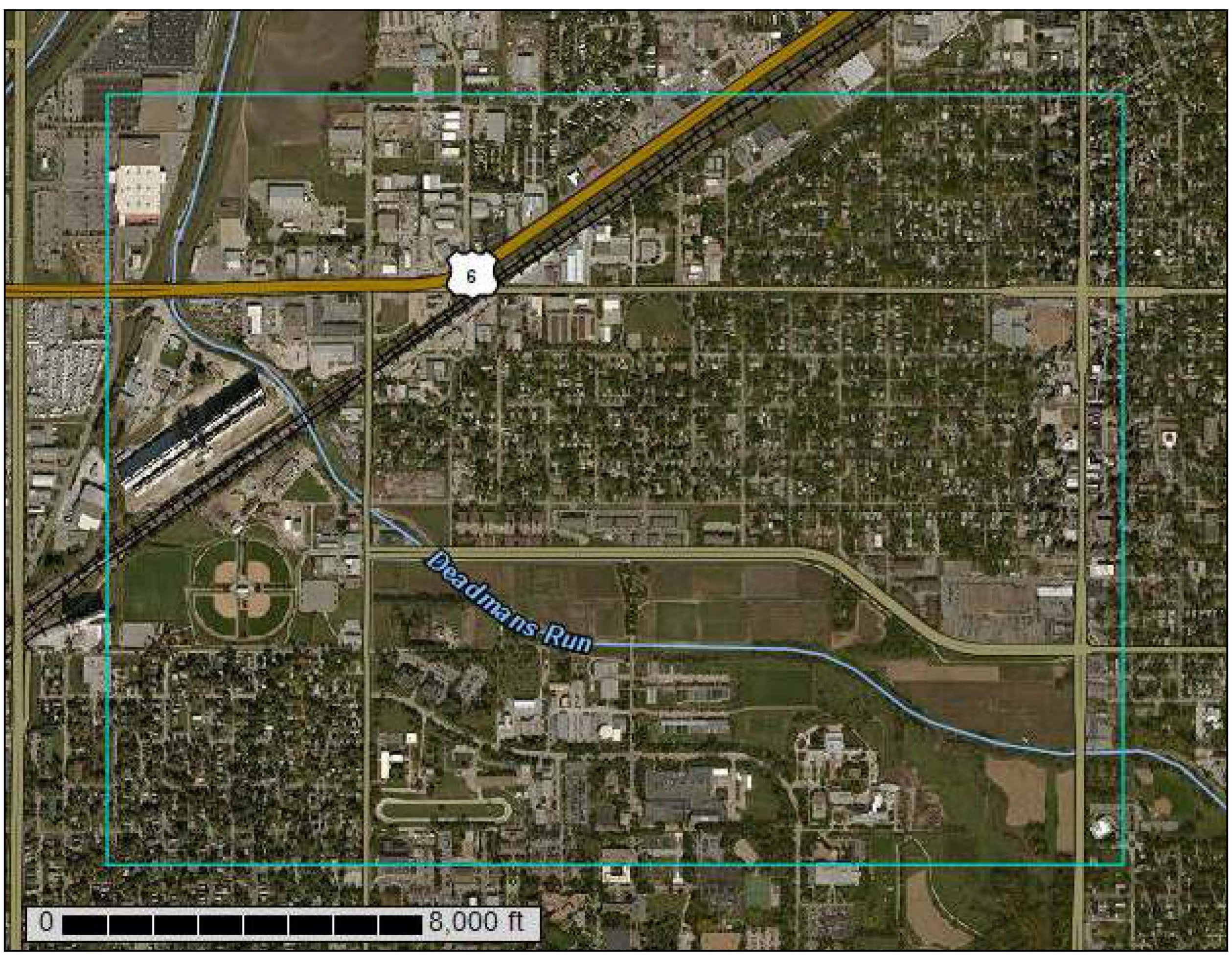
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

Lancaster County, Nebraska



January 18, 2017

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map


7091
7091
7091
3709
7015
9728
9728
9722
7090
9709
9708
9728
9722
9708
9722
9721
Cornhusker Hwy
27th
31st Cir
N 28th St
N 43rd St
48th
Adams
Huntington
33rd
Leighton
Ramp
Fair St
N 48th St
6
6
Map Scale: 1:14,700 if printed on A landscape (11" x 8.5") sheet.
Meters
0 200 400 800 1200
Feet
0 500 1000 2000 3000
N
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 14N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Lancaster County, Nebraska
Survey Area Data: Version 21, Sep 8, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 26, 2013—Oct 26, 2013

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Lancaster County, Nebraska (NE109)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
3709	Crete silt loam, terrace, 0 to 1 percent slopes	29.5	3.0%
7015	Salmo silt loam, occasionally flooded	26.9	2.7%
7091	Wabash silty clay, occasionally flooded	6.7	0.7%
7099	Zook silty clay loam, occasionally flooded	92.7	9.4%
9708	Urban land-Judson complex, 1 to 3 percent slopes	18.5	1.9%
9709	Urban land-Kennebec complex, 0 to 2 percent slopes	257.0	26.2%
9721	Urban land-Wymore complex, 0 to 2 percent slopes	3.5	0.4%
9722	Urban land-Wymore-Aksarben complex, 2 to 6 percent slopes	161.0	16.4%
9728	Urban land-Crete-Aksarben complex, 0 to 2 percent slopes	386.4	39.3%
Totals for Area of Interest		**982.3**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Lancaster County, Nebraska

3709—Crete silt loam, terrace, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 1trzm
Elevation: 1,000 to 1,500 feet
Mean annual precipitation: 30 to 32 inches
Mean annual air temperature: 52 to 55 degrees F
Frost-free period: 160 to 180 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Crete and similar soils: 98 percent
Minor components: 2 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Crete

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 13 inches: silty clay loam
H3 - 13 to 40 inches: silty clay
H4 - 40 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Available water storage in profile: High (about 10.8 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: C
Ecological site: Clayey Upland (R075XY057NE)
Hydric soil rating: No

Minor Components

Fillmore

Percent of map unit: 2 percent

Landform: Playas on stream terraces
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave, linear
Across-slope shape: Concave, linear
Other vegetative classification: Clayey Overflow - Veg. zone 4 (106XY069NE_2)
Hydric soil rating: Yes

7015—Salmo silt loam, occasionally flooded

Map Unit Setting

National map unit symbol: 1ts0m
Elevation: 1,000 to 1,500 feet
Mean annual precipitation: 30 to 32 inches
Mean annual air temperature: 52 to 55 degrees F
Frost-free period: 160 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Salmo, occasionally flooded, and similar soils: 98 percent
Minor components: 2 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Salmo, Occasionally Flooded

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty alluvium

Typical profile

H1 - 0 to 18 inches: silt loam
H2 - 18 to 43 inches: silty clay loam
H3 - 43 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.04 to 0.60 in/hr)
Depth to water table: About 18 to 36 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum in profile: 25 percent
Gypsum, maximum in profile: 3 percent
Salinity, maximum in profile: Slightly saline to strongly saline (4.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 7.0

Available water storage in profile: High (about 11.4 inches)

Interpretive groups

Land capability classification (irrigated): 4w
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C
Ecological site: Saline Subirrigated (R106XY067NE)
Other vegetative classification: Saline (G106XY895NE)
Hydric soil rating: No

Minor Components

Wt at 0-1 foot

Percent of map unit: 1 percent
Landform: Swales
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: Yes

Ponded soils

Percent of map unit: 1 percent
Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

7091—Wabash silty clay, occasionally flooded

Map Unit Setting

National map unit symbol: 1ts1b
Elevation: 1,000 to 1,500 feet
Mean annual precipitation: 30 to 32 inches
Mean annual air temperature: 52 to 55 degrees F
Frost-free period: 160 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Wabash, occasionally flooded, and similar soils: 99 percent
Minor components: 1 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wabash, Occasionally Flooded

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Clayey alluvium

Typical profile

H1 - 0 to 9 inches: silty clay

H2 - 9 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: Moderate (about 6.4 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: D
Ecological site: Clayey Overflow - Veg. zone 4 (R107XY069NE)
Other vegetative classification: Clayey Overflow - Veg. zone 4 (106XY069NE_2)
Hydric soil rating: Yes

Minor Components

Ponded soils

Percent of map unit: 1 percent
Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

7099—Zook silty clay loam, occasionally flooded

Map Unit Setting

National map unit symbol: 1ts1l
Elevation: 1,000 to 1,500 feet
Mean annual precipitation: 30 to 32 inches
Mean annual air temperature: 52 to 55 degrees F
Frost-free period: 160 to 180 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Zook, occasionally flooded, and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Zook, Occasionally Flooded

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear

Parent material: Clayey alluvium

Typical profile

H1 - 0 to 20 inches: silty clay loam
H2 - 20 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately high (0.01 to 0.20 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: Moderate (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: D
Ecological site: Clayey Overflow - Veg. zone 4 (R107XY069NE)
Other vegetative classification: Clayey Overflow - Veg. zone 4 (106XY069NE_2)
Hydric soil rating: Yes

9708—Urban land-Judson complex, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 1ts14
Elevation: 1,000 to 1,500 feet
Mean annual precipitation: 30 to 32 inches
Mean annual air temperature: 52 to 55 degrees F
Frost-free period: 160 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 65 percent
Judson and similar soils: 35 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Landform: Drainageways
Down-slope shape: Concave
Across-slope shape: Linear

Typical profile

H1 - 0 to 60 inches: variable

Description of Judson

Setting

Landform: Drainageways
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Fine-silty colluvium

Typical profile

H1 - 0 to 28 inches: silt loam
H2 - 28 to 60 inches: silty clay loam

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very high (about 12.2 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: Loamy Upland (R106XY075NE)
Other vegetative classification: Loam (G106XY100NE)
Hydric soil rating: No

9709—Urban land-Kennebec complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 1ts15
Elevation: 1,000 to 1,500 feet
Mean annual precipitation: 30 to 32 inches
Mean annual air temperature: 52 to 55 degrees F
Frost-free period: 160 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 55 percent
Kennebec, occasionally flooded, and similar soils: 45 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear

Typical profile

H1 - 0 to 60 inches: variable

Description of Kennebec, Occasionally Flooded

Setting

Landform: Flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty alluvium

Typical profile

H1 - 0 to 36 inches: silt loam
H2 - 36 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 36 to 72 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Very high (about 12.4 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B
Ecological site: Loamy Overflow (R106XY068NE)
Other vegetative classification: Overflow (G106XY500NE)
Hydric soil rating: No

9721—Urban land-Wymore complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 1ts17
Elevation: 1,000 to 1,500 feet
Mean annual precipitation: 30 to 32 inches
Mean annual air temperature: 52 to 55 degrees F

Frost-free period: 160 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 55 percent
Wymore and similar soils: 45 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Landform: Divides
Down-slope shape: Linear
Across-slope shape: Linear

Typical profile

H1 - 0 to 60 inches: variable

Description of Wymore

Setting

Landform: Divides
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess

Typical profile

H1 - 0 to 7 inches: silty clay loam
H2 - 7 to 30 inches: silty clay
H3 - 30 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 12 to 36 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 2 percent
Available water storage in profile: High (about 10.2 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: D
Ecological site: Clayey Upland (R106XY074NE)
Other vegetative classification: Clayey Subsoil (G106XY210NE)
Hydric soil rating: No

9722—Urban land-Wymore-Aksarben complex, 2 to 6 percent slopes

Map Unit Setting

National map unit symbol: 1ts18
Elevation: 1,000 to 1,500 feet
Mean annual precipitation: 30 to 32 inches
Mean annual air temperature: 52 to 55 degrees F
Frost-free period: 160 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 60 percent
Aksarben and similar soils: 20 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Landform: Hillslopes
Down-slope shape: Convex, concave
Across-slope shape: Linear

Typical profile

H1 - 0 to 60 inches: variable

Description of Aksarben

Setting

Landform: Hillslopes
Down-slope shape: Convex, concave
Across-slope shape: Linear
Parent material: Loess

Typical profile

H1 - 0 to 7 inches: silty clay loam
H2 - 7 to 44 inches: silty clay loam
H3 - 44 to 60 inches: silty clay loam

Properties and qualities

Slope: 2 to 7 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 10.8 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: Loamy Upland (R106XY075NE)
Other vegetative classification: Loam (G106XY100NE)
Hydric soil rating: No

Minor Components

Wymore

Percent of map unit: 20 percent
Landform: Hillslopes
Down-slope shape: Convex, concave
Across-slope shape: Linear
Ecological site: Clayey Upland (R106XY074NE)
Other vegetative classification: Clayey Subsoil (G106XY210NE)
Hydric soil rating: No

9728—Urban land-Crete-Aksarben complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 1ts13
Elevation: 1,000 to 1,500 feet
Mean annual precipitation: 30 to 32 inches
Mean annual air temperature: 52 to 55 degrees F
Frost-free period: 160 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 55 percent
Crete and similar soils: 25 percent
Aksarben and similar soils: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear

Typical profile

H1 - 0 to 60 inches: variable

Description of Crete

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 31 inches: silty clay loam
H3 - 31 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 10.8 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: C
Ecological site: Clayey Upland (R075XY057NE)
Hydric soil rating: No

Description of Aksarben

Setting

Landform: Hillslopes
Down-slope shape: Convex, concave
Across-slope shape: Linear
Parent material: Loess

Typical profile

H1 - 0 to 7 inches: silty clay loam
H2 - 7 to 44 inches: silty clay loam
H3 - 44 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 10.8 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: Loamy Upland (R106XY075NE)
Other vegetative classification: Loam (G106XY100NE)
Hydric soil rating: No

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

US Army Corps of Engineers ®
Omaha District

DEADMANS RUN
LINCOLN, NEBRASKA

SECTION 205 – FLOOD RISK MANAGEMENT

FEASIBILITY REPORT

APPENDIX D
ECONOMICS

AUGUST 2018

US Army Corps
of Engineers®

Deadmans Run

Lincoln, Nebraska

Economics Appendix

August 2018

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Introduction

This report documents the economic analysis performed as part of the Section 205 Feasibility Study at Lincoln, NE along Deadmans Run. This effort is intended to estimate the benefit potential for a flood risk management project for the Deadmans Run affected area. This analysis identifies the existing and future without-project conditions and potential with-project alternatives for the Deadmans Run flood plain at Lincoln, NE. The methods used for collecting data and the rationale for key assumptions necessary to estimate flood damages and flood-related costs are presented below.

Area of Analysis

This economic analysis encompasses a 1.5 – 2 square mile portion of the Deadmans Run watershed in the City of Lincoln, Lancaster County, Nebraska. The portion of the stream being analyzed begins at approximately the 48th St Bridge, just upstream of the University of Nebraska-Lincoln East Campus, and ends at the confluence with Salt Creek. The analysis focuses on the area determined by hydraulic engineering to be within the 0.2% annual chance exceedance (ACE) area (or 500-year floodplain), with data collection and modeling going slightly beyond this area to account for uncertainty and flood events that are theoretically greater than the .2% ACE event. The entire area is located within city limits and includes residential neighborhoods, developed commercial areas, and the University of Nebraska East Campus.

Socioeconomic Setting

The City of Lincoln, Nebraska has experienced continued population growth since 2000. This population growth has led to increases in the number of housing units while household size has remained relatively constant. Table 1 contains the U.S. Census Bureau data for 2000, 2010, and 2015 illustrating the growth of Lincoln since 2000.

Table 1 Population, Housing Units, and Average Household Size: Lincoln, Nebraska, 2000 - 2015

	2000[1]	2010[2]	2015[3]	% Increase (2000-2010)	% Increase (2010-2015)	% Increase (2000-2015)
Population	225,442	258,379	277,346	14.61	7.34	23.02
Housing Units	95,188	110,546	115,343	16.13	4.34	21.17
Avg. Household Size	2.37	2.34	2.40	-1.31	2.88	1.53

[1]U.S. Census Bureau, 2000
[2]U.S. Census Bureau, 2010
[3]U.S. Census Bureau, 2016

In 2015, Lincoln's racial composition consisted of the following: White, 80.6 percent; Hispanic of Latino (of any race), 7.3 percent; Black, 4.2 percent; American Indian and Alaska Native, 0.4 percent; Asian, 4.2 percent; Native Hawaiian and Other Pacific Islander, 0.1 percent; some other race, 0.0 percent; and two or more races, 3.1 percent (U.S. Census Bureau, 2016).

Educational attainment is relatively high, with 93.6 percent of the population age 25 years or older having graduated high school and 37.1 percent having obtained a bachelor's degree or higher in 2015. In 2015, the major industries employing Lincoln residents were: Educational services, and health care and social assistance, 27.5 percent; Retail trade, 11.6 percent; Arts, entertainment, and recreation, and accommodation and food services, 9.1 percent; Professional, scientific, and management, and administrative and waste management services, 10.1 percent; manufacturing, 9.1 percent; and Finance and insurance, and real estate and rental and leasing, 7.6 percent. Lincoln had an estimated 2015 median household income of $51,503, and in this same time period the percentage of the population living below the poverty level was 15.1. By comparison, median household income and poverty level in the state of Nebraska are $54,996 and 12.6 percent, while the U.S. has figures of $55,775 and 14.7 percent for the same time period (U.S. Census Bureau, 2016).

Problem Identification

The flooding problem in Lincoln, NE dates back over 120 years. According to the most recent Flood Insurance Study, over one hundred floods have been recorded along Salt Creek and its tributaries in Lincoln and the vicinity since 1900. Of these, 17 are classified as major floods. Two floods, those of July 6, 1908 and May 8, 1950 inflicted very heavy damage on Lincoln. Flooding specific to the ungaged Deadmans Run watershed was recorded in 1951, 1957, 1963, 1989, and 2002, with the two events in June 1951, being the most severe. In the lower basin residential area northeast of 33rd and Huntington, flood depths are projected to be from 5 to 7 feet. While the duration of flooding on this Salt Creek tributary is generally considered to be short and flashy, these types of depths can lead to high consequences in physical damages to structures, as well as life loss. The existing and future without-project conditions analysis will seek to summarize the physical damages of statistical flood events for use in determining the feasibility of proposed solutions to the flooding.

Economic Parameters and Flood Damage Model

The following sections outline the economic modeling parameters and inputs used for estimation of damages in the Deadmans Run study area.

Risk Analysis Preparation

Economic damages and potential benefits for Deadmans Run were computed using the Hydrologic Engineering Center Flood Damage Analysis (HEC-FDA) version 1.4 tool. The driving assumption underlying this software program is that the inputs of the program contain uncertainty and imperfect knowledge. Using the most likely values for the input parameters, HEC-FDA uses specified levels of uncertainty over tens of thousands or even hundreds of thousands of model iterations to incorporate the uncertainty in the values used in the program. Throughout these iterations, the HEC-FDA program determines whether a flood event resulted in damage and how much damage would have occurred. The result is a computed expected annual damage (EAD) with incorporated risk and uncertainty. Uncertainty parameters used in the HEC-FDA study for this analysis include:

- first floor elevations
- structure values
- content to structure ratios
- appurtenant uses to structure ratios
- percent depth-damage functions
- discharge-exceedance functions
- stage-discharge functions

Damages are initially expressed as a stage-damage relationship; i.e., each foot of potential flooding at an index point is associated with an estimated amount of "primary damage." But the ultimate goal is expression of damages in an annualized equivalent form. The calculation of expected annual damages involves a weighted average in which the primary damages for each event are multiplied by the incremental probability of that event and the product is summed. The calculated total is an estimate of the average annual damages that could be expected in any given year over the long term.

Land Use Extent

A land use file for Deadmans Run was created, and it contained all structures in the 0.2% ACE flood plain to determine expected annual flood damages under existing without-project conditions. Additional land use beyond the 0.2% ACE flood plain was also collected to ensure that structures with the potential for flood damages, even at higher elevations, were considered in the analysis.

Analysis Years and Period of Analysis

The base year for this study is 2021. The mostly likely future condition year is typically 25 to 30 years from the base year. For this study, the most likely future year is 2046. The two analysis years are used to compute equivalent annual damage computations. The expected annual damage is assumed to be constant beyond the most likely future analysis year to the end of the period of analysis. Currently, hydrologic and hydraulic conditions are expected to remain about the same between the existing condition and the future-most likely year. While the city has indicated that transportation infrastructure plans could lead to some changes within the watershed, it is unlikely that these changes will have significant impacts to development in the area, leading to the assumption in this analysis that the economic future-most likely year and existing condition are the same.

Interest Rate, Period of Analysis and Price Level

Annualized estimates of damages in this analysis assume the fiscal year (FY) 2017 Federal interest rate of 2.875 percent and a period of analysis of 50 years based on official guidance for evaluation of Federal projects. All estimates are expressed in FY 2017 price levels.

Selected Reaches and Index Locations

Reaches for Deadmans Run were delineated based on two primary variables. Input from hydraulic engineering was taken into account when it was determined that certain physical features impacted the river hydraulics. This may occur at bridge crossings and culverts. This accounts for most of the boundaries for reaches. In addition to this variable, the potential for with-project alternatives in particular reaches led to delineations that would allow for comparison of different alternatives to the existing condition in the future.

In addition to Deadmans Run, hydraulic modeling was done for the West tributary, which begins at Leighton Ave., near Fleming Fields. This tributary flows in a northerly direction until its confluence with Deadmans Run, approximately a half-mile downstream. The same variables for considering reaches and their boundaries were considered for this tributary.

Reaches and their descriptions can be found in Table 2 and Table 3. The reach boundaries in terms of river station (RS) and the index station for each reach are expressed as numbered cross-sections from the existing conditions hydraulics analysis in the Hydraulics Appendix, in which further details are provided.

Table 2 Selected Reaches for Deadmans Run

Reach	Bank	Upstream Boundary Station	Downstream Boundary Station	Index Station	Description
1	L	11256.140	10871.310	11212.140	Pedestrian Bridge at University Place Park to N 48th St. bridge
	R				
2	L	10871.300	6376.972	8078.226	N 48th St. to N 37th St.
	R				
3	L	6376.971	5651.412	5698.626	N 37th St. to Huntington Ave. bridge
	R				
4	L	5651.411	4145.135	4562.746	Huntington Ave. bridge to BNSF railroad
	R				
5	L	4145.134	2777.996	3419.463	BNSF railroad to Cornhusker Hwy.
	R				
6	L	2777.995	0.000	1403.944	Cornhusker Hwy. to confluence with Salt Creek
	R				

Table 3 Selected Reaches for West Tributary

Reach	Bank	Upstream Boundary Station	Downstream Boundary Station	Index Station	Description
1	L	2933.719	2663.918	2782.523	Left bank West tributary from Leighton Ave. to grain elevator and rail road spur
	R		2007.781	2538.539	Right bank West tributary from Leighton Ave. BNSF railroad main line
2	L	2663.917	0.000	1029.047	Left bank West tributary from grain elevator to confluence with Dead Man's Run
	R	2007.780			Right bank West tributary from BNSF main line to confluence with Dead Man's Run

Hydraulic and Hydrologic Uncertainty Parameters

HEC-FDA requires the input of the standard deviation of error associated with stages determined by the hydraulic modeling. Additionally, a period of record must be input in order to calculate the distribution for the flow data determined in the hydrologic analysis. These uncertainty parameters are necessary in order to complete the EAD analysis with uncertainty. Deadmans Run was a previously ungaged stream which required a synthetic period of record to be calculated using EM 1110-2-1619. The period of record determined for Deadmans Run is 17 years. Stage standard deviation of error was determined to be 1.4 ft. at the 1% ACE event. Values were provided by the hydrologic engineer and hydraulic engineer, respectively.

Pseudo Levees

Upon review of the hydraulic modeling, it was determined that the right bank of Reach 2R had a significant land feature that acts as high ground. This high ground separates the impacted structures in the floodplain from the stream at events below the 4% ACE event. Additionally, due to the one dimensional hydraulic modeling, many structures in the floodplain sit at ground elevations that are lower than in-channel stages. For these reasons, the existing conditions modeling incorporates a pseudo levee to keep events below a 4% ACE (plus 0.5 feet) event from damaging structures in Reach 2R. It is at this level that overbank flooding from the upstream reach begins to impact structures in Reach 2R. The pseudo levee stage was determined by the hydraulic engineer and set at the index station for Reach 2R.

Land Use

Land use activities within the Deadmans Run floodplain were surveyed in October of 2014. Assessor's data was obtained in order to gather structure characteristics prior to the survey. The survey was then conducted to verify structure characteristics such as use type and quality, and to estimate foundation heights for all residential structures. Commercial structure characteristics were also verified, though foundation heights were estimated based on a sampling of commercial structures for which more precise surveyed elevations were calculated. Due to less variance in foundation heights of commercial structures, an average height was determined based on the survey. The resulting average commercial foundation height is .5 foot above ground elevation.

All ground elevations for structures are extracted from LiDAR data. Using ArcMap, centroids were created and placed within an outline of each structure in the study area. The LiDAR data has a high degree of accuracy, with ground elevations being within .3 feet of observed or surveyed values. Based on the ground elevation error and the error associated with first flood estimates of structures, the first floor stage error standard deviation is estimated to be .3 feet.

Once structure elevations were computed and characteristics were verified, depreciated replacement values were calculated. With a large number of single-family residential structures in the study area, average structure types and their values were compared to existing assessed values in order to determine an appropriate adjustment factor to represent a depreciated replacement cost for each single-family residential structure. Single-family residential structures were divided into the generic types based on number of stories, whether they had basements, condition and other variables which are normally used to determine a depreciated replacement value. An average value for the generic structure type was then determined from the structures that fell into a particular type. Then, using *RSMeans Square Foot Costs 2014,* each average structure type had a depreciated replacement cost estimated for it. This calculated value was compared to what the average value for the structure type was in the assessor's database. An update factor for each generic type was calculated from these two values. The range for these values was .87 - 1.40, relative to the assessed value. A weighted average of these update factors was then calculated based on each generic type's share of the total count of single-family residential homes. This value is 1.249, or 24.9 percent above the assessed value. The update factor was applied to all single family residential homes to represent a depreciated replacement value adjustment to the inventory. Due to the variance observed in the assessment method used for commercial structures in the assessor's database, each commercial structure and multi-family residential structure (assessed similarly to commercial structures) had a depreciated replacement value calculated for it. The square foot costs for these structures came from *Marshall & Swift Valuation Service 2013 (with 2014 updates).* All values calculated in October of 2014 (FY15) have since been updated to FY17 values using the *Engineering News Record (ENR) Building Cost Index (BCI).*

There is uncertainty in the depreciated replacement values for structures due to factors such as assessment of construction types and qualities. In order to account for this, uncertainty measures were assigned to structure values, as suggested in Corps EM 1110-2-1619. Residential and non-residential structure values were assumed to be normally distributed with a standard error (standard deviation in percent) of 25 percent. Data from previous studies from the Omaha and Kansas City Districts, as well as professional judgment, were used to calculate the standard deviation of the depreciated replacement values for structures in the HEC-FDA risk model. The only exception to this was mobile homes. Instead, these structures were assumed to have a standard error of 11.4 percent, which was taken from *Final Report: Depth-Damage Relationships for Structures, Contents, and Vehicles and Content-To-Structure Value Ratios (CSVR) in Support of the Donaldsonville to the Gulf, Louisiana, Feasibility Study* (USACE, 2006b). The use of this uncertainty value for mobile homes was deemed appropriate based on the assumption that this structure type is generally similar across the country.

Each structure was assigned to both a study damage category and structure occupancy type formatted for HEC-FDA. Study damage categories are used in HEC-FDA to consolidate large numbers of structures into specific categories with similar characteristics. Table 4 lists the study damage categories used in the flood damage analysis.

Table 4 Damage Categories

Category Name	Category Description
R	Residential
C	Commercial
I	Industrial
P	Public

A structure occupancy type in HEC-FDA is a subcategory of individual study damage categories and is a name given to a similar set of structures that is used to define depth-percent damage functions, first-floor uncertainties, structure value uncertainties, content-to-structure value ratios with uncertainties, and other-to-structure value ratios with uncertainties for each type of structure. The codes and corresponding occupancy types are contained in Table 5. For purposes of aggregating to specific damage categories, additional occupancy types were created that are not shown in the table below. These additional occupancy types are simply copies of those listed in the table, but are assigned to a different damage category.

Table 5 Structure Occupancy Types

NR01	Furniture Retail Store Engineered
NR02	Electronic Retail Store Engineered
NR03	Clothing Retail Store Engineered
NR04	Hotel Engineered
NR05	Fast Food Restaurant Engineered
NR06	Non-Fast Food Restaurant Engineered
NR07	Hospital Engineered
NR08	Medical Office Engineered
NR20	Warehouse, Refrigerated Engineered
NR21	Warehouse, Non-Refrigerated Engineered
NR99	Grain Elevator
R01	HOMES - 1NB - (1 story, no basement)
R02	HOMES - 1WB - (1 story, with basement)
R03	HOMES - 2NB - (2 story, no basement)
R04	HOMES - 2WB - (2 story, with basement)
R05	HOMES - SPL NB - (split level, no basement)
R06	HOMES - SPL WB - (split level, with basement)

NR09 Protective Services Engineered	R07 MOBILE HOMES
NR10 Correctional Facility Engineered	R08 APARTMENTS - 1NB - (1 story, no basement), 8 units or less
NR11 Recreational Facility Engineered	R09 APARTMENTS - 1WB - (1 story, with basement), 8 units or less
NR12 Religious Facility Engineered	R10 APARTMENTS - 2NB - (2 story, no basement), 8 units or less
NR13 School Engineered	R11 APARTMENTS - 2WB - (2 story, with basement), 8 units or less
NR14 Service Station Engineered	R12 APARTMENTS - SPLWB - (split level, with basement), 8 units or less
NR15 Office Building Engineered	R13 Apartment (large, multi-story apartment building)
NR16 Convenience Store Engineered	
NR17 Grocery Engineered	
NR19 Industrial Light Manufacturing Engineered	

Content Value

The value of contents in a residence was assumed to equal 50 percent of the structure value. This percentage is similar to the percentages used by local casualty insurance companies for homeowners' policies and is consistent with previous survey data from the Omaha District. The generic content depth-damage curves for residential structures provided in the Economic Guidance Memorandum (EGM) 04-01, *Generic Depth-Damage Relationships for Residential Structures with Basements,* represented the content depth-damage functions for residential structures in HEC-FDA (USACE, 2003). Using these relationships, it is not necessary to define the value of contents for a residence in HEC-FDA. Thus, the 50 percent value assigned to residential contents was used merely for reporting investment values in the flood plain external to HEC-FDA. The only deviation from this would be the contents of mobile homes. The depth-damage curve for mobile homes was created by the New Orleans District and assigns a content value of 139 percent of the structure value. It was assumed for this analysis that the contents of mobile homes don’t vary significantly by region and curves created in the New Orleans District are applicable to the Omaha District.

For commercial structures, a content-to-structure value ratio was based on the specific type of use of the structure, using the report *Solicitation of Expert Opinion Depth-Damage Function Calculations for the Benefit-Cost Analysis Tool* (URS Group, 2008). The closest relevant use-type was applied to any structures with use-types not found in this reference.

As specified in Corps EM 1110-2-1619, a measure of uncertainty should be applied to the content-to-structure value ratios to account for variation among structures within each occupancy type (USACE, 1996). Based on guidance from EGM 04-01, the “error associated with content-to-structure” value for residential structures should be left blank, which implies that the error in content-to-structure value ratio is part of the content depth-damage relationship (USACE, 2003). For non-residential structures, the standard deviation of the percent value of contents within each occupancy type from the aforementioned expert solicitation report was imported into the model. This solicitation report was used due to the breadth of knowledge that was covered when this document was composed. Further rationale for using this data is that the business types covered by this report are similar to the businesses existing in the Deadmans Run watershed.

Appurtenant Uses

Appurtenant uses such as vehicles, equipment and landscaping can be accounted for in HEC-FDA. For this particular study only the value of vehicles associated with residential structures was evaluated. Based on the 2015 American Community Survey 1-Year Estimates for Selected Housing Characteristics, there is an average of 1.69 vehicles per occupied residence in the City of Lincoln. To account for some vehicles being moved to higher ground, it was assumed that there would be one vehicle per single family residential household susceptible to flooding. Using data from Autotrader.com for used vehicles for sale in the City of Lincoln, an average value per vehicle was calculated. This value, representing a resale value, was further adjusted to a wholesale value to more accurately represent the true value of a vehicle before dealer markup is added. The adjustment is based on data from Myvinny.com, which specializes in comparing the true market value of a vehicle to the dealer prices. Using data on the 10 most popular vehicles on the road, the average difference in price was calculated by the site. The percent difference found was then applied to the average vehicle value for this study. After adjustment, the average value of a vehicle used for this study was $10.5 thousand. While this value was used for single family households, there is some uncertainty for multi-family structures. Since accurate counts are more difficult for these, a percentage of the structure value was used instead. This percentage is based on the average single family structure value compared to the $10.5 thousand average vehicle value. The average vehicle value is slightly greater than 10 percent of the average single family structure value. To be conservative, 10 percent of multi-family structure value was used for appurtenant uses in multi-family structures.

A summary of investment value in the 0.2% ACE flood plain, including structure, content, and appurtenant uses, as well as the number of structures, is shown in Table 6. Structures identified as being located in the 0.2% ACE flood plain are those that show damages incurred at the 0.2% ACE event under the without-project condition. As explained in the Content Value section above, content value for single-family residential structures is assumed to be 50 percent of structure value, though the depth-damage functions used from EGM 04-01 do not identify a CSVR as this is taken into account in the damage percentages to contents at various depths.

Table 6 Investment Value in Deadmans Run .2% ACE (500-yr.) Floodplain ($1,000s), FY17 Price Levels

Damage Category	Number of Structures	Structure Value	Content Value	Appurtenant / Other Value	Total Value
Deadmans Run					
Residential	555	68,472.22	29,761.07	8,080.15	106,313.44
Commercial	28	12,555.78	6,835.74	0.00	19,391.52
Industrial	11	728.64	269.60	0.00	998.24
Public	10	1,437.12	278.77	0.00	1,715.89
Subtotal	604	83,193.76	37,145.18	8,080.15	128,419.09
West Tributary					
Residential	105	2,896.57	2,912.69	1,102.50	6,911.76
Commercial	8	4,355.47	1,385.88	0.00	5,741.35
Industrial	29	34,770.57	13,075.54	0.00	47,846.11
Public	4	942.46	75.39	0.00	1,017.85
Subtotal	146	42,965.07	17,449.50	1,102.50	61,517.07
Total	**750**	**126,158.83**	**54,594.68**	**9,182.65**	**189,936.16**

Depth-Damage Functions

Residential Depth-Damage Functions

Each occupancy type has its own depth-percent of value damaged curves for structure and contents. The generic structure and content depth-damage curves for residential structures provided in the Economic Guidance Memorandum (EGM) 04-01, represented the depth-damage functions for residential structures in Lincoln (USACE, 2003). This EGM summarizes data developed by the Institute for Water Resources (IWR) using post-flood residential damage claim records provided by the Federal Emergency Management Agency (FEMA). The functions account for both structural and content damage to homes. A depth-damage curve was also applied for appurtenant uses, which in this circumstance only included vehicles located at residential structures. A depth-damage curve for mobile homes is not included in EGM 04-01. Instead, the damage curve for mobile homes based on 2006 data from the New Orleans district is used (USACE, 2006B). This curve was used because it is reasonable to assume that mobile homes across the nation would face similar depth-damage functions from various heights of fresh water flooding and would also have similar CSVRs.

The depth-percent damage functions are not known with certainty. In order to account for this, and to be consistent with guidelines specified in Corps EM 1110-2-1619, uncertainty measures were incorporated into the depth-damage functions. Reported average standard deviations for structure and content damages from EGM 04-01 were used to incorporate uncertainty with respect to the residential structure and content damage functions in the HEC-FDA model.

Commercial Depth-Damage Functions

The depth-damage functions for non-residential structures were based on the data presented from the draft report *Solicitation of Expert Opinion Depth-Damage Function Calculations for the Benefit-Cost Analysis Tool* (URS Group, 2008).Twenty-one core non-residential structures were evaluated by a panel of experts recruited from across the United States. The resulting data from the panel included nationally relevant depth-damage functions (DDFs) for use in estimating the value of damages expected to occur from a flood event. Each DDF is applicable to businesses across the Nation. These FEMA/USACE expert-engineered depth-damage functions were used for non-residential structures in the study area.

Uncertainty measures were incorporated into the commercial and public depth-damage functions. For non-residential structures, depth-damage function uncertainty is expressed as a triangular distribution. Uncertainty values associated with the occupancy types provided in the report above were used in the modeling.

Appurtenant Use Depth-Damage Functions

Appurtenant uses such as vehicles, equipment and landscaping can be accounted for in HEC-FDA. For this particular study only the value of vehicles associated with residential structures was evaluated.

Using EGM 09-04, *Generic Depth-Damage Relationships for Vehicles*, a weighted average depth-damage curve was created to represent the makeup of vehicle ownership in Lincoln (USACE, 2009). It was then incorporated into the HEC-FDA program. Of the vehicle types examined in EGM 09-04: sedans, pickups, SUVs, sports cars and mini vans, only sedans, pickups and SUVs were considered when creating the weighted depth-damage curve because these types are most representative of the automobiles in Lincoln. The percentage of damage to a certain type of vehicle at varying elevations was multiplied by the percentage that vehicle type represented of the total number of vehicles sampled. This process was followed for each vehicle type and the results were totaled, giving a single depth-damage relationship that could be applied to each residential structure. The same process was also followed to derive the standard deviations of damages at different water depths. Table 7 displays the vehicle depth-damage curve used for this study.

Table 7 Vehicle Depth-Damage Functions

Depth of Flooding	Percent Damage	Standard Deviation	Depth of Flooding	Percent Damage	Standard Deviation
0	0.00	0.00	5.5	80.62	3.48
0.5	4.42	5.16	6	85.62	3.73
1	20.64	4.08	6.5	89.27	4.00
1.5	28.64	3.70	7	92.92	4.28
2	36.64	3.32	7.5	95.71	4.54
2.5	43.89	3.12	8	98.50	4.80
3	51.14	2.92	8.5	99.25	5.07
3.5	57.64	2.91	9	100.00	5.33
4	64.14	2.91	9.5	100.00	5.33
4.5	69.88	3.07	10	100.00	5.33
5	75.63	3.22			

Other Damage Categories

Infrastructure, Emergency Response and Cleanup Damages

Data availability for damages related to infrastructure, emergency response and cleanup was not readily available for the Deadmans Run watershed. To account for these damage types, figures from a recent study on a similar watershed within the City of Lincoln were incorporated into this study. In 2000, these damage categories were estimated for the Antelope Creek watershed within the City of Lincoln. The similarities between these two watersheds are numerous. Deadmans Run is located just a couple miles north of Antelope Creek and shares many of the same traits related to hydrology and soils. Both are right bank tributaries of Salt Creek, as well. In addition to this, levels and types of development in the watersheds are much the same. The development, specifically, lends to the inclusion of damages related to infrastructure, emergency response and cleanup in this analysis.

In the Antelope Creek Feasibility Study in 2000, the cost of repairing flood damage to public infrastructure and the cost of emergency services were estimated for the 1% and .2% ACE events by the Public Works Department for the City of Lincoln. Damages at lesser events were estimated based on those figures. The estimates included labor, equipment, and contract services for sanitary and storm sewer cleaning, equipment and facility repair, tree and brush cleanup and disposal, park repair and reseeding, bridge repair, additional police assistance, and the administration of staff and contracts. Damages by event for Antelope Creek are shown in Table 8 below.

Table 8 Antelope Creek Infrastructure and Emergency Management Costs (2000 Price Levels)

Event	.125 (8-yr)	.1 (10-yr)	.02 (50-yr)	.01 (100-yr)	.002 (500-yr)
Damages ($1,000s)	36	52	192	440	528

Source: USACE, 2000b

Based on the onset of flooding on Deadmans Run, damages from Antelope Creek are not used below the 4% ACE event. Figures for the 4% and .4% ACE events are interpolated from the figures provided. These figures are updated to FY17 price levels using the Civil Works Construction Cost Index System (CWCCIS) Composite Index, which was updated in October of 2016. The updated values are shown in the table below. Table 9 below values represent totals for the entire stream. They are further broken down by reach based on the total damages calculated for structures in the HEC-FDA model. To account for uncertainty when inputting these damages into a direct depth-damage function in HEC-FDA, a triangular distribution with maximum and minimum values of +/- 40 percent is assumed.

Table 9 Deadmans Run Infrastructure and Emergency Management Costs

Event	.04 (25-yr)	.02 (50-yr)	.01 (100-yr)	.004 (250-yr)	.002 (500-yr)
Damages ($1,000s)	252.88	309.25	708.70	815.00	850.43

National Flood Insurance Administration Cost Savings

The City of Lincoln is a participant in the National Flood Insurance Program (NFIP). As part of this program, the city has adopted and enforces strict land use controls, including building codes, zoning regulations, and subdivision regulations designed to limit flood damage to future construction within the Federal Emergency Management Agency (FEMA) specified Special Flood Hazard Area (SFHA). This area comprises the 1% ACE floodplain. The city has statutory authority to enforce land use regulations in the city and within an extraterritorial zoning jurisdiction. As a result of the city's participation in this program, property owners and renters in the area are eligible to purchase flood insurance. These policies provide for the reimbursement for eligible damages in the event of a flood.

Savings which accrue to the government as a result of the implementation of a flood risk management project are considered NED benefits. The savings in policy premiums are not considered, because to do so would result in double counting flood damages that are reflective of the policy premiums. The savings of flood insurance policy administration costs are not reflected as flood damages and would constitute a benefit. Savings would occur to the extent present and future policyholders are removed from the SFHA and NFIP policies are no longer required.

The most recent estimate of NFIP administrative costs is $192/policy, according to Economic Guidance Memorandum 06-04, *National Flood Insurance Program Operating Costs* (USACE, 2006a). In the City of Lincoln, there are currently 567 NFIP policies in force within three zip codes adjacent to Deadmans Run. Not all of these policies will fall within the portion of Deadmans Run that makes up the study area. Prior analysis of the entire stream resulted in the assumption that 379 policies were located in the study area based on this segment's share of the total structures in the 1% ACE floodplain. The 379 policies are applied to each reach based on that reach's share of 1% ACE floodplain structures in the study area. Table 10 below shows the estimated number of policies in force by reach, with potential annual savings included and indexed to FY17 Price levels.

Table 10 Number of NFIP Policies in Force and Potential Annual Savings, by Reach, FY17 Price Levels

Reach	Number of Policies	Potential Annual Savings
Deadmans Run		
Reach 1L	2	$503
Reach 1R	5	$1,259
Reach 2L	0	$0
Reach 2R	230	$57,894
Reach 3L	9	$2,265
Reach 3R	43	$10,824
Reach 4L	18	$4,531
Reach 4R	27	$6,796
Reach 5L	0	$0
Reach 5R	0	$0
Reach 6L	0	$0
Reach 6R	0	$0
Total Deadmans Run	**334**	**$84,072**
West Tributary		
Reach 1L	5	$1,259
Reach 1R	0	$0
Reach 2L	41	$10,320
Reach 2R	0	$0
Total West Tributary	**46**	**$11,579**
Total	**380**	**$95,651**

A direct correlation cannot be drawn between the number of structures and the number of flood insurance policies. Some structures, such as apartments, may have multiple policies. Other structures may be owned free and clear or may have been purchased under land contract. In both instances, flood insurance is recommended, but not required. For purposes of this analysis, and to provide simplicity in computing potential benefits for the removal of structures from the floodplain, it is assumed that each structure requires one policy and that the current rate of insured structures will remain relatively flat over time. The current rate of insured structures in the 1% ACE floodplain is 65.7 percent. Predicting turnover rates for homes, which homes will have a mortgage, whether those who pay off a mortgage will keep their insurance, and other variables is not likely to yield changes in the insured rate that could be justified with any degree of certainty. Therefore, no change in future policy numbers in the without-project condition is considered.

It should be noted that including the administrative cost savings for NFIP policies in the benefits analysis will only show an impact to the extent that the 1% ACE floodplain is reduced, and less structures are captured within it. Alternatives that only reduce flooding extents and damages for events smaller than the 1% ACE event, will not see this benefit realized.

Existing Condition Damages by Event Expected Annual Damage Analysis Results

Table 11 below displays damages by event for the study area. Figures are based on outputs from the HEC-FDA model that do not incorporate uncertainty. This table is only an approximation of structure, content and vehicle damages at each event. There is a large increase in damages from the 4% ACE event to the 2% ACE event. This is primarily due to onset of damages in Reach 2R, which is modeled with a pseudo levee as describe above. The pseudo levee, which is being modeled to represent high ground between the stream and structures, prevents damages in this reach until 0.5 ft. above the 4% ACE event. Therefore, damages for this reach aren't included until the 2% ACE event. Expected annual damages for other categories are included in Table 12.

Table 11 Structure, Content and Appurtenant Use Damages by Event (FY 2017 Price Levels, $1,000s)

Event	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	250-yr	500-yr
Probability	0.5	0.2	0.1	0.04	0.02	0.01	0.004	0.002
Structure/Content/ Appurtenant Use Damages ($1,000s)	0	0	12	1,472	23,684	29,773	36,159	45,091

Expected annual damages (EAD) are based on the fiscal year 2017 price levels, an interest rate of 2.875 percent, and a 50-year project life. As shown in Table 12 below, the total EAD, including damages to residential and commercial structures and contents, as well as infrastructure damages, emergency costs and NFIP administration costs, is nearly $2.18 million. Three reaches stand out as showing especially significant damage estimates, and those cover the area on the right bank of Deadmans Run between 48th St and the BNSF railroad (Reaches 2R through 4R). These three reaches account for over 80 percent of the EAD. Approximately 10 percent of the EAD is attributed to the West Tributary reaches. Within the West Tributary reaches, a significant amount of the EAD can be attributed to three, high value grain elevators. Approximately 40 percent of the West Tributary EAD results from the flooding of these three high value structures. As a percentage of the entire study area EAD however, these three structures account for roughly 5 percent or less.

Table 12 Expected Annual Damages by Reach (FY 2017 Price Levels, $1,000s)

	Bank	EAD by Damages and Costs Categories: Commercial / Public / Industrial Structure & Contents	Residential Structures & Contents	Infrastructure & Emergency Response Costs	NFIP	Total EAD
Deadmans Run						
Reach 1	L	3.65	1.57	0.08	0.50	5.80
	R	19.63	13.51	0.50	1.26	34.90
Reach 2	L	0.96	0.00	0.02	0.00	0.98
	R	203.87	1,115.51	20.04	57.89	1,397.31
Reach 3	L	0.73	28.68	0.45	2.27	32.12
	R	1.05	206.09	3.15	10.82	221.11
Reach 4	L	24.90	66.58	1.39	4.53	97.40
	R	7.11	146.91	2.34	6.80	163.16
Reach 5	L	0.00	0.00	0.00	0.00	0.00
	R	0.00	0.00	0.00	0.00	0.00
Reach 6	L	0.00	0.00	0.00	0.00	0.00
	R	0.00	0.00	0.00	0.00	0.00
	Subtotal	**261.90**	**1,578.85**	**27.97**	**84.07**	**1,952.79**
West Tributary						
Reach 1	L	24.88	15.91	0.62	1.26	42.67
	R	0.37	0.00	0.01	0.00	0.38
Reach 2	L	78.27	20.64	1.50	10.32	110.73
	R	68.78	0.00	1.05	0.00	69.83
	Subtotal	**172.30**	**36.55**	**3.18**	**11.58**	**223.60**
	Total	**434.20**	**1,615.40**	**31.14**	**95.65**	**2,176.39**

Without-project Condition: Summary of Analysis Accounts

The resources consulted in establishing the future without-project conditions included maps, aerial photos, topographic and hydrographic surveys, soils data, previous studies, and consultation with other agencies. It is assumed that minimal channel encroachments (urbanization and commercialization) will continue. Economic and social revitalization along Deadmans Run will likewise degrade due to nonsocial interaction within this area and the flood plain development restrictions that currently exist. Periodic flooding will continue to plague portions of the river floodplain and will continue to damage property in the flood plain. This will continue to create economic and social hardships to the properties affected, as well as to others not directly impacted by flooding. Overall, a "no action" condition would have negative impacts on the national economic development (NED), regional economic development (RED), and other social effects (OSE) accounts, as enumerated below. In addition, it is expected that future without-project conditions would not result in any improvement to the plant, aquatic, and wildlife habitat for the area and environmental quality (EQ).

NED Effects of No Action: Losses to national economic output are quantified as the expected annual damages estimated for this study. Expected annual damage totals an estimated $2,176,390 in the study area as noted above. This is only an average annual total; little or no damage might occur in some years, while other years would bring flood events causing several million in damages. Listed below are several aspects of these losses accounted for as part of the NED analysis.

- **Residential -** Many residents in the study area would sustain heavy personal losses from flooding. According to the HEC-FDA model, the 0.2% ACE (500-year) event would be expected to damage 586 single family homes in Lincoln. A 1% ACE (100-year) event showed damage to 466 homes.

- **Businesses -** Many businesses and public facilities, large and small, would be seriously damaged by flooding and possibly driven out of business. A 0.2% ACE flood could damage 76 businesses, while a 1% ACE flood could damage 35.

- **Public sector –** The public sector could also suffer losses. In a 0.2% ACE flood could damage 14 public facilities in the City. Additionally, costs associated with infrastructure repairs, cleanup, emergency response, etc. would be incurred by the City of Lincoln.

Additional effects that are likely NED losses, but are not included in the equivalent annual damage cited above because they resulted in minimal losses or were not calculated for this study, include the following:

- **Traffic interruptions -** Periodic closures during flooding (threatened flooding as well as actual) is likely to interrupt traffic and commerce along many City roads. Road closures could lead to detours and time-consuming delays on these routes. Costs associated with these interruptions are not quantified in this analysis, however. The costs are typically based on the number of days a road may be closed. Due to the nature of flooding in the study area, it is unlikely that roads would be closed for a significant enough time to add substantial quantifiable costs to those calculated in this analysis. The flashy nature of the flooding would likely not lead to closures on major arterials that would last any more than a few days under the most extreme flooding conditions.

- **Business income losses from shutdowns -** Business shutdowns can last for weeks in large floods, causing sizable and even ruinous production losses. Usually, production can be replaced by other locations of the company or companies in the same industry, so costs of business interruptions are generally considered economic transfers rather than losses to total output and are not counted as NED damages. However, production losses at some study area companies probably could not be made up by other companies or other branches of the same company , (due to production switching costs, shipping of materials, increased demand on capacity, etc.), at least not quickly enough to meet consumer needs. These production losses would represent NED losses.

- **Agricultural Losses at the University of Nebraska-Lincoln East Campus Research Plots –** While the study area is a heavily developed, urbanized watershed, the University of Nebraska-Lincoln has an approximately 370 acre agricultural research campus located on the left bank of Deadmans Run, with agricultural research plots located on both banks. These research plots that have been in use for over 100 years are not only a great source of pride for the school, they are also invaluable to the important research conducted by the school that has impacts far beyond the campus.

  When comparing the most extreme flood event modeled (.2% ACE) to the campus and its crop land, it was determined that approximately 75 acres of land would be impacted. Typical agricultural analyses involve the study of many hundreds or thousands of acres of lands.

Damages are typically calculated by determining the input costs, harvest costs and income from the harvested crops that would be lost if a flood event were to impact the crop land. Other variables that determine the amount of these inputs and outputs lost are the time of year and the duration of flooding. For this study, determining the time of year would carry a great amount of uncertainty. Additionally, durations of inundation are not expected to be much longer than a day or two, which in a typical agricultural analysis would likely only result in a low percentage of costs and potential income lost. The inability to capture the true input costs, such as research hours, that are far beyond typical costs captured in a crop budget would also lead to a relatively low estimate of losses on a per-acre basis. These low estimates that likely do not capture the true loss, coupled with a maximum of 75 acres inundated, would likely show no significant impact on the quantitative results captured in the expected annual damages.

It is expected that the true impact, especially in terms of lost research, of major flood events would be significant and felt beyond the campus community, into the farming community whose farming practices and decisions can be based on research conducted at the East Campus. Any proposed alternative that would potentially address flooding on the campus, would have beneficial impacts that will not be captured in this analysis.

- **Advanced Bridge Replacement Benefits -** If a railroad, highway, street, or pedestrian bridge is replaced as the result of a flood risk management project, a benefit can be claimed to at least partially offset the cost of the bridge replacement. Advanced bridge replacement benefits are taken for the period that the useful life of the bridge is extended by the project. Benefits are based on credit for deferring the replacement cost for the existing bridges for n years (where n = new bridge life minus old bridge remaining life). Although bridge replacement is a component of multiple alternatives, advanced bridge replacement benefits were not estimated as a part of this study. While it is recognized that there is a benefit for the period that the useful life of a bridge is extended by the project, the estimation of this benefit would not have changed the conclusion of the alternative screening or the Tentatively Selected Plan. Additionally, the absence of this benefit means that net benefits are likely slightly greater than currently reported, and the selected plan is all the more justified based on the net benefit analysis

RED Effects of No Action

Regional economic development considerations are factors affecting the Lincoln regional economy while not necessarily affecting national economic outputs. Several such effects would be felt in the study area if no actions were taken to reduce the flood threat. RED effects resulting would include the following:

- **Residential flood insurance premium costs** *(probable adverse income impact*) - Residents would continue to face onerous flood insurance requirements.

- **Threats to local/regional businesses** *(probable adverse income and jobs impacts)* – Lincoln businesses in and around the study area would be threatened by multiple factors related to flood risk, including (a) catastrophic periodic flood damage; (b) frequent business closures or scale backs; (c) employee safety during flood events; (d) the cost of flood insurance requirements; and (e) stiff building codes that would work against firms needing to expand in the flood plain.

- **Threats to economic development prospects** *(probable adverse income and jobs impacts)* **-** The same considerations listed above that would affect existing jobs in the City would also discourage new development and growth in the form of businesses migrating into the City or region or the development of new areas. Large companies considering moving into the study area, bringing job concentrations with them, may not do so in a flood-prone area and the attendant regulatory environment.

Other Social Effects of No Action

- **Public safety** *(probable adverse impacts on human life)* – If no action is taken, a greater risk to public safety exists. With 586 residential structures (of which mobile homes represent a significant portion in downstream and West Tributary reaches) identified in the floodplain, there are likely more than 1,400 residents (based on 586 residential structures x 2.40 average household size, not taking into account multi-family structures) in the affected area. Danger could take the form of drowning, electrocution, and illness from exposure to contaminated flood waters. A short warning time due to the flashy nature of the flooding could exacerbate these dangers. The increased likelihood of coincident flooding on Salt Creek also makes residents in mobile homes in the lower reaches of the study area very vulnerable to flood water's life safety risks. This danger is present even if a home is not directly impacted by flood waters. Taking "no action" would not reduce the potential for loss of human life or the potential for extensive flood damage Lincoln.

- **Threats to redevelopment** *(possible adverse cultural, historical and aesthetic impacts)* **-** As briefly discussed under RED impacts, if redevelopment is hampered all structures in the study area may tend to age and depreciate; this could negatively affect aesthetic and historical values.

National Ecosystem Restoration effects of No Action

- It is expected that under future without-project conditions no significant changes would occur to the riparian or aquatic habitat.

Alternatives Screening

Economic costs and benefits resulting from a project are evaluated in terms of their impacts on national wealth, without regard to where in the United States the impacts may occur. National Economic Development (NED) benefits must result directly from a project and must represent net increases in the economic value of goods and services to the national economy, not simply to a locality. For example, if a flood interrupts auto production at a plant in one community, that community suffers a loss. But if the affected company replaces the interrupted production at another plant in another City, the community's loss does not represent a net loss to the national economy, and the prevention of such a loss cannot be claimed as a NED benefit.

NED costs represent the costs of diverting resources from other uses in implementing the project, as well as the costs of uncompensated economic losses resulting from detrimental effects of the project. NED benefits, the benefit-cost ratio, and the net NED benefits are calculated during the evaluation process. Net benefits represent the amount by which the NED benefits exceed NED costs, thereby defining the plan's contribution to the nation's economic output. The plan with the highest net benefits is considered the recommended plan, assuming technical feasibility, environmental soundness, and public acceptability. Note that the plan with highest net benefits is not necessarily the plan with the highest benefit-cost ratio. The benefit-cost ratio helps identify which plans have likely economic feasibility and can be carried forward for further analysis, but is not decisive in identifying the NED plan from among those plans that are economically feasible.

General Description of the With-Project Alternatives

This section details the alternatives considered for flood risk reduction. Many structural and nonstructural flood damage reduction measures were considered for reducing the flood threat from the City of Lincoln. Structural flood mitigation measures considered including off channel storage, levees and channels. Nonstructural flood mitigation measures included flood warning, flood preparedness planning, flood proofing and elevation, and structure buy-out and relocation. These measures require the support of the entire community to implement. These alternatives are described in further detail below followed by a detailed analysis of the alternatives considered for final evaluation.

ALTERNATIVE #1 – CHANNEL AND BRIDGE WIDENING, CHANNEL CONVEYANCE IMPROVEMENTs

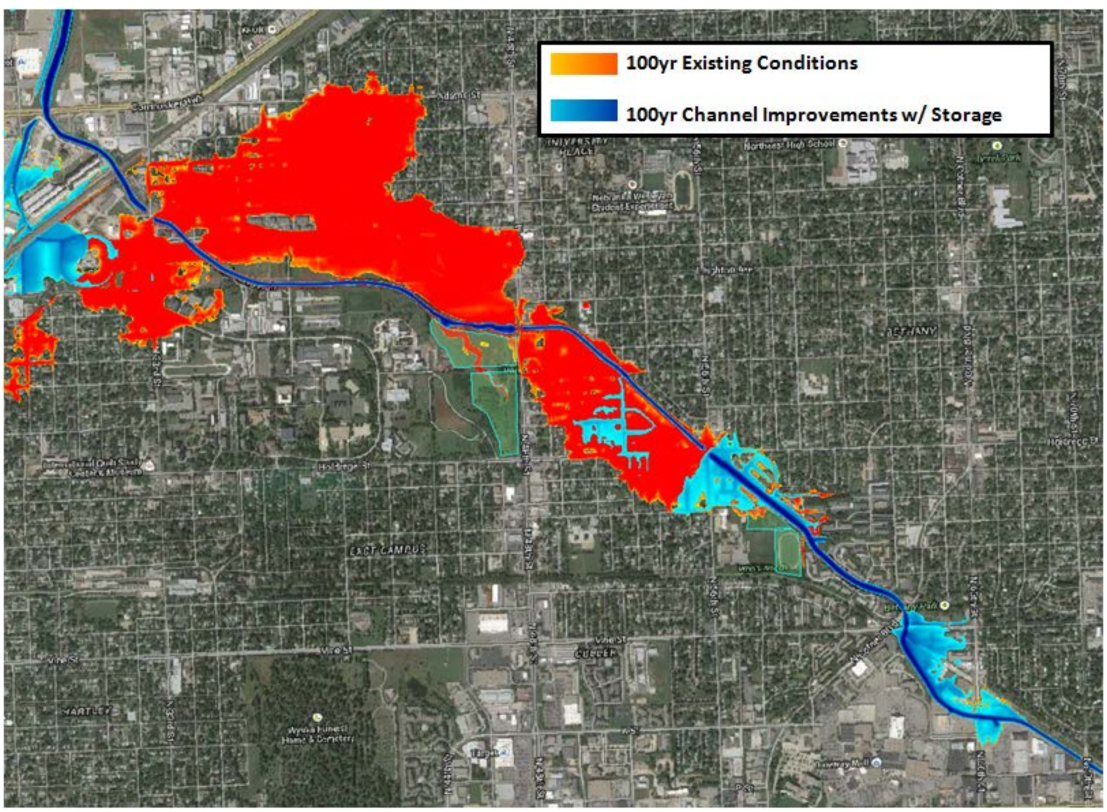
The focus of this alternative was on increasing channel conveyance by widening the channel and increasing flow velocity. Significant channel widening, bridge replacements, and a flume beneath the railroad bridges form the core of the effort to lower flood stages. This alternative does not contain levees.

The initial version of Alternative #1 only included replacement of the 33rd and 48th street bridges with wider structures, placing the concrete flume under the railroad bridges, and sizing the channel to a 1% ACE flood event. However, the HEC-RAS models showed that with the improved channel and wider structures, the flow with the Deadmans Run channel has increased in speed enough to cause backwater effects on the west tributary. HEC-FDA modeling determined that these backwater effects were significant enough to cause induced damages along the tributary. After some additional analysis it was determined that the backwater effects along the tributary were being caused by coincidental hydrographs. These effects don't currently exist because the tributary's hydrograph peaks before the peak of the current Deadmans Run hydrograph. However, by increasing the velocity of the flows in the Deadmans Run channel, and increasing the volume of water within the channel, the hydrographs are now peaking at almost the exact same time.

In order to mitigate the induced damages being caused by the improved Deadmans Run channel a detention basin was designed along the west tributary. The detention basin was designed with a hard overtopping so that at events equal to or more severe than the 4% ACE event (the event at which it was determined the backwater effects started) water would start flowing into the basin. The detention basin was sized to accommodate the necessary volume, approximately 90 acre-ft, to “shave” the West Tributary hydrograph enough to eliminate all of the previously noted backwater effects. In addition to the detention basin, it was determined that the existing access road to the grain elevator and other industrial facilities along the left bank of the West Tributary needed to be relocated. The reason for this relocation was the existing access road didn’t have sufficient space to accommodate another culvert underneath it. This additional culvert is necessary to allow the West Tributary to release flows into the Deadmans Run channel faster, which in turn allows more of the flows from the tributary to escape before the water levels within the Deadmans Run channel rise and begin causing backwater effects. The relocated access road will not only allow for increase flow underneath the roadway, but it should also provide for a safer and more geometrically friendly intersection between the access road and the State Fair Park Drive. It is worth noting that a “Texas Crossing,” or low water crossing, was also considered for the access road, but due to the geometrics required for the tractor trailers accessing the grain elevator this type of crossing was determined to be infeasible.

Figure 1 below shows the change in the floodplain with the proposed alternative. The high damage area to the north of the channel between 48th St and 33rd St has been removed from the 1% ACE floodplain with the channel improvements and bridge replacements. This area contributes the largest amount to the reduced damages and elimination of NFIP administrative costs.

Figure 1 Alternative 1 and Existing Condition 1% ACE Floodplain Comparison



ALTERNATIVE #2 – CHANNEL AND BRIDGE IMPROVEMENTS WITH A SHORT LEVEE

The focus of this alternative was on increasing channel conveyance by increases in channel width and flow depth. Substantial channel widening, the widening the 48th Street bridge, and a short levee to increase channel depth in localized areas form the core of the effort to lower flood stages. This alternative differs from Alternative #1 primarily by substituting a right bank levee between the Railroad Bridges and Huntington Avenue in-lieu of replacing the 33rd and Baldwin Bridge and installing the concrete flume under the railroad bridges.

Similar to Alternative #1, the initial version of Alternative #2 only included structure measures along the main Deadmans Run channel. However, the HEC-RAS models for Alternative #2 also showed that with the backwater effects on the west tributary. Therefore, the detention basin and relocated access road were incorporated as pieces of Alternative #2 as well.

ALTERNATIVE #3 – STAND-ALONE NONSTRUCTURAL RISK REDUCTION MEASURES

A stand-alone nonstructural assessment was completed for the study area along Deadmans Run. The assessment looked at the 1% ACE design flood event. All of the structures within the 1% ACE floodplain were identified, and a nonstructural measure was selected for each structure. Nonstructural measures included elevating structures, removing basement areas, wet floodproofing, and dry floodproofing. Although relocation is another potential nonstructural measure that could have been identified, given the number of structures within the floodplain, relocation was not considered to be a cost-effective solution. The measures identified for each structure were selected based on the structure characteristics, and the depth of flooding at that structure's location. The details of the methodology used in the assessment are located in the FRFM Appendix.

In addition to the stand-alone nonstructural plan, supplemental nonstructural plans were considered for both Alternatives #1 and #2. These plans looked at any of the structures that would remain within the 1% ACE floodplain within the study area, and attempted to identify an appropriate nonstructural measure for each remaining structure. However, the only economically viable structures found under these supplemental plans were downstream of the BNSF Railroad Bridge. The significance of the structures being downstream of the BNSF Railroad Bridge is that this is the point where the Salt Creek Floodplain begins to overlap the Deadmans Run Floodplain. Therefore, although there may have been "viable" supplemental nonstructural plans for Alternatives #1 and #2 when evaluating the Deadmans Run Floodplain, when consideration was given for the Salt Creek Floodplain, these plans were no longer economically justifiable. Further discussion on the supplemental nonstructural plans can be found in the FRFM Appendix.

ALTERNATIVE #4 – THE "NO ACTION" PLAN

In accordance with NEPA practices the "No Action" plan was also considered as an alternative. Under the "No Action" Plan the existing flood risk to the community persists into the future.

Detailed Evaluation and Comparison of Alternatives

COMPARISON OF ALTERNATIVES

The principal unit of measure for comparing successful flood risk management plans is the comparison of NED net benefits. The comparison is performed on alternative plans that have been evaluated based upon meeting project objectives and have been found to be cost effective. Cost effective projects are those that have positive net benefits, or a BCR greater than 1.0. Such projects are considered to be in the Federal Interest. The comparison of formulated plans always includes a "no action alternative", which defines the net benefit of doing nothing.

One dimensional unsteady hydraulic modeling was used to produce the water surface profiles that were analyzed in HEC-FDA. Due to the terrain of the area causing structures to sit at lower elevations than stages that stay within the banks, hydraulic modeling methodology, and alternatives analyzed, some issues arose with the stages reported in the water surface profiles that required use of additional pseudo levees to ensure structures in the HEC-FDA model were not showing damages at too frequent of an event.

Significant troubleshooting was undertaken for the hydraulics model to ensure that modeled flows under the alternatives were remaining within the stream banks. Additional detail related to model troubleshooting can be found in section 2.3 of the hydraulics appendix. Once hydraulic modeling was believed to be accurately showing changes to the floodplain under the channel alternative, revised water surface profiles were provided. Pseudo levee heights were also provided for the channel project reaches to help account for the elevation difference between the affected structures and stream. Pseudo levees were set at the index stations for these reaches at the top of bank stage. Any events that produced stages below this height will not have damages calculated in the EAD simulations in HEC-FDA. Pseudo levees were used for the same reaches in Alternative 1 and Alternative 2, with an additional actual levee set in the identified leveed reach in Alternative 2.

Events that produce stages above the top of bank in these reaches do lead to damages that are calculated and included in the EAD. Because the channel is modeled as a levee, these events above the top of bank stage are likely leading to higher residual damages than what would occur, as a typical channel project designed to a specific exceedance event would also likely reduce stages on higher events as there is greater capacity.

ALTERNATIVE #1 – CHANNEL AND BRIDGE WIDENING, CHANNEL CONVEYANCE IMPROVEMENTS

Alternative #1 was determined to meet all of the study objectives within the study area. This alternative would both reduce the potential for life loss and damages associated with flooding along the Deadmans Run channel. Furthermore, it is expected that the channel improvements would reduce emergency response costs associated with future high water events. Additionally, the reduced flood plain should decrease any future costs associated with disrupted transportation networks.

As for the four accounts, Alternative #1 was found to have an annualized project cost of approximately $1 million, producing an annualized benefit of approximately $1.38 million. Alternative #1 produces a BCR of 1.38 and annualized net benefits of $379,540. Furthermore, it stands to reason that by reducing the Deadmans Run floodplain, and thus the number of structures that would require flood insurance and Lincoln residents that would pay flood insurance premiums, there is a positive RED benefit to Alternative #1. The EQ and OSE accounts were not a primary focus in this study, but it is believed that there will be a benefit to life safety for residents and businesses located in the affected area and no negative effect to EQ under Alternative #1.

ALTERNATIVE #2 – CHANNEL AND BRIDGE IMPROVEMENTS WITH A SHORT LEVEE

Alternative #2 was determined to meet all of the study objectives within the study area. This alternative would both reduce the potential for life loss and damages associated with flooding along the Deadmans Run channel. Additionally, like Alternative #1, Alternative #2 should lead to reduced costs associated with emergency response and disruptions to transportation networks during future high water events. Although Alternative #2 satisfies the study objectives, this alternative doesn't produce the same level of positive benefits; this can be seen in the discussion of the NED account below. The primary driver behind the reduced benefits for Alternative #2 is the levee, which, while protecting the right bank structures behind the levee, would increases stages on the left bank.

When evaluating Alternative #2 under the NED account, the alternative was found to have an annualized project cost of approximately $968 thousand producing an annualized benefit of $851,350. Alternative #2 has a BCR of 0.88 and would produce annualized net benefits of -$116,640. Due to Alternative #2 not meeting the requirements for the NED account, other account benefits were not calculated.

ALTERNATIVE #3 – STAND-ALONE NONSTRUCTURAL RISK REDUCTION MEASURES

Alternative #3 was determined to partially meet the study objectives within the study area. This alternative would reduce the potential for damages associated with flooding along the Deadmans Run channel. However, since the existing floodplain would remain unchanged it is hard to determine if there would be significant impact to life loss. Furthermore, without changing the floodplain, it can be expected that there will be no significant change to costs associated with emergency response during high water events. Additionally, disruptions to transportation infrastructure will remain similar to their current levels.

In regards to the NED account, Alternative #3 was found to have an annualized project cost of approximately $1.7 million, producing an annualized benefit of approximately $1.51 million. Alternative #3 has a BCR of 0.89 and would produce annualized net benefits of -$188,710. Due to Alternative #3 not meeting the requirements for the NED account, other account benefits were not calculated.

ALTERNATIVE #4 – THE "NO ACTION" PLAN

Alternative #4 was determined to not meet any of the study objectives. Since this alternative involves no action, there would be no reduction to the potential for life loss and damage associated with flood events along Deadmans Run. Similarly, there would be no change to the existing floodplain, and thus there would be no changes to emergency response costs or costs associated with disruptions to transportation networks. Additionally, Alternative #4 would not satisfy the requirements of the NED account, as there are no benefits associated with the alternative.

Alternatives Cost Summary

Table 13 below shows the costs associated with each of the structural alternatives. Economic costs include construction costs as well as Interest During Construction (IDC) and Operations, Maintenance, Repair, Rehabilitation and Replacement (OMRR&R) costs. IDC is based on a three year construction period, FY17 discount rate of 2.875 percent and payments in the middle of each period. OMRR&R costs were calculated using estimates of expected periodic expenses provided by cost engineering. OMRR&R costs include routine operations and maintenance assumed to be performed by the sponsor into the future. Additional, non-routine outlays including semi-periodic replacement of significant amounts of rip rap, major restoration of storage volume in the detention basin once storage has been reduced by 25 percent, and replacement of structures associated with the detention basin have been incorporated into the estimated OMRR&R costs for this project.

Table 13 Structural Alternatives Cost Summary, FY17 Price Levels ($1,000s)

ECONOMIC COSTS	Alternative 1 - Channel & Bridge Widening, Channel Conveyance Improvements		Alternative 2 - Channel & Bridge Improvements with Short Levee	
INVESTMENT COSTS:				
Construction	$	17,305.84	$	15,330.23
LERRD	$	3,775.00	$	4,933.00
Planning, Engineering, and Design	$	1,565.31	$	1,387.51
Construction Management	$	1,137.46	$	1,008.25
Subtotal, Construction Cost	$	23,783.61	$	22,658.99
Subtotal, IDC	$	925.23	$	936.44
TOTAL PRESENT VALUE, INVESTMENT COST	**$**	**24,708.84**	**$**	**23,595.42**
Annualized Investment Cost (50 yrs, 2.875%)	$	937.65	$	895.40
Annualized OMRR&R Cost	$	62.59	$	72.59
TOTAL ANNUAL PROJECT COSTS	**$**	**1,000.24**	**$**	**967.99**

Costs associated with the nonstructural alternative are estimated using generalized square foot costs for residential and commercial structures, as determined by Omaha District cost engineering and Flood Risk Floodplain Management (FRFM) sections. Further description of unit costs used to determine the aggregate investment cost for all structures with proposed nonstructural measures can be found in the FRFM appendix. The total project cost provided for alternatives comparison is $44.8 million, which is equal to an annual cost of $1.7 million. These costs are included in Table 14 in the net benefits summary, for comparison to structural alternatives.

Net Benefits and Benefit Cost Ratio Summary

A net benefit and benefit-cost analysis was completed for each of the three alternatives to determine the plan with the maximum net annual benefits. The scenario that considers channel and bridge widening and channel improvements (Alternative #1) demonstrates the highest net annual benefits. Of the three alternatives, this is the only one with positive net benefits and a BCR greater than 1.0. Net annual benefits of $379.54 thousand and a BCR of 1.38 indicate a federal interest in this project.

Table 14 Summary of Alternatives Comparison, FY17 Price Levels ($1,000s)

ECONOMIC COSTS	Alternative 1 - Channel & Bridge Widening, Channel Conveyance Improvements		Alternative 2 - Channel & Bridge Improvements with Short Levee		Alterntive 3 - Stand-Alone Nonstructural Risk Reduction Measures	
WITHOUT PROJECT DAMAGES [EAD]						
Structure/Contents/Ext. Damages	$	2,049.60	$	2,049.60	$	2,049.60
Public Damage/Emergency Costs	$	31.14	$	31.14	$	31.14
Flood Insurance Administrative Costs	$	95.65	$	95.65	$	95.65
TOTAL ANNUAL w/o PROJECT DAMAGES [EAD]	**$**	**2,176.39**	**$**	**2,176.39**	**$**	**2,176.39**
WITH PROJECT RESIDUAL DAMAGES [EAD]						
Structure/Contents/Ext. Damages	$	772.16	$	1,300.59	$	620.99
Public Damage/Emergency Costs	$	12.87	$	12.87	$	31.14
Flood Insurance Administrative Costs	$	11.58	$	11.58	$	11.58
TOTAL ANNUAL w/ PROJECT RESIDUAL DAMAGES [EAD]	**$**	**796.61**	**$**	**1,325.04**	**$**	**663.71**
PROJECT BENEFITS:						
Structure/Contents/Ext. Damage Reduction	$	1,277.44	$	749.01	$	1,428.61
Public Damage/Emergency Cost Reduction	$	18.27	$	18.27	$	-
Flood Insurance Administrative Cost Reduction	$	84.07	$	84.07	$	84.07
TOTAL ANNUAL w/ PROJECT ECONOMIC BENEFITS	**$**	**1,379.78**	**$**	**851.35**	**$**	**1,512.68**
INVESTMENT COSTS:						
Construction	$	17,305.84	$	15,330.23	$	-
LERRD	$	3,775.00	$	4,933.00	$	-
Planning, Engineering, and Design	$	1,565.31	$	1,387.51	$	-
Construction Management	$	1,137.46	$	1,008.25	$	-
Subtotal, Construction Cost	$	23,783.61	$	22,658.99	$	-
Subtotal, IDC	$	925.23	$	936.44	$	-
TOTAL PRESENT VALUE, INVESTMENT COST	**$**	**24,708.84**	**$**	**23,595.42**	**$**	**44,834.83**
Annualized Investment Cost (50 yrs, 2.875%)	$	937.65	$	895.40	$	1,701.40
Annualized OMRR&R Cost	$	62.59	$	72.59	$	-
TOTAL ANNUAL PROJECT COSTS	**$**	**1,000.24**	**$**	**967.99**	**$**	**1,701.40**
NET ANNUAL BENEFITS	**$**	**379.54**	**$**	**(116.64)**	**$**	**(188.71)**
BENEFIT/COST RATIO		**1.38**		**0.88**		**0.89**

Optimization

Flood risk management plans must be formulated to meet the National Economic Development (NED) criterion, which requires that the plan with the maximum net benefit be selected, all other things being equal. Determining the optimal plan means not only finding the alternative with the optimal combinations of measures, but determining the optimal scale of those measures. The best project may be defined as the plan that returns the greatest excess of benefits over costs, i.e., it is not possible to improve upon a plan producing maximum net benefits (total benefits less total costs). The process of optimizing net benefits should be reasonable and practical in seeking to maximize net benefits (USACE, 2000a).

After screening out various measures that were found to be impractical, or insufficiently effective or efficient; the principle measures evaluated for this project were channel improvements and bridge replacement and widening, with the scale being the dimension of the channel trapezoid and which bridges to replace and/or modify. For Deadmans Run flooding, estimates of channel improvement costs and benefits were evaluated over a range of design frequencies, from the 2% ACE event to the .833% ACE (120yr) event.

Deadmans Run flooding begins to cause significant damage within the upstream reaches of the study area between the 10% and 4% ACE (10 and 25 year) events. Above the 25 year event, flooding pushes into the 1% ACE floodplain within the study area and expands in depth and lateral coverage to around the 1% ACE event. For lesser FRM levels, benefits rise faster than costs as channel dimension is increased.

Annual benefits rise more quickly from the 2% to the 1% ACE event than from the 1% to the .833% ACE event. Costs at the .833% ACE event also begin to rise very quickly due to the need for demolition and reconstruction of buildings. The .833% ACE event was chosen as the upper bound for the optimization because that is the maximum channel capacity that could be attained before having to remove the next bridge, which would cause even greater escalation in costs that would not be offset by a large enough increase in benefits. Table 15 below provides the results of the optimization with annual net benefits and BCRs for the range of scales.

It can be seen that with-project damages decreased (and benefits increased) from the alternatives screening and TSP. The causes are the replacement of the 38th Street Bridge, which allows for more conveyance, and further optimization of channel sizing. This change would not impact the TSP screening, as it is assumed this change would only increase benefits for Alternative 2 on a similar scale. This particular reach for the proposed project is very similar between the two alternatives, with the key difference being a levee in place of a channel flume in a downstream reach. Cost revisions, including adjustments to the LERRDs, IDC and OMRR&R, are also included in the optimization analysis and the table below.

Table 15 Summary of Optimization, FY17 Price Levels ($1,000s)

ECONOMIC BENEFITS & COSTS	50-Year Channel 0.02	100-Year Channel 0.01	120-Year Channel 0.00833
WITHOUT PROJECT DAMAGES [EAD]			
Structure/Contents/Ext. Damages	$ 2,049.60	$ 2,049.60	$ 2,049.60
Public Damage/Emergency Costs	$ 31.14	$ 31.14	$ 31.14
Flood Insurance Administrative Costs	$ 95.65	$ 95.65	$ 95.65
TOTAL ANNUAL w/o PROJECT DAMAGES [EAD]	**$ 2,176.39**	**$ 2,176.39**	**$ 2,176.39**
WITH PROJECT RESIDUAL DAMAGES [EAD]			
Structure/Contents/Ext. Damages	$ 602.09	$ 480.59	$ 454.67
Public Damage/Emergency Costs	$ 16.65	$ 12.87	$ 12.87
Flood Insurance Administrative Costs	$ 95.65	$ 11.58	$ 11.58
TOTAL ANNUAL w/ PROJECT RESIDUAL DAMAGES [EAD]	**$ 714.39**	**$ 505.04**	**$ 479.12**
PROJECT BENEFITS:			
Structure/Contents/Ext. Damage Reduction	$ 1,447.51	$ 1,569.01	$ 1,594.93
Public Damage/Emergency Cost Reduction	$ 14.49	$ 18.27	$ 18.27
Flood Insurance Administrative Cost Reduction	$ -	$ 84.07	$ 84.07
TOTAL ANNUAL w/ PROJECT ECONOMIC BENEFITS	**$ 1,462.00**	**$ 1,671.35**	**$ 1,697.27**
INVESTMENT COSTS:			
Construction	$ 17,498.23	$ 17,707.68	$ 20,781.24
LERRD	$ 4,244.80	$ 4,329.20	$ 4,374.10
Planning, Engineering, and Design	$ 1,574.88	$ 1,593.69	$ 1,870.31
Construction Management	$ 1,144.38	$ 1,158.08	$ 1,359.09
Subtotal, Construction Cost	$ 24,462.29	$ 24,788.66	$ 28,384.75
Subtotal, IDC	$ 966.96	$ 981.00	$ 1,099.23
TOTAL PRESENT VALUE, INVESTMENT COST	**$ 25,429.25**	**$ 25,769.65**	**$ 29,483.97**
Annualized Investment Cost (50 yrs, 2.875%)	$964.99	$977.91	$1,118.86
Annualized OMRR&R Cost	$ 77.50	$ 77.50	$ 77.50
TOTAL ANNUAL PROJECT COSTS	**$ 1,042.49**	**$ 1,055.40**	**$ 1,196.36**
NET ANNUAL BENEFITS	**$ 419.52**	**$ 615.95**	**$ 500.92**
BENEFIT/COST RATIO	**1.40**	**1.58**	**1.42**

The annual net benefits and BCR increase from the 2% ACE event to the 1% ACE event, then decrease at the next higher, .833% ACE event. The highest net benefits and BCR are at the 1% ACE channel alternative and are nearly $616 thousand and 1.58, respectively. The 1% ACE channel alternative is the optimized level of protection. Total annual benefits, costs, net benefits and the BCR for the optimal plan are displayed in Table 16 below.

After the optimization analysis was completed, a final gross appraisal was submitted and LERRD costs were revised for the optimal plan. Gross appraisals were not completed for the alternative levels of protection, however it is assumed that the changes in LERRD costs would be on a similar scale as the optimal plan. Additionally, minor cost revisions were made to the selected plan based on ATR. Included in the cost revisions, is a change to the IDC based on a more detailed schedule of design and construction expenditures provided in the certified Total Project Cost Summary. It is assumed that if these revisions were made to each of the optimization alternatives, they would result in similar changes to total annual costs and the selected alternative would not change. With revised costs, the net benefits and BCR for the optimal plan are $613,361 and 1.58, respectively.

Table 16 Summary of Optimal (1% ACE) Plan, FY17 Price Levels ($1,000s)

ECONOMIC BENEFITS & COSTS	One Percent ACE Channel with Bridge Replacement	
WITHOUT PROJECT DAMAGES [EAD]		
Structure/Contents/Ext. Damages	$	2,049.60
Public Damage/Emergency Costs	$	31.14
Flood Insurance Administrative Costs	$	95.65
TOTAL ANNUAL w/o PROJECT DAMAGES [EAD]	**$**	**2,176.39**
WITH PROJECT RESIDUAL DAMAGES [EAD]		
Structure/Contents/Ext. Damages	$	480.59
Public Damage/Emergency Costs	$	12.87
Flood Insurance Administrative Costs	$	11.58
TOTAL ANNUAL w/ PROJECT RESIDUAL DAMAGES [EAD]	**$**	**505.04**
PROJECT BENEFITS:		
Structure/Contents/Ext. Damage Reduction	$	1,569.01
Public Damage/Emergency Cost Reduction	$	18.27
Flood Insurance Administrative Cost Reduction	$	84.07
TOTAL ANNUAL w/ PROJECT ECONOMIC BENEFITS	**$**	**1,671.35**
INVESTMENT COSTS:		
Construction	$	19,525.18
LERRD	$	2,829.70
Planning, Engineering, and Design	$	2,064.77
Construction Management	$	1,171.51
Subtotal, Construction Cost	$	25,592.16
Subtotal, IDC	$	245.66
TOTAL PRESENT VALUE, INVESTMENT COST	**$**	**25,837.82**
Annualized Investment Cost (50 yrs, 2.875%)		$980.50
Annualized OMRR&R Cost	$	77.50
TOTAL ANNUAL PROJECT COSTS	**$**	**1,057.992**
NET ANNUAL BENEFITS	**$**	**613.361**
BENEFIT/COST RATIO		**1.58**

Update to Optimized Plan

Upon further discussion with the project sponsor, it was concluded that there would be a future without-project condition that would differ from the existing condition. Based on the discussions with the sponsor, the future without-project condition would include the three bridge replacements and detention area that were originally part of the selected alternative. Due to this change, a different without-project plan needed to be modeled against the selected alternative to take into account any changes in the hydraulics as a result of these changes.

Analysis was only conducted on the originally selected alternative (Alternative 1), which was optimized based on the revised future without-project conditions. The exclusion of Alternative 2 from further analysis was based on the fact that preliminary alternative evaluation and comparison determined that the levee feature of this alternative would induce higher stages and thus damages downstream, and the revised future without-project conditions would not have changed this result. Additionally, this alternative did not result in positive net benefits under the original analysis, and while it is possible that a revised analysis would result in positive net benefits for Alternative 2, nothing in the revised future without-project conditions would likely lead to Alternative 2 showing sufficiently greater net benefits than Alternative 1, which resulted in over 50 percent greater benefits in the original alternatives analysis. Alternative 1 also experienced additional costs savings by the removal of the 33rd Street Bridge which is not a feature of Alternative 2. Alternative 3, which consisted of nonstructural measures, is also not likely to result in a great enough increase in benefits as a result of the revised future without-project condition to change the selected alternative. Any decrease in costs associated with the revised future without-project conditions would not have as great of an impact on the nonstructural plan net benefits because the costs of bridge replacement and the detention basin weren't included in the nonstructural alternative's costs. The costs would only be reduced by the reduction in flood proofing costs associated with those structures that are no longer impacted under the updated future without-project condition. With approximately a 10 percent decrease in damages for the updated future without-project conditions, costs for the nonstructural alternative would very likely not decrease enough to result in a feasible project, and would not result in net benefits greater than Alternative 1. The total project costs would also still likely exceed the CAP limit.

The optimization process was not revisited because it was qualitatively determined that there shouldn't be a significant change in the optimization curve. This was due to the fact that the infrastructure costs now associated with the local infrastructure project would have equally reduced the cost of all three plans, so the net benefits would have been increased equally for all three plans. Additionally the larger channel design would have still required additional infrastructure improvements at the Huntington Bridge and BNSF Railway Bridge, so it would have remained substantially more costly than the chosen plan.

The new future without-project condition was modeled in HEC-FDA with water surface profiles that reflected the replaced bridges and downstream detention area on the West Tributary. The effects of these changes on the EAD were not dramatic, but slightly lower stages resulting from the improved bridges and their impacts on the hydraulics did reduce the EAD for the without-project plan. The results can be seen below in Table 17. Other damage categories including public damages, emergency costs and flood insurance administration costs were updated based on the change in structure, content and vehicle damage modeled in HEC-FDA.

Table 17 and Table 18 display the revised investment value in the .002 ACE floodplain and damages by event using the updated future without-project condition and updated price levels. Table 17 also provides the changes in with-project damages, benefits, costs and net benefits. All figures have been updated to FY18 price levels and annualized with the FY18 discount rate of 2.75 percent. Updated costs include costs for the channel improvement, but now exclude the bridge replacements and detention basin as those are part of the future-without project condition. While benefits have been reduced slightly, the reduction is more than offset by the reduction in costs, leading to a higher BCR and higher net benefits compared to the original optimized plan. Net benefits are now $902,443 and the BCR is 2.72. The selected, optimized plan remains feasible under the updated future without-project condition.

Table 17 Updated Investment Value in the .002 ACE Floodplain, FY18 Price Levels ($1,000s)

Damage Category	Number of Structures	Structure Value	Content Value	Appurtenant / Other Value	Total Value
Deadmans Run					
Residential	536	72,638.43	29,948.98	8,189.65	110,777.06
Commercial	24	12,197.81	6,892.56	0.00	19,090.37
Industrial	4	360.86	133.52	0.00	494.38
Public	9	1,261.49	205.54	0.00	1,467.03
Subtotal	573	86,458.59	37,180.60	8,189.65	131,828.84
West Tributary					
Residential	29	1,197.98	964.99	304.50	2,467.47
Commercial	1	141.54	90.59	0.00	232.13
Industrial	14	10,647.96	3,945.45	0.00	14,593.41
Public	1	32.42	12.00	0.00	44.42
Subtotal	45	12,019.90	5,013.03	304.50	17,337.43
Total	**618**	**98,478.49**	**42,193.63**	**8,494.15**	**149,166.27**

Table 18 Updated Damages by Event, FY18 Price Levels ($1000s)

Event	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	250-yr	500-yr
Probability	0.5	0.2	0.1	0.04	0.02	0.01	0.004	0.002
Structure/Content/ Appurtenant Use Damages ($1,000s)	0	0	1	188	23,377	28,682	33,565	40,942

Table 19 Summary of Updated Optimal (1% ACE) Plan, FY18 Price Levels ($1,000s)

ECONOMIC BENEFITS & COSTS	One Percent ACE Channel
WITHOUT PROJECT DAMAGES [EAD]	
Structure/Contents/Ext. Damages	$ 1,833.38
Public Damage/Emergency Costs	$ 27.86
Flood Insurance Administrative Costs	$ 85.56
TOTAL ANNUAL w/o PROJECT DAMAGES [EAD]	**$ 1,946.80**
WITH PROJECT RESIDUAL DAMAGES [EAD]	
Structure/Contents/Ext. Damages	$ 495.60
Public Damage/Emergency Costs	$ 13.27
Flood Insurance Administrative Costs	$ 11.94
TOTAL ANNUAL w/ PROJECT RESIDUAL DAMAGES [EAD]	**$ 520.81**
PROJECT BENEFITS:	
Structure/Contents/Ext. Damage Reduction	$ 1,337.78
Public Damage/Emergency Cost Reduction	$ 14.59
Flood Insurance Administrative Cost Reduction	$ 73.62
TOTAL ANNUAL w/ PROJECT ECONOMIC BENEFITS	**$ 1,425.99**
INVESTMENT COSTS:	
Construction	$ 10,157.88
LERRD	$ 1,650.00
Planning, Engineering, and Design	$ 867.00
Construction Management	$ 609.47
Subtotal, Construction Cost	$ 13,284.36
Subtotal, IDC	$ 174.52
TOTAL PRESENT VALUE, INVESTMENT COST	**$ 13,458.88**
Annualized Investment Cost (50 yrs, 2.75%)	$498.53
Annualized OMRR&R Cost	$ 25.01
TOTAL ANNUAL PROJECT COSTS	**$ 523.543**
NET ANNUAL BENEFITS	**$ 902.443**
BENEFIT/COST RATIO	**2.72**

References

Kelly Blue Book. 2015. Pre-Owned Vehicle Valuation Service. http://www.kbb.com.

Marshall Valuation Service. 2014. Marshall & Swift/Boeckh, Los Angeles, California.

Paine, Mitch. Nebraska Department of Natural Resources, 2015. Provided flood insurance policies in force via email on 14 October, 2015.

RSMeans Square Foot Costs. 2014. Construction Publishers & Consultants, Norwell, Massachusetts.

URS Group, Inc., 2008. Draft Report Solicitation of Expert Opinion Depth-Damage Function Calculations for the Benefit-Cost Analysis Tool. October 2008.

USACE, 1996. Engineering Manual (EM) 1110-2-1619, Risk-Based Analysis for Flood-Damage-Reduction Studies. U.S. Army Corps of Engineers, August 1996.

USACE, 2000a. ER1105-2-100 Planning Guidance Notebook, U.S. Army Corps of Engineers, 22 April 2000.

USACE, 2000b. Flood Control for Antelope Creek at Lincoln, Nebraska. Feasibility Report and Environmental Assessment. October 2000.

USACE, 2003. Economic Guidance Memorandum (EGM) 04-01, Generic Depth-Damage Relationships for Residential Structures with Basements. U.S. Army Corps of Engineers, 10 October 2003.

USACE, 2004. ER1105-2-100 Planning Guidance Notebook, Appendix D, Amendment #1, U.S. Army Corps of Engineers, 30 June 2004.

USACE, 2006a. Economic Guidance Memorandum (EGM) 06-04, National Flood Insurance Program Operating Costs. U.S. Army Corps of Engineers. 2006

USACE, 2006b. Final Report: Depth-Damage Relationships for Structures, Contents, and Vehicles and Content-To-Structure Value Ratios (CSVR) in Support of the Donaldsonville to the Gulf, Louisiana, Feasibility Study.

USACE, 2009. Economic Guidance Memorandum (EGM) 09-04, Generic Depth-Damage Relationships for Vehicles. U.S. Army Corps of Engineers, 22 June 2009.

U.S. Census Bureau. 2000. U.S. Census Bureau Profile of General Population and Housing Characteristics: 2000. http://factfinder2.census.gov.

U.S. Census Bureau. 2010. U.S. Census Bureau Profile of General Population and Housing Characteristics: 2010. http://factfinder2.census.gov.

U.S. Census Bureau. 2016. U.S. Census Bureau Profile of General Population and Housing Characteristics: 2015 American community Survey 1 Year Estimates for Lincoln, NE. http://factfinder2.census.gov.

US Army Corps of Engineers ®
Omaha District

DEADMANS RUN
LINCOLN, NEBRASKA

SECTION 205 – FLOOD RISK MANAGEMENT

FEASIBILITY REPORT

APPENDIX E
HYDROLOGIC ANALYSIS & CLIMATE ASSESSMENT

AUGUST 2018

Deadmans Run Section 205
Lincoln, Nebraska

US Army Corps of Engineers ®
Omaha District

Appendix E: Hydrologic Analysis & Climate Assessment

HYDROLOGIC ENGINEERING BRANCH

ENGINEERING DIVISION

~~December~~ August 201~~7~~8

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E.0 Executive Summary

The purpose of this report was to organize the existing conditions hydrology results for the Deadmans Run Section 205. Hydrologic analysis included the generation of a USGS regional peak-flow frequency, analysis of historic precipitation events, documentation of a high-water marks survey for the October 2014 event, development of a current-conditions hydrologic model, and a qualitative climate change analysis. Figure E1 shows the project location in Lincoln, Nebraska along Deadmans Run. Note that this Section 205 focuses on the watershed area downstream of 48th Street; not all the reaches shown were included in the study.

A current-conditions hydrologic model was developed in version 4.0 of the Hydrologic Modeling System (HEC-HMS) using NOAA Atlas 14 recommended rainfall depths. The model was developed by the consultant URS from an existing HEC-HMS version 3.0 computer model provided from USACE. The original model was developed by Camp Dresser and McKee (CDM). Changes in the soil loss and rainfall-to-runoff transformation methodologies were made to the model along with conversion to HEC-HMS version 4.0, updates in the watershed delineation, and change in the precipitation to NOAA Atlas 14 depths. Model results were compared to past model flows and the indirect measurement at the 38th Street gauge for the October 2014 event. Model results are shown in Table E1. Figure E1 shows the locations of the peak flows listed in the table. Not all the peak flows increase with distance downstream for the 10-year event and higher because overbank flows occur at those magnitudes and increase the attenuation of these peaks.

In addition to the HEC-HMS model, the USGS regional peak-flow frequency was developed at the mouth of Deadmans Run by the consultant URS. The regional peak flows were determined using the USGS publication WRIR 99-4032, *Peak-Flow Frequency Relations and Evaluation of the Peak-Flow Gauging Network in Nebraska* (USGS 1999). Peak flows from this regional analysis were lower than those determined through hydrologic models considered in this study but this is to be expected given the large amounts of urbanization within the Deadmans Run watershed.

An analysis of historic precipitation events was undertaken to determine why the October 2014 precipitation event did not produce flooding on Deadmans Run. The October 2014 storm is estimated to be a 24-hour 60-year event, however, the peak discharge estimated at the 38th Street Bridge (3,680 cfs) was less than a 10-year discharge based on the peaks of the adopted hydrologic model. Hourly rainfall depths were collected at applicable rain gauges and the largest 24-hour period of precipitation determined for several historic rainfall events.

An analysis of depths over several durations revealed that while the longer rainfall durations were significant frequency events for many of the events considered, the shorter duration events (less than 3-hours) were much more frequent and not extreme events. Given the Deadmans Run watershed's short time of concentration, historically, it is the rainfall durations less than the 3-hour that are important to flooding and not so much the longer durations. This is why the July 1957 rainfall resulted in flooding and the October 2014 rainfall did not.

High-water marks (HWMs) were collected for the October 2014 rainfall event by four members of the USACE Omaha District. Locations and elevations of these HWMs were documented in this report. These HWMs confirm that no flooding occurred along Deadmans Run during the October 2014 event.

A qualitative climate analysis was undertaken using the U.S. Corps of Engineers *Engineering and Construction Bulletin No. 2016-25*. Projected changes in annual maximum precipitation and annual maximum discharges should be negligible over the 50-year project life, but it is likely that the frequency of extreme events will increase. Therefore, project alternatives would benefit from including resiliency for future increases in the number of large flood events.

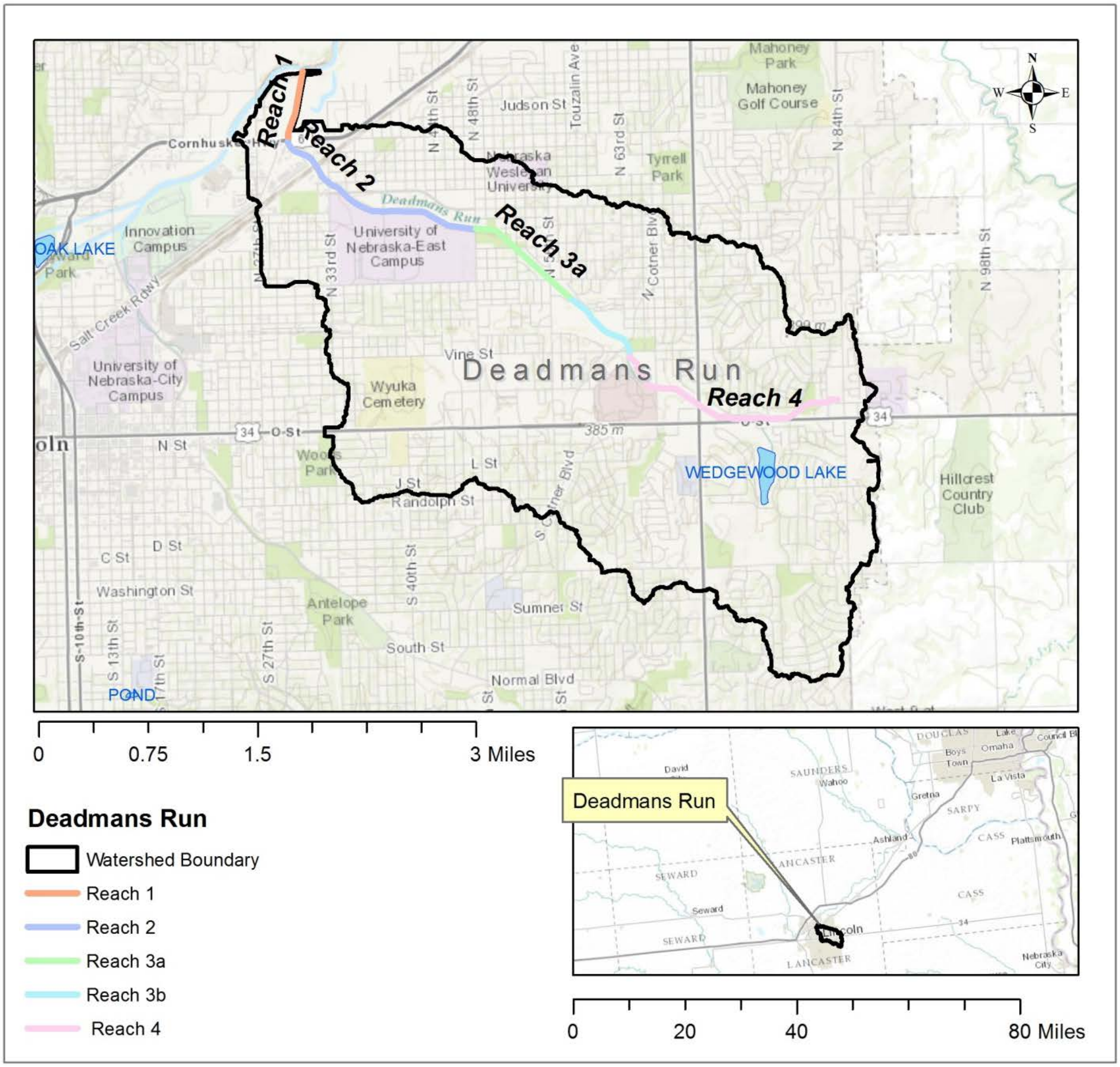

Figure E1. Deadmans Run location

Table E1. Adopted peak flow results for Deadmans Run

Location	Drainage Area (Mi^2)	Frequency Storms							
		2-year	5-year	10-year	25-year	50-year	100-year	200-year	500-year
At mouth	9.618	1,681	3,053	5,026	6,940	8,399	9,890	11,677	14,174
At 38th Street	6.931	1,440	2,644	4,429	5,981	7,163	8,397	9,839	11,929
Below 48th Street	6.571	1,409	2,627	4,483	6,167	7,320	8,489	9,871	11,922
Above 48th Street	5.709	1,207	2,228	3,742	5,102	6,045	7,045	8,259	10,105
At Cotner	4.259	922	1,722	2,815	3,833	4,676	5,645	6,768	8,376
Below 66th Street	3.559	842	1,627	2,833	3,796	4,615	5,336	6,388	8,042
Above 66th Street	3.373	794	1,534	2,623	3,489	4,187	4,976	6,133	7,684
Below O Street	1.901	434	858	1,483	2,094	2,594	3,148	3,695	4,477
Above O Street	1.239	317	602	1,012	1,390	1,683	2,031	2,369	2,845
At A Street*	0.424	161	338	711	1,082	1,358	1,599	1,888	2,237

*Element "A Street" drainage area is listed as 1.1 square miles in Section 205 Study (Ref. 4).

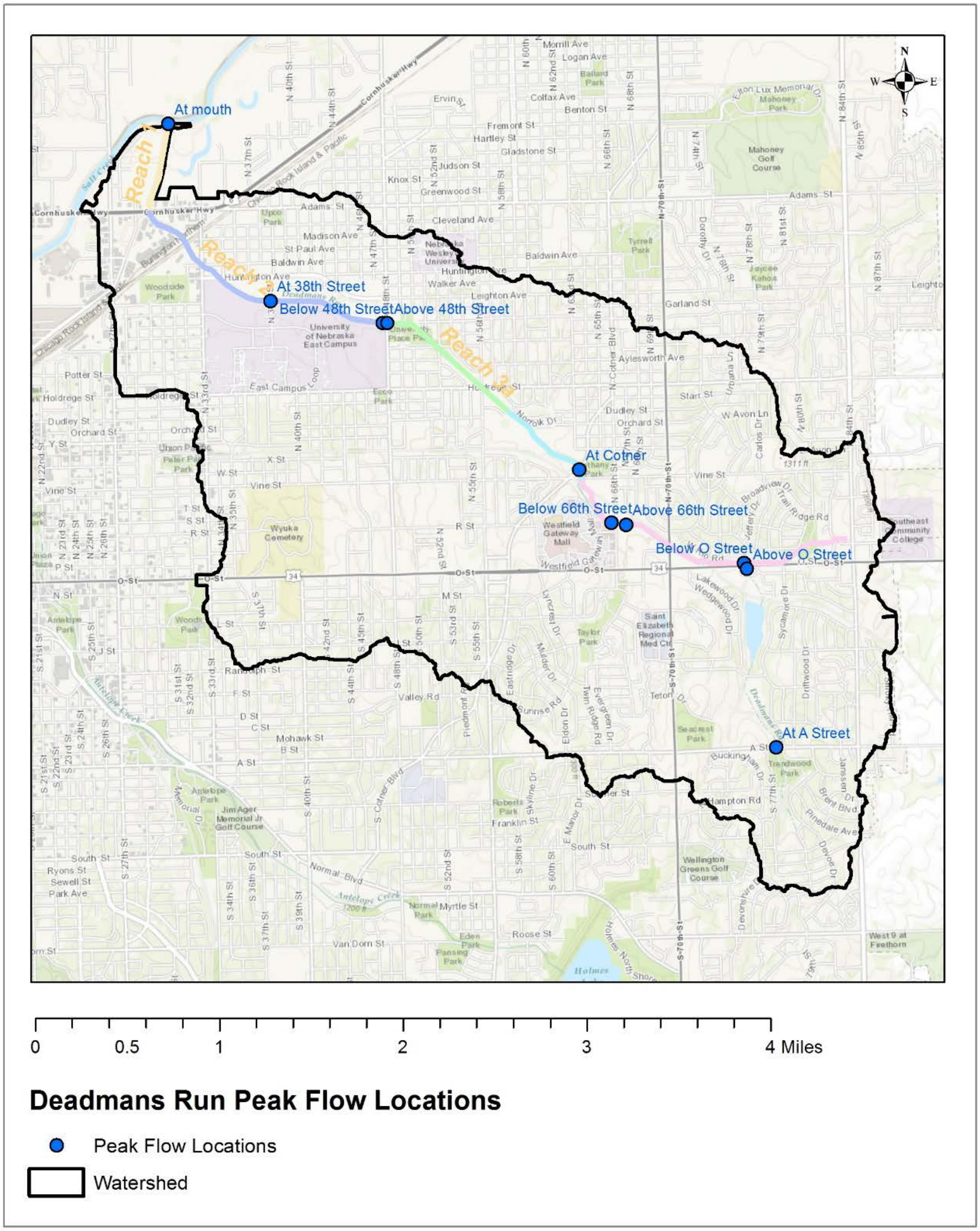

Figure E1. Peak flow locations

1.0 Purpose

The purpose of this report was to organize the existing conditions hydrology results for the Deadmans Run Section 205. The overall objective of this Section 205 was to determine if there is a feasible flood risk management project along Deadmans Run in Lincoln, Nebraska that will reduce flood risk. The project sponsor is the Lower Platte South Natural Resources District (LPSNRD).

This report contains the USGS regional peak-flow frequency, analysis of historic precipitation events, documentation of a high-water marks survey for the October 2014 event, development of a current-conditions hydrologic model, and a qualitative climate change analysis. Note that this Section 205 focuses on the watershed area downstream of 48th Street. The full watershed is considered to generate the hydrology for the project area (downstream of 48th Street).

2.0 Background and Location

The Deadmans Run watershed is located in the City of Lincoln, Nebraska and is a mostly urbanized right-bank tributary of Salt Creek. The watershed drains a 9.6 square mile area which lies entirely within Lancaster County and the limits of the City of Lincoln. Deadmans Run begins in the gently rolling hills of suburban eastern Lincoln, NE, located between the Stevens Creek watershed to the east and Antelope Creek watershed to the west. The soils are generally clay or clay loam with modest infiltration rates.

Deadmans Run flows northward before entering Wedgewood Lake, a private lake surrounded by homes. Wedgewood Lake has no designated flood storage and limited capacity to attenuate streamflow. From Wedgewood Lake, Deadmans Run flows northwesterly under O Street and through shopping centers where its channel is lined by gabions and concrete. Below Cottner Boulevard, the channel slope becomes milder and the floodplain broader.

Land use is primarily residential, with limited open space. The channel is lined with gabions with undersized bridge crossings by residential streets. At 48th Street (start of project site), the channel becomes more natural, flowing through the East Campus of the University of Nebraska and the floodplain in this reach is not highly urbanized. At Huntington Avenue, the floodplain transitions to primarily industrial land use, and the channel is constricted by a series of road and rail bridges. This lower reach of the watershed is also subject to flooding by Salt Creek as well as by Deadmans Run.

Flooding on both Deadmans Run and Salt Creek is primarily the result of warm season thunderstorms, with flooding or significant high water possible from April into October. Rapid snow melts have historically remained in bank and ice jam flooding has not been a problem within the historical range of information.

Figure 1 shows the location of the Deadmans Run watershed.

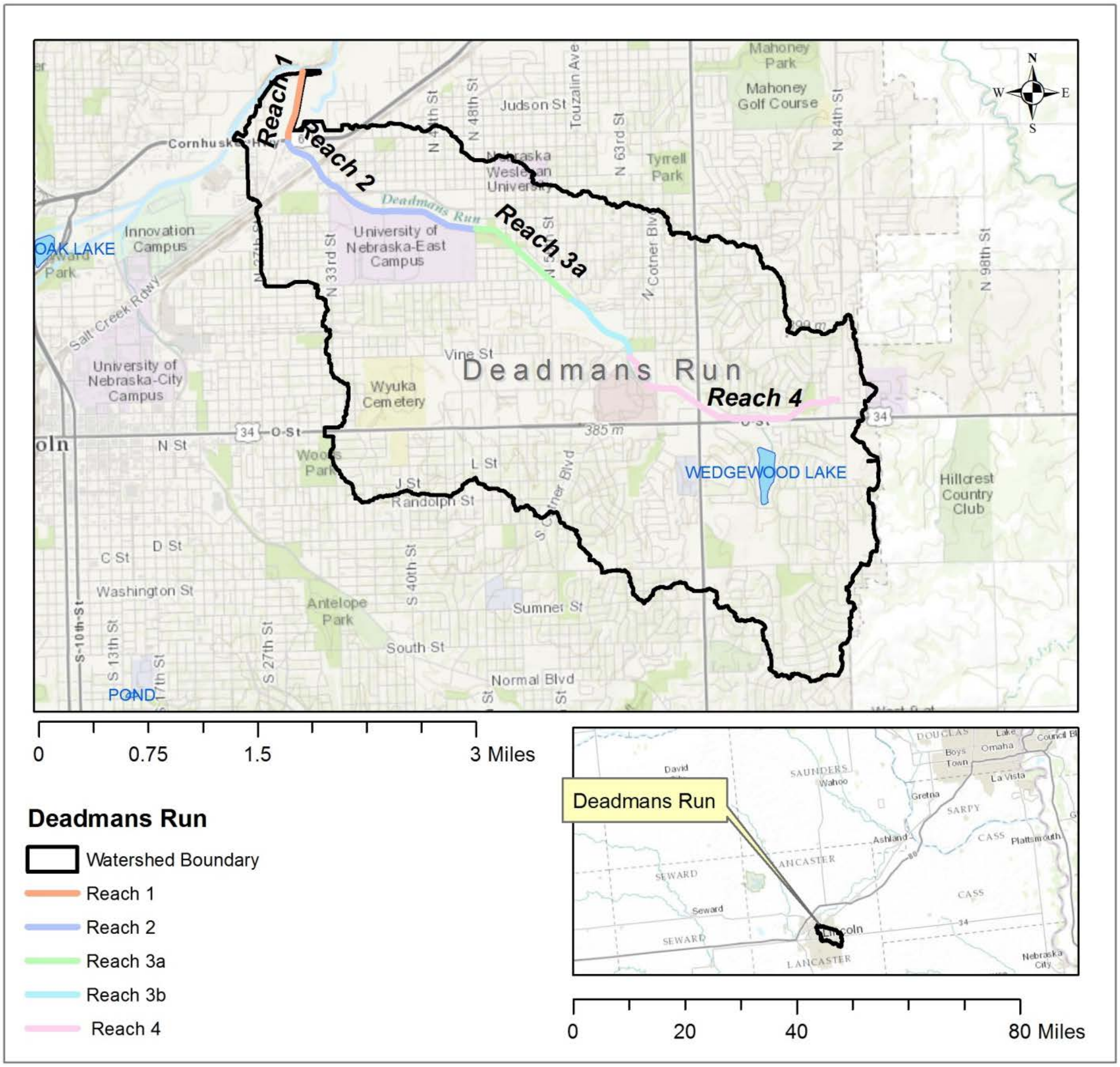

Figure 1. Deadmans Run Location

3.0 NOAA Atlas 14 Precipitation

The National Oceanic and Atmospheric Administration (NOAA) Atlas 14 precipitation frequency estimates were referenced for use in this study using the Precipitation Frequency Data Server (PFDS, NOAA 2014). Table 1 summarizes these data for the Deadmans Run watershed. Both recommended values and the 90% confidence interval are provided. The precipitation frequencies shown in this table are based on frequency analysis of partial duration series, meaning more than just the annual maximum depths were considered. The recommended values, shown in bold italics in the table, were used as input into the existing conditions hydrologic model.

Table 1. NOAA Atlas 14 depths for Lincoln, NE

Duration	Average Recurrence Interval (Years)								
	1	2	5	10	25	50	100	200	500
5-min	***0.383*** (0.310-0.475)	***0.457*** (0.370-0.568)	***0.579*** (0.467-0.720)	***0.679*** (0.546-0.847)	***0.818*** (0.639-1.04)	***0.924*** (0.710-1.18)	***1.03*** (0.771-1.33)	***1.14*** (0.824-1.49)	***1.28*** (0.899-1.71)
15-min	***0.683*** (0.554-0.848)	***0.816*** (0.661-1.01)	***1.03*** (0.834-1.29)	***1.21*** (0.975-1.51)	***1.46*** (1.14-1.85)	***1.65*** (1.27-2.11)	***1.84*** (1.38-2.38)	***2.03*** (1.47-2.67)	***2.29*** (1.61-3.05)
1-hr	***1.31*** (1.06-1.62)	***1.56*** (1.26-1.94)	***1.98*** (1.60-2.46)	***2.32*** (1.87-2.90)	***2.81*** (2.20-3.56)	***3.18*** (2.45-4.07)	***3.56*** (2.67-4.61)	***3.95*** (2.86-5.18)	***4.47*** (3.14-5.95)
2-hr	***1.61*** (1.32-1.98)	***1.92*** (1.57-2.36)	***2.43*** (1.98-3.00)	***2.87*** (2.33-3.54)	***3.47*** (2.75-4.38)	***3.95*** (3.06-5.01)	***4.43*** (3.35-5.70)	***4.93*** (3.60-6.44)	***5.61*** (3.97-7.43)
3-hr	***1.78*** (1.47-2.18)	***2.11*** (1.74-2.59)	***2.67*** (2.19-3.27)	***3.15*** (2.57-3.87)	***3.84*** (3.06-4.82)	***4.39*** (3.42-5.55)	***4.95*** (3.76-6.35)	***5.54*** (4.07-7.21)	***6.35*** (4.51-8.39)
6-hr	***2.06*** (1.71-2.49)	***2.42*** (2.01-2.94)	***3.05*** (2.53-3.71)	***3.61*** (2.97-4.39)	***4.43*** (3.57-5.54)	***5.09*** (4.02-6.41)	***5.8*** (4.45-7.40)	***6.55*** (4.85-8.48)	***7.59*** (5.44-9.98)
12-hr	***2.32*** (1.95-2.79)	***2.72*** (2.28-3.26)	***3.41*** (2.85-4.10)	***4.04*** (3.36-4.87)	***4.97*** (4.05-6.19)	***5.75*** (4.58-7.19)	***6.57*** (5.09-8.34)	***7.46*** (5.58-9.61)	***8.72*** (6.30-11.4)
24-hr	***2.61*** (2.21-3.10)	***3.03*** (2.57-3.61)	***3.78*** (3.19-4.50)	***4.47*** (3.75-5.33)	***5.49*** (4.53-6.79)	***6.36*** (5.12-7.89)	***7.28*** (5.69-9.17)	***8.28*** (6.24-10.6)	***9.7*** (7.07-12.6)

Bold-italic value is the NOAA recommended depth
Values within the ( ) are the 90% confidence intervals

4.0 USGS Regional Flow Frequencies

USGS regional equations were used to determine an estimate of the peak flow frequency curve for Deadmans Run. This was undertaken in place of a stream gauge analysis as a long-term stream gauge record does not exist on Deadmans Run.

URS determined the USGS flow frequency for Deadmans Run. USGS regional regression relationships were determined by URS with guidance from WRIR 99-4032 (USGS 1999), *Peak-Flow Frequency Relations and Evaluation of the Peak-Flow Gauging Network in Nebraska*. Basin slope and the permeability of the least permeable layer were determined as 24.5 feet per mile (at the channel mouth) and 0.12 inches per hour, respectively.

Table 2 and Figure 2 show the results.

Table 2. USGS peak flow frequencies at mouth of Deadmans Run

Return Period	Drainage Area (Mi^2)	Regression Flows (cfs)	Regression Standard Error	Regression + Standard Error (cfs)	Regression - Standard Error (cfs)
2-year	9.618	444	0.461	648	239
5-year	9.618	1259	0.297	1633	885
10-year	9.618	2074	0.251	2594	1553
25-year	9.618	3397	0.243	4222	2572
50-year	9.618	4624	0.254	5799	3450
100-year	9.618	6053	0.272	7699	4406
200-year	9.618	7751	0.293	10022	5480
500-year	9.618	10358	0.322	13693	7022

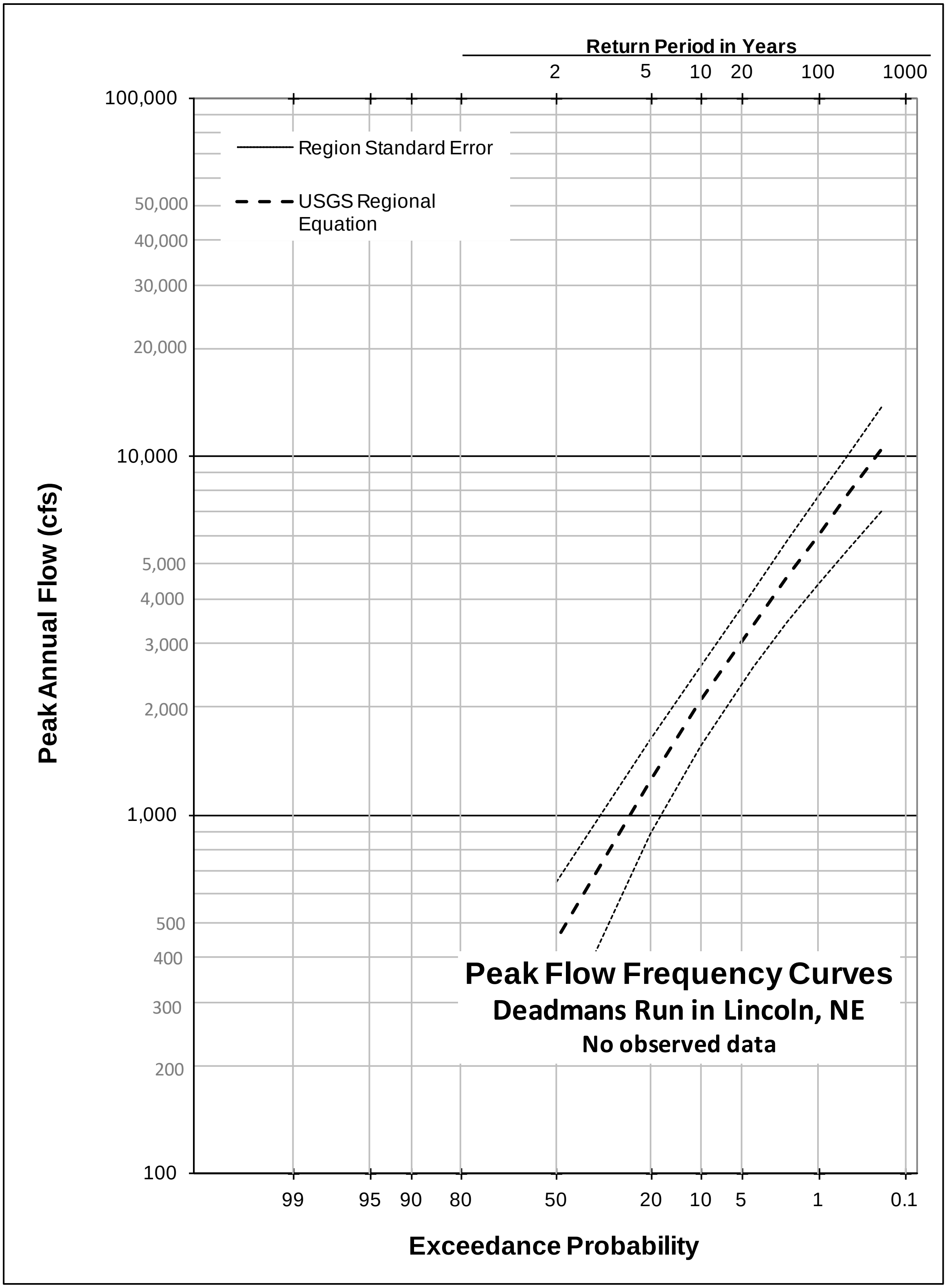

Figure 2. USGS Regional Peak Flow Frequency for Deadmans Run

5.0 Historic Events and Watershed Time of Concentration

5.1 Historic Event Frequencies and Durations

Several past historic precipitation events were analyzed to estimate their return frequencies for different durations. This was important because the Deadmans Run watershed has experienced several large precipitation events in the recent past that only produced in-channel flows, which has resulted in the public perception that there is no real need for a flood control project. Knowledge of other historic events suggests otherwise.

The storms analyzed include the following events: May 1950, June 1951, July 1957, October 1989, October 2014, and May 2015. Some information from the 1908 event is also included but quantitative information is not included due to the lack of hourly precipitation records. Flow data are provided where it was available but not for all events as Deadmans Run did not have a stream gauge until the end of October 2014.

Figure 3 shows the flood impacts reported in historic editions of the *Lincoln Star* provided by the Nebraska Historical Society as well as the rain gauges referenced for rainfall depths.

Hourly rainfall depths were collected at applicable rain gauges and the largest 24-hour period of precipitation determined. Total maximum depths for durations of 24-, 6-, 3-, 2-, and 1-hours were then calculated and their return frequencies estimated from the frequency-depth-durations referenced from NOAA Atlas 14 (NOAA 2014). Figure 4 through Figure 9 show the hyetographs and cumulative precipitations for each rainfall event. Figure 10 shows the frequency durations for most of the events and Table 3 shows the depths and estimated frequencies.

Note that storm precipitation varies spatially and that the rain gauge data presented may or may not have captured the driving rainfall for each event. For example, the UNL Campus rain gauge did not capture the precipitation that created the 1950 flood because all the depths are under a 1-year return frequency.

5.2 Watershed Time of Concentration

A basin's time of concentration is the time at which all the watershed area is contributing to the outflow or the time it takes for flow from the farthest point of the watershed to contribute to the outflow. The Deadmans Run watershed time of concentration was estimated using Equations 1 through 8 where t_c is the time of concentration of the watershed, t_{sheet} is the sheet flow travel time, $t_{channel}$ is the channel travel time, $v_{channel}$ is the channel flow velocity, $v_{shallow}$ is the velocity of the shallow concentrated flow, L is the channel length, S is the average channel slope, n is the channel Mannings roughness, R is the channel hydraulic radius, A is the cross sectional area of the channel, h is the stage of flow in the channel, b_1 and b_2 are trapezoidal channel dimensions, and P_2 is the 2-year 24-hour precipitation. These equations are from the HEC-HMS *Technical Reference Manual* (HEC 2000).

$$t_c = t_{sheet} + t_{shallow} + t_{channel} \qquad \text{Equation 1}$$

$$t_{sheet} = \frac{0.007(nL)^{0.8}}{(P_2)^{0.5} S^{0.4}} \qquad \text{Equation 2}$$

$$t_{shallow} = \frac{L}{v_{shallow}} \qquad \text{Equation 3}$$

$$t_{channel} = \frac{L}{v_{channel}} \qquad \text{Equation 4}$$

$$v_{channel} = \frac{1.49}{n} R^{2/3} S^{1/2} \qquad \text{Equation 5}$$

$$A = \frac{1}{2} h(b_1 + b_2) \qquad \text{Equation 6}$$

$$v_{shallow} = 16.1345\sqrt{S} \quad \text{for unpaved surfaces} \qquad \text{Equation 7}$$

$$v_{shallow} = 20.3282\sqrt{S} \quad \text{for paved surfaces} \qquad \text{Equation 8}$$

Flow lengths and average channel slope were estimated in ArcGIS, a representative channel cross section was sampled downstream of the 48th Street bridge in the UNL campus for the cross-section geometry, the 2-year 24-hour rainfall depth was referenced from NOAA Atlas 14, the overland flow coefficient of 0.05 was selected through engineering judgment and textbook values, a sheet flow length of 300 feet was assumed based on engineering literature, and channel depth was assumed to be at bankfull elevation.

The Mannings n used for the channel was increased above textbook values to account for other energy losses other than channel roughness (e.g. bridge constrictions). This was decided because the flow velocity calculated with a channel roughness of 0.035 was 16.8 feet/second which is too large based on engineering judgment. The Mannings n was increased to 0.07 to bring the channel velocity to 8.4 feet/second, which is still somewhat high.

The time of concentration for the Deadmans Run watershed estimated in this study was about 1 hour.

5.3 Watershed Response to Historic Events

Deadmans Run has an estimated time of concentration of about 1 hour. As a result, the flood frequency of rainfall events is closely related to the rainfall frequencies of shorter-duration events, best portrayed by the 2- or 3-hour maximum precipitations.

To illustrate the importance of the watershed time of concentration, consider the October 2014 event. A 24-hour rainfall of 6.6 inches is approximately a 60-year return period storm, yet the discharge near the 38th Street Bridge of 3,680 cfs is less than a 10-year flood peak based on the adopted model results of this study, and the flows stayed within the channel. However, the 2-hour maximum rainfall was approximately a 5-year event and the 3-hour maximum rainfall was approximately a 10-year event, corresponding closely to the return period of the flood peak at the 38th Street stream gauge. This relationship is evident among several major rainfall-runoff events that have occurred from 1950 through May 2015. Thus, the 24-hour 60-year rainfall only produced a 10-year peak discharge at the basin outlet in the case of the 2014 storm because the rainfall was scattered through time, allowing the watershed to drain out the runoff produced by each burst of rainfall before the next pulse of discharge was created. If the rainfall had been concentrated into a duration of less than 3-hours, then a much larger peak flow would have been produced.

The May 6, 2015 event is the only storm, so far, for which both Deadmans Run stage and rainfall were recorded in sufficient detail to allow for comparison of the peak intensity of the rainfall burst and the peak gage height. Rainfall from the USGS Salt Creek at 70th Street gauge station in Lincoln, NE was collected northeast of the basin, and shows two distinct rainfall bursts separated by over 2 hours of light rainfall as shown in Figure 9.

The May 2015 rainfall pattern produced the stage record shown in Figure 11 at the USGS Deadmans Run at 38th Street stream gauge. The peak discharge for that event was estimated to be 3,360 cfs at the 38th Street Bridge, which again fell between a 5- and 10-year return period discharges estimated from the adopted model results. The 24-hour rainfall of 6.08 inches, on the other hand was roughly a 40-year return period event. The 3-hour maximum rainfall was less than 3 inches or roughly a 5-year return period rain storm.

It is noteworthy that the May 2015 storm produced flood peaks on Salt Creek that nearly overtopped the 50-year levee that provides flood-risk reduction along Salt Creek through the city. The Salt Creek watershed is much larger than Deadmans Run and has a longer time of concentration which makes the watershed more responsive to long-duration rainfall.

Figure 11 shows three peaks produced by the May 2015 storm at the 38th Street stream gauge. The third rounded peak was produced not from flow coming out of Deadmans Run but from flows on Salt Creek backing up along the Deadmans Run channel.

Table 4 lists the rainfall gauges used in this analysis and their general locations in latitude and longitude. Location coordinates for the UNL Campus & Power Plant gauge and the Salt Creek at 70th Street gauge are from the National Climatic Data Center (NCDC) while the location for the UNL Ag Campus gauge was estimated in GoogleEarth from documentation on the 1989 high-water mark survey.

Table 3. Rainfall Depth-Duration-Frequencies

1950 Precipitation Totals			1951 Precipitation Totals		
Duration	Depth (in.)	NOAA Atlas 14 Return Period (yr)	Duration	Depth (in.)	NOAA Atlas 14 Return Period (yr)
24 hr	1.23	< 1	24 hr	4.64	13
6 hr	1.17	< 1	6 hr	3.98	17
3 hr	1.12	< 1	3 hr	3.05	9.0
2 hr	0.82	< 1	2 hr	2.14	3
1 hr	0.47	< 1	1 hr	1.62	2

July 1, 1957 Precipitation Totals			September 8, 1989 Precipitation Totals		
Duration	Depth (in.)	NOAA Atlas 14 Return Period (yr)	Duration	Depth (in.)	NOAA Atlas 14 Return Period (yr)
24 hr	4.85	16	24 hr	4.79	15
6 hr	4.66	34	6 hr	2.58	3
3 hr	3.62	20	3 hr	1.88	1
2 hr	2.32	4	2 hr	1.53	< 1
1 hr	1.96	5	1 hr	1.07	< 1

Sep. 30, 2014 Precipitation Totals			May 6, 2015 Precipitation Totals		
Duration	Depth (in.)	NOAA Atlas 14 Return Period (yr)	Duration	Depth (in.)	NOAA Atlas 14 Return Period (yr)
24 hr	6.6	63	24 hr	6.08	42
6 hr	4.08	19	6 hr	3.53	9
3 hr	3.27	13	3 hr	2.71	5
2 hr	2.42	5	2 hr	2.42	5
1 hr	1.53	2	1 hr	1.28	< 1

Table 4. Rain Gauge Locations

Rain Gauge	Latitude	Longitude	Storm Event
UNL Campus & Power Plant	40.81667	-96.7	1950, 1951 & 1957
Salt Creek at 70th Street	40.88911	-96.6	2014 & 2015
UNL Ag Campus	40.83237	-96.7	1989

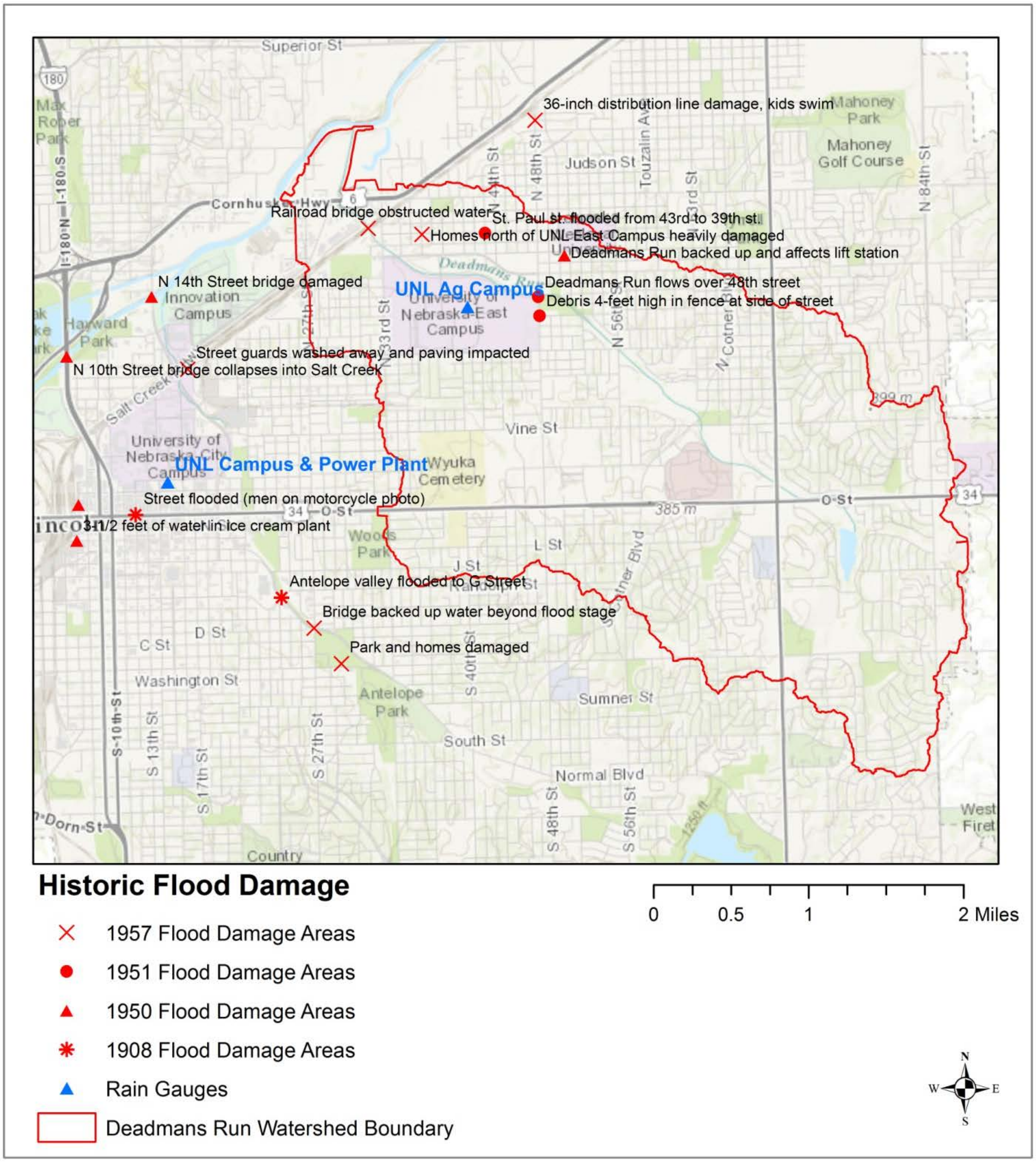

Figure 3. Historic flood damage areas

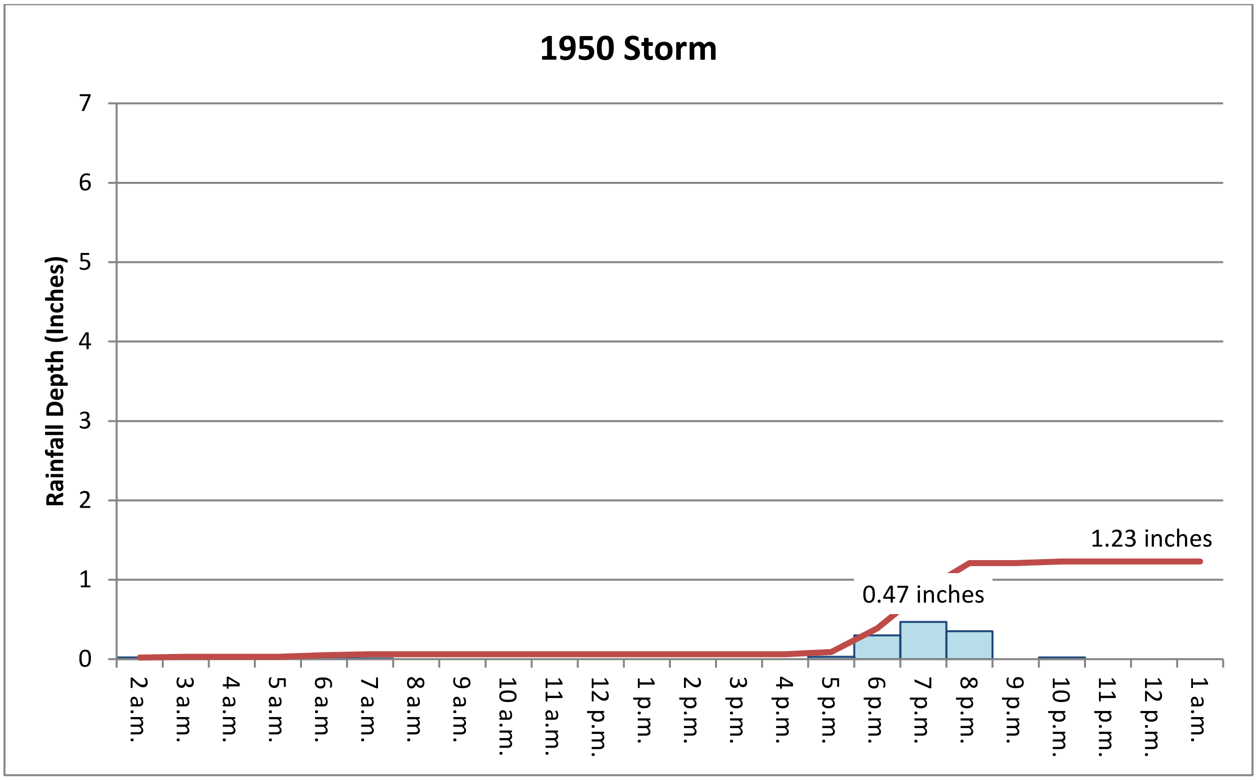

Figure 4. May 9, 1950 precipitation from UNL Campus & Power Plant gauge

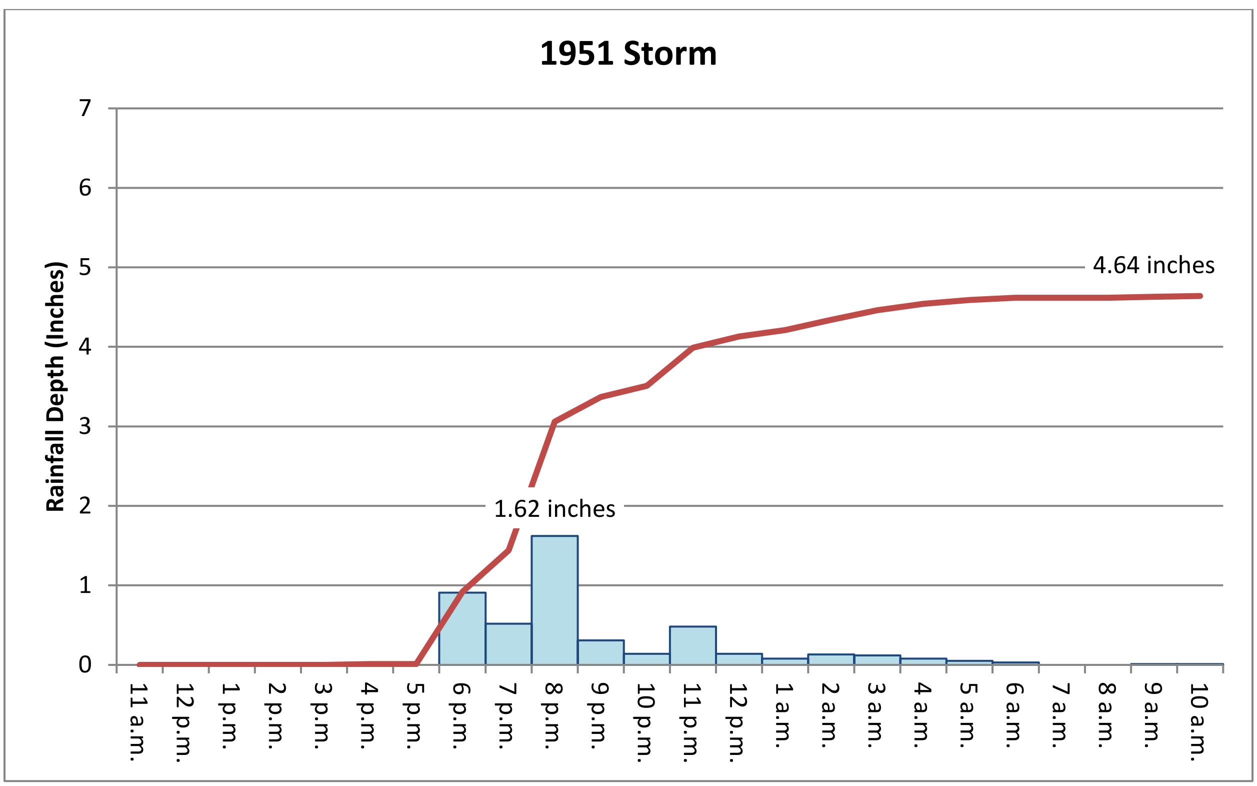

Figure 5. June 2, 1951 precipitation from UNL Campus & Power Plant gauge

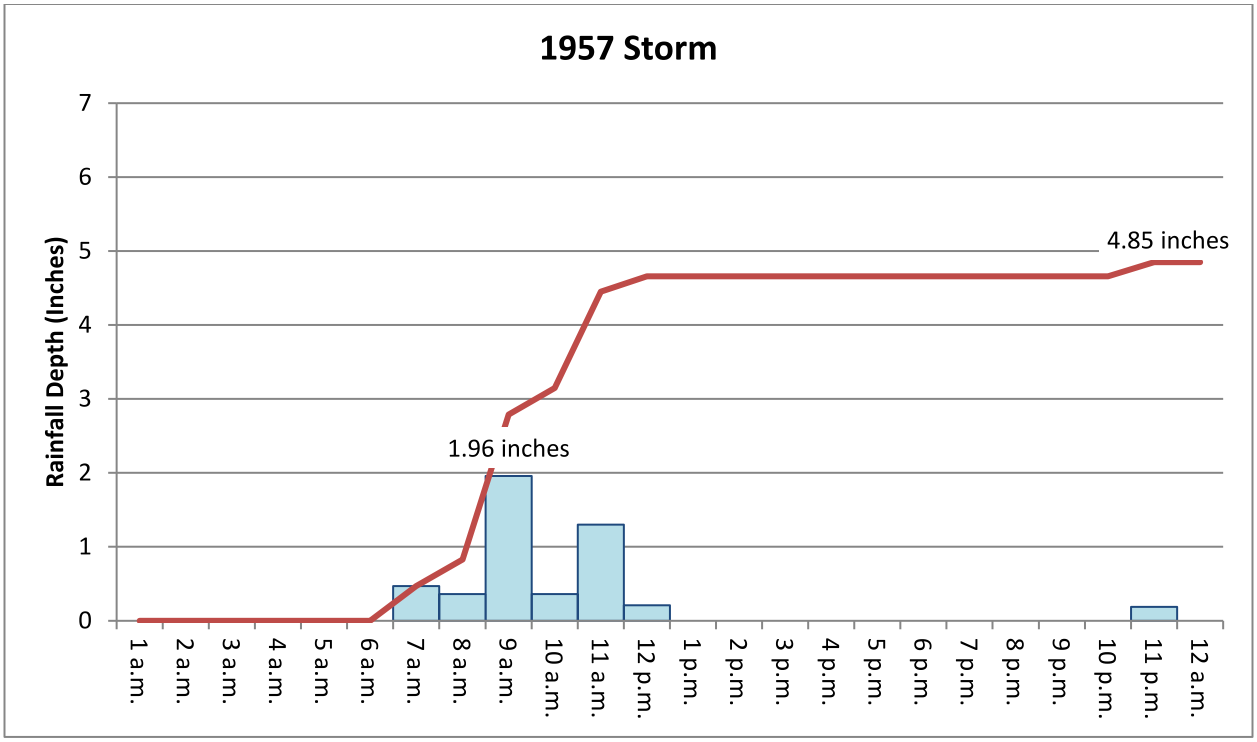

Figure 6. July 1, 1957 precipitation from UNL Campus & Power Plant gauge

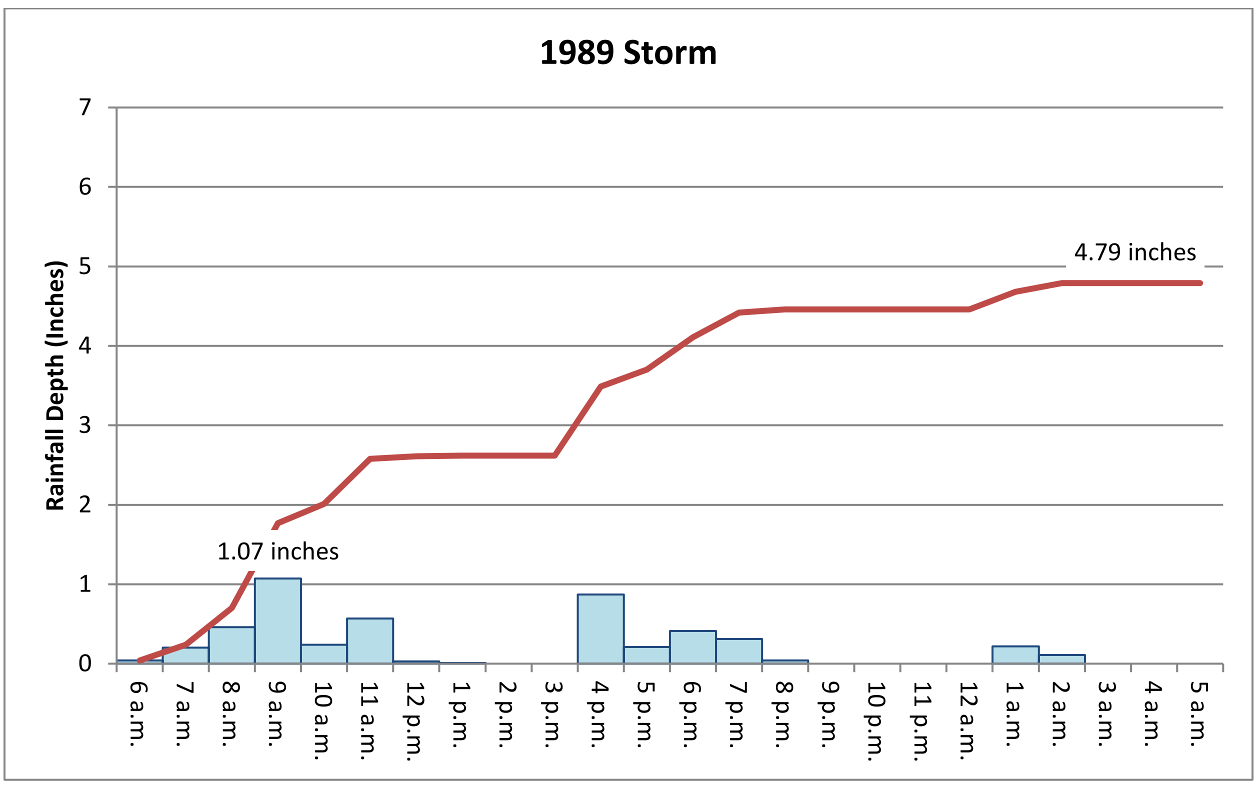

Figure 7. October 5, 1989 precipitation from UNL Agricultural Campus gauge

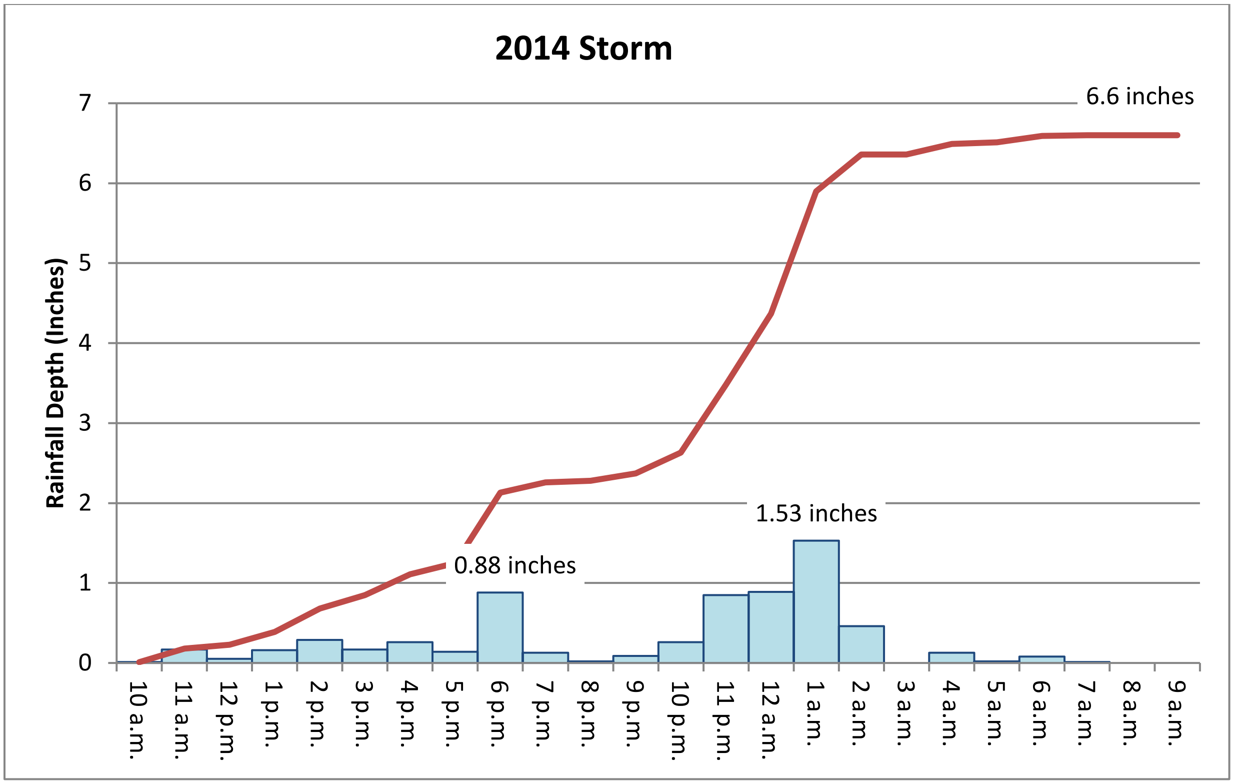

Figure 8. October 1, 2014 precipitation from Salt Creek at 70th Street gauge

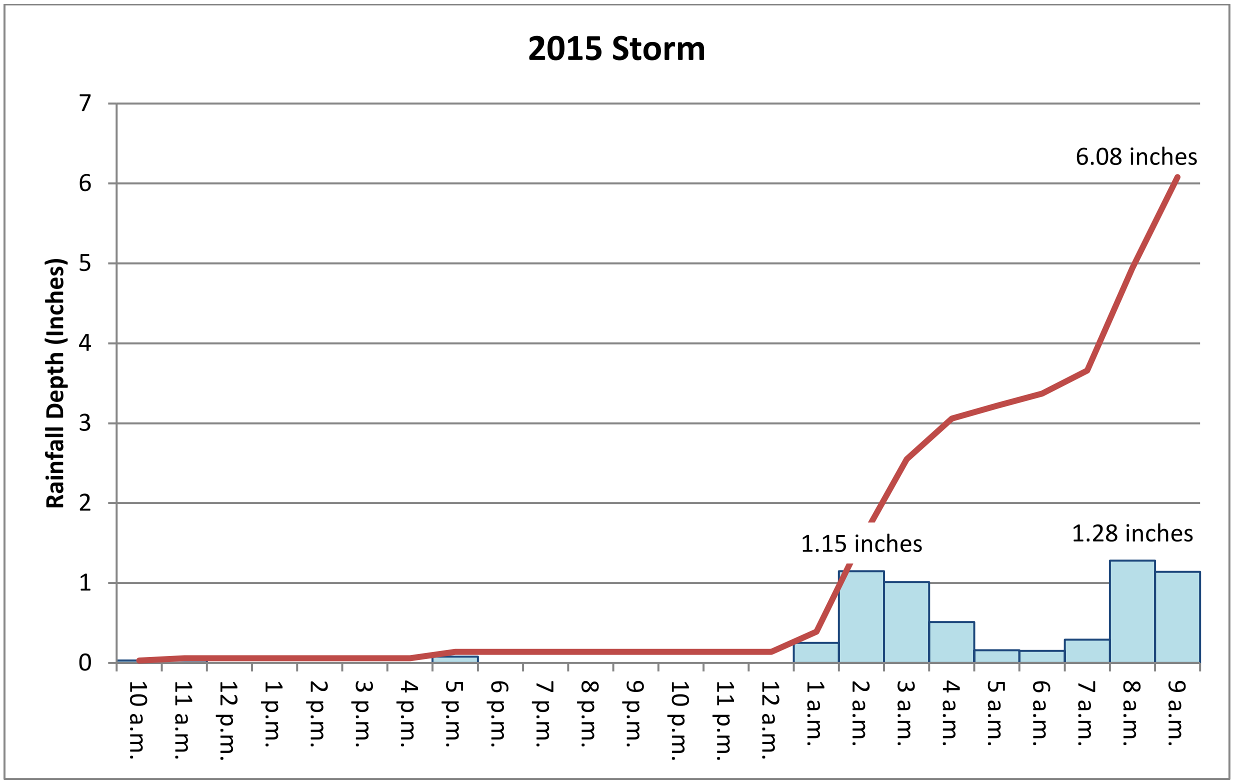

Figure 9. May 7, 2015 precipitation from Salt Creek at 70th Street gauge

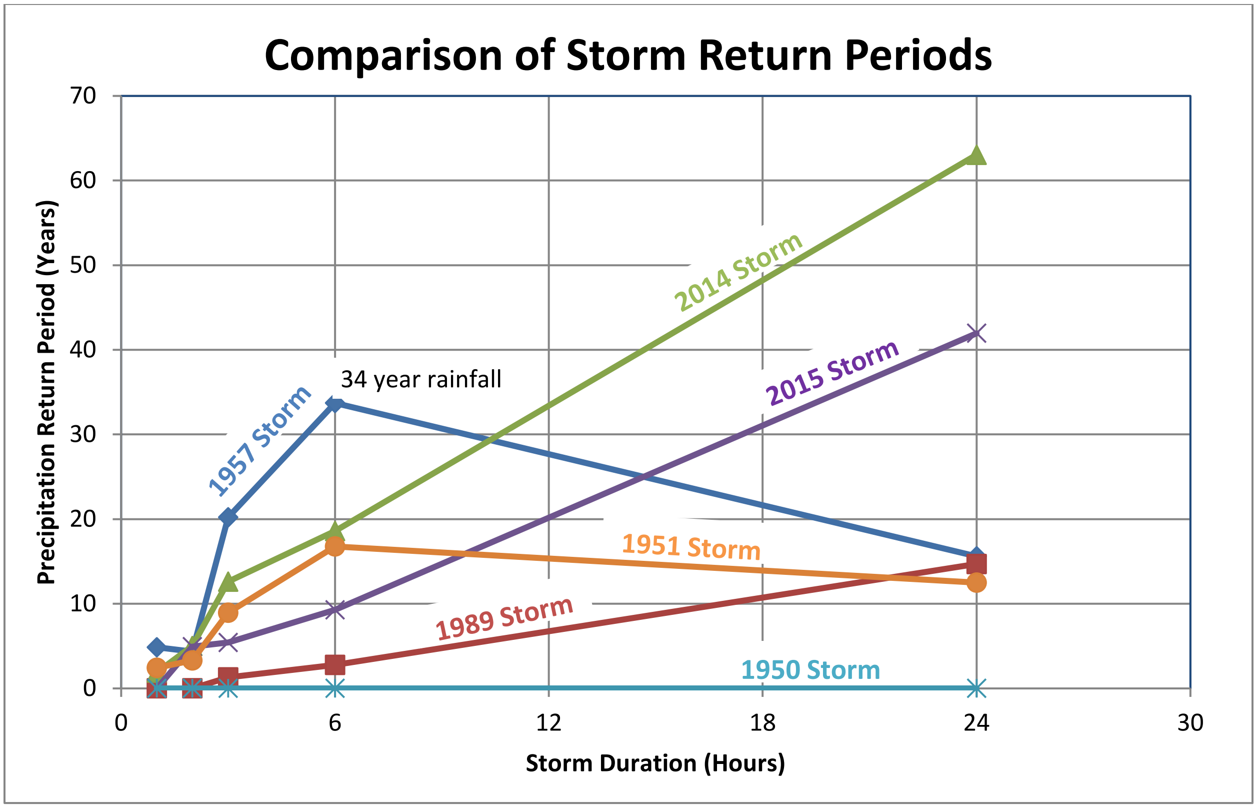

Figure 10. Comparison of storm return periods for various durations at Deadmans Run

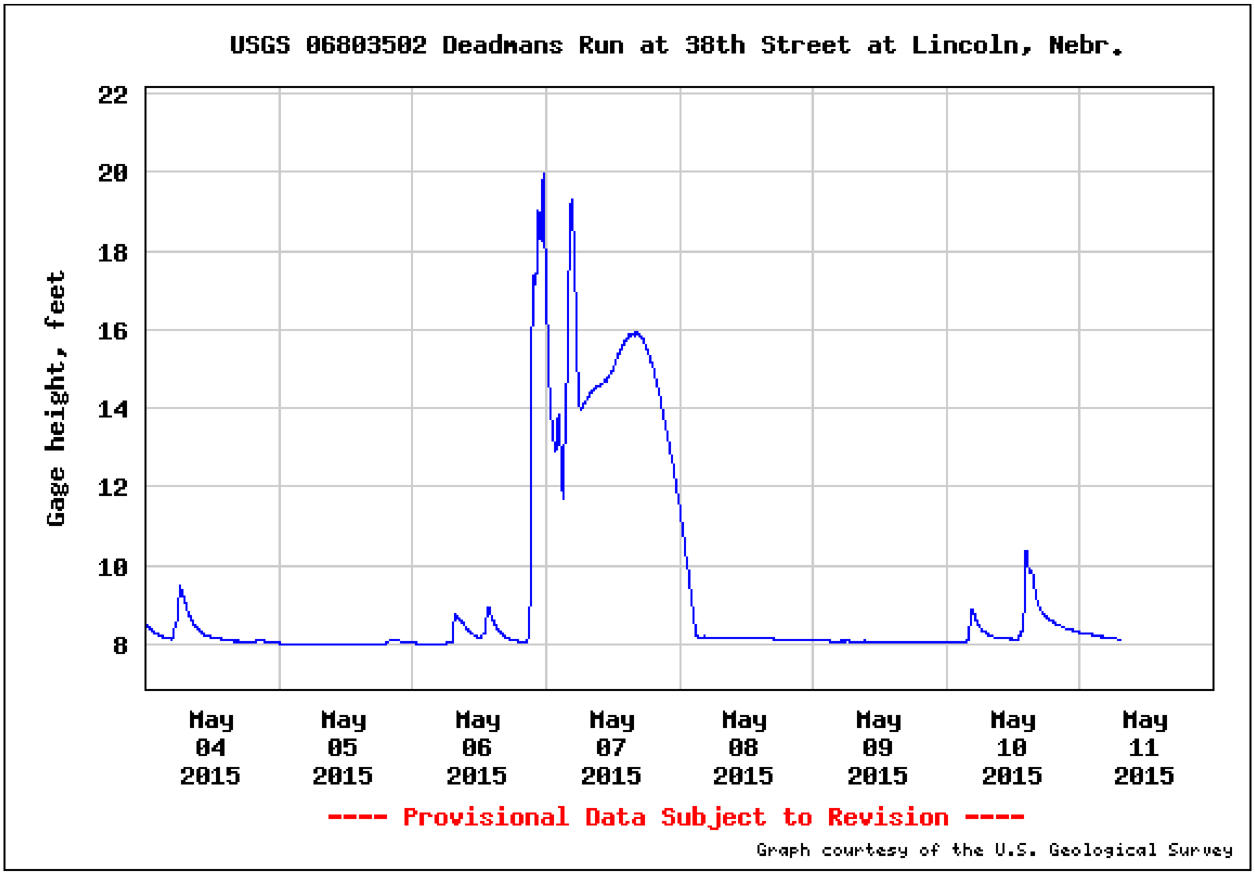

Figure 11. May 2015 high water event on Deadmans Run

6.0 October 2014 Event High Water Marks

High water marks were surveyed in the Deadmans Run watershed on October 1, 2014 after the September 30-October 1 historic rainfall event by four members of the USACE Omaha District. At the time of the event, the stream gauge on the 38th Street Bridge near the UNL East Campus had not yet been installed so the peak discharge had to be estimated through calculations instead of recorded flow observations. The peak discharge estimated later near the 38th Street Bridge was 3,680 cfs for the October 2014 event.

Figure 12 shows the high water marks (HWMs) surveyed and Table 5 summarizes their locations and surveyed elevations. The survey team did not encounter any areas where the high water came out of the channel. Figure 13 and Figure 14 show high water marks surveyed at the 38th Street Bridge and near the intersection of N 56th and Holdrege.

Refer to the *Deadmans Run Lincoln, Nebraska September 30 – October 1, 2014 Storm* (USACE 2015) report created by the USACE Omaha Hydrology Section for more documentation on the surveyed high water marks.

Table 5. High water marks locations and elevations

Site	Latitude (degrees)	Longitude (Degrees)	Surveyed Elevations (ft)
Cornhusker & 29th Street	40.84282	-96.67819	1133.38
Huntington & 35th Street	40.83697	-96.67052	1142.75
38th Street Bridge (DS)	40.83543	-96.66595	1146.55
38th Street Bridge (US)	40.83542	-96.66562	1146.61
48th Street Bridge HMW1	40.83319	-96.65326	1156.86
48th Street Bridge HMW2	40.83316	-96.65350	1156.57
N 56th Street & Holdrege HWM1	40.82750	-96.64347	1168.93
N 56th Street & Holdrege HWM2	40.82768	-96.64375	1168.84
N 56th Street & Holdrege HWM3	40.82781	-96.64398	1168.03
1st Bridge below Cotner	40.82255	-96.63618	1172.12

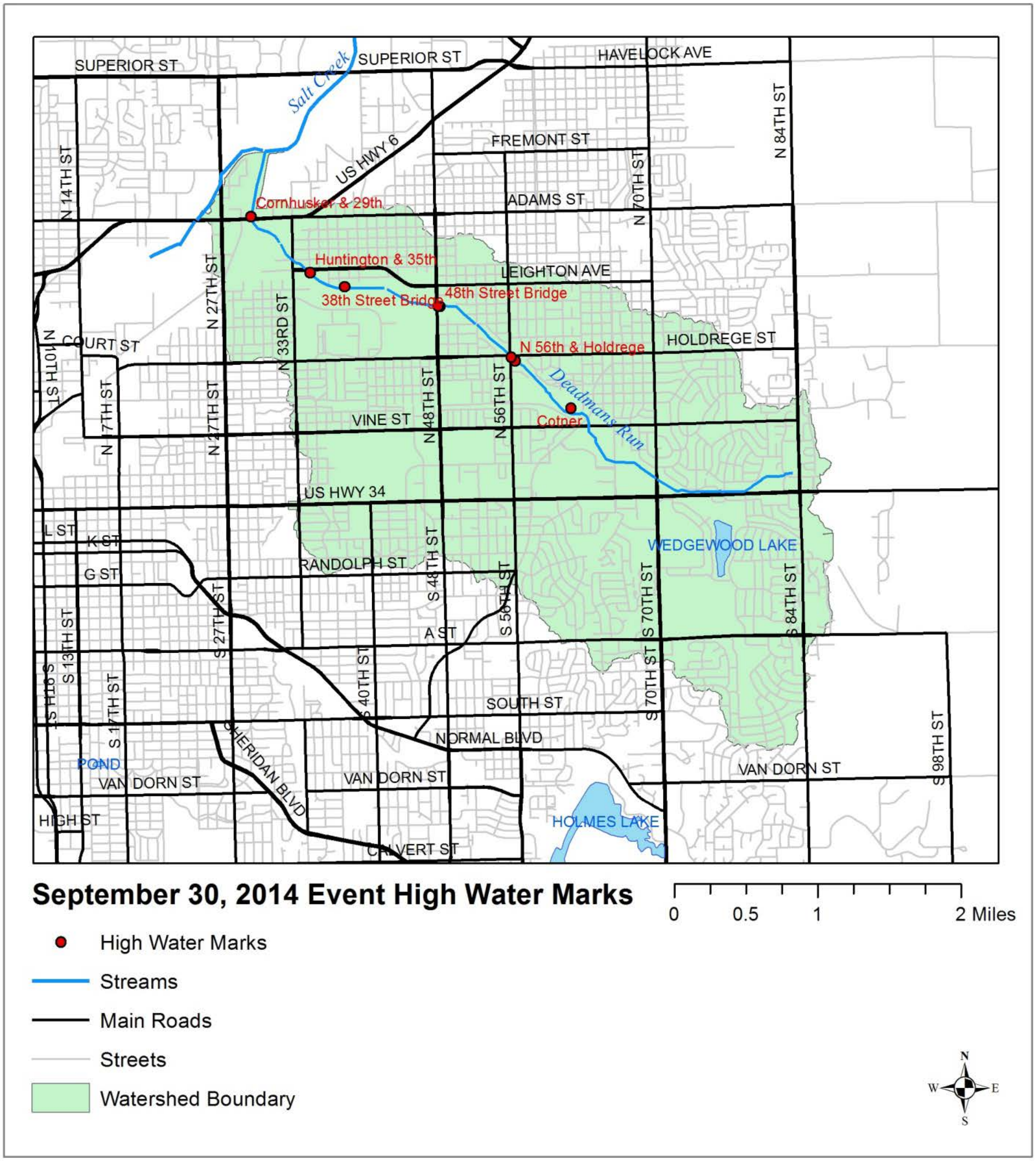

Figure 12. High water mark locations

Figure 13. High water mark at 38th Street Bridge

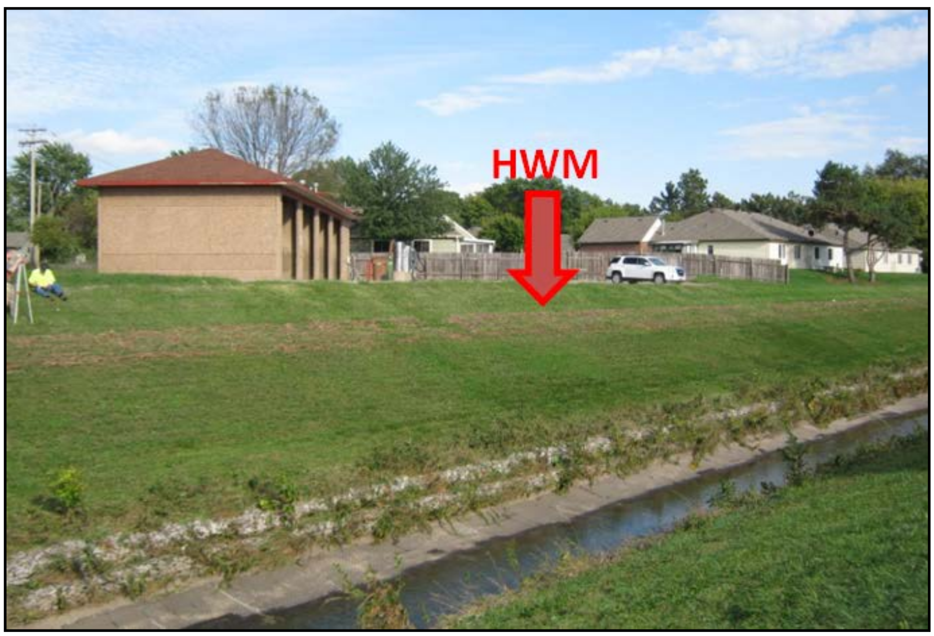

Figure 14. High water mark at N 56th & Holdrege

7.0 Existing Conditions Hydrologic Model

An existing conditions hydrologic model was developed in version 4.0 of the Hydrologic Modeling System (HEC-HMS) by the consultant URS based on a scope written by USACE. An existing HEC-HMS version 3.0 model developed by Camp Dresser and McKee (CDM) in 2007 to support the City of Lincoln Master Plan (CDM 2007) was provided to URS as a starting point. The main updates to the model required by the USACE scope and made by URS to the model were the following,

1. The version 3.0 model was converted to version 4.0.
2. The watershed delineation was modified to include calibration points at 38th Street and 66th Street. A subarea outlet was also included near the intersection of Norfolk Drive and Wells Court.
3. The SCS Curve Number soil loss method was replaced with the Initial and Constant loss method.
4. The SCS Curve Number transform method was replaced with Kinematic Wave transformation.
5. Precipitation was changed from the NRCS Type II 24-hour storm distribution from the City of Lincoln Drainage Criteria Manual to NOAA Atlas 14 depths.
6. Muskingum-Cunge was used for channel routing.
7. The eight precipitation-frequency events required for the economic analysis were modeled. These included the 2-, 5-, 10-, 25-, 50-, 100-, 200-, and 500-year events.

7.1 Watershed Delineation

The delineation of the original CDM model was modified slightly to incorporate additional calibration points. Calibration points were added at 38th Street and 66th Street. The 38th Street calibration point was added as it was the location of the soon-to-be installed USGS stream gauge. A subarea outlet was also placed at the sponsor's proposed location for off-channel storage, along the left bank near the intersection of Norfolk Drive and Wells Court. Note that detention storage will not be considered part of the Federal project due to the funding cap of the Section 205.

Figure 15 shows the final delineation of the Deadmans Run watershed used in the HEC-HMS model. The number of subareas was increased from the original 67 to 70 to account for the additional points requested by USACE.

The model includes five flow diversions (represented by dashed lines) which were originally included in the CDM model to represent pipe networks that cross subbasin ridge lines carrying more than ten percent of the total peak flow from the drainage area. Rating curves for the pipe flows were calculated by CDM using Mannings equation for various flow depths within the pipes. Flows exceeding the capacity are routed overland.

Figure 16 shows the locations of the peak flows determined in this study.

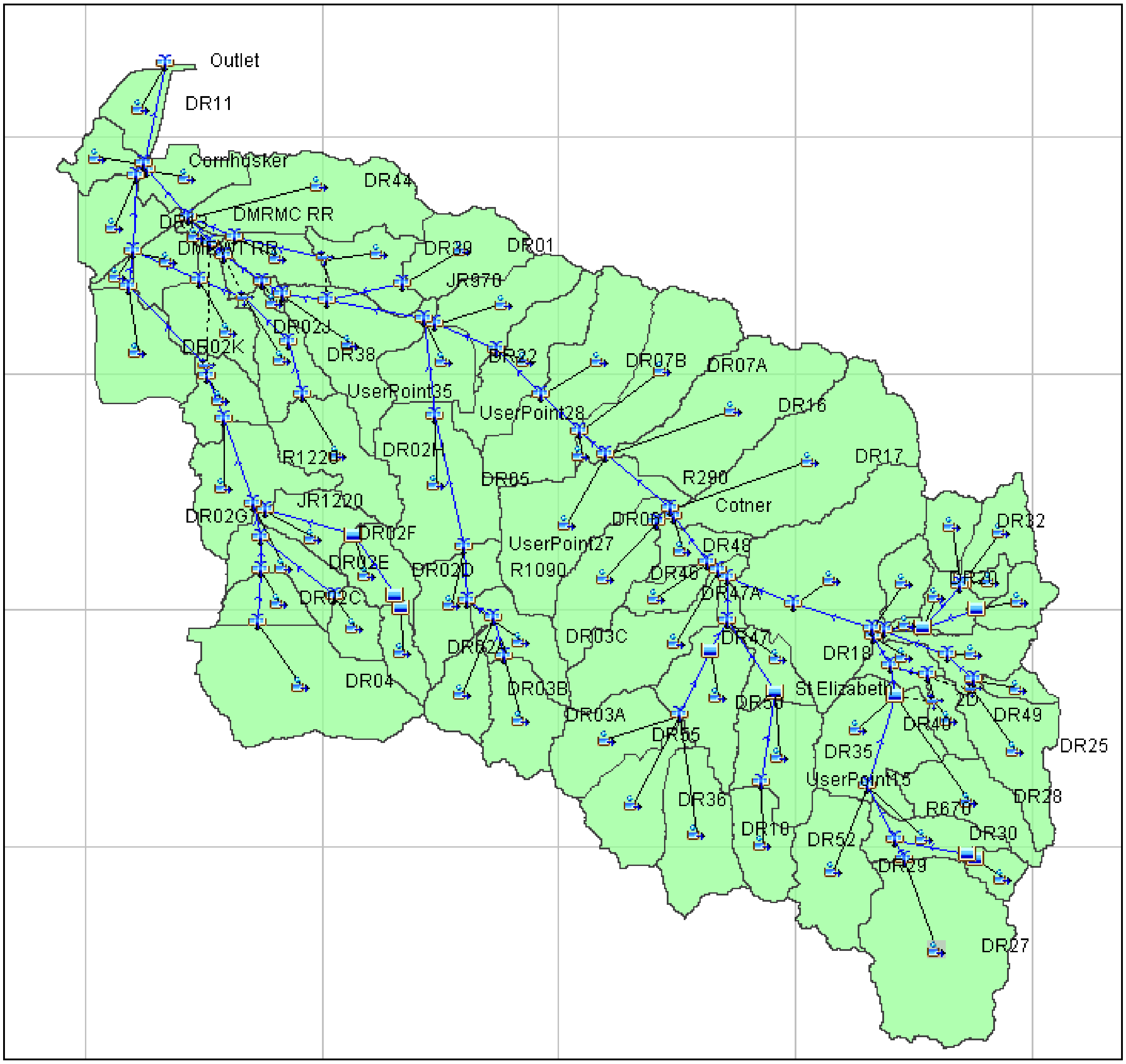

Figure 15. Watershed delineation in HEC-HMS

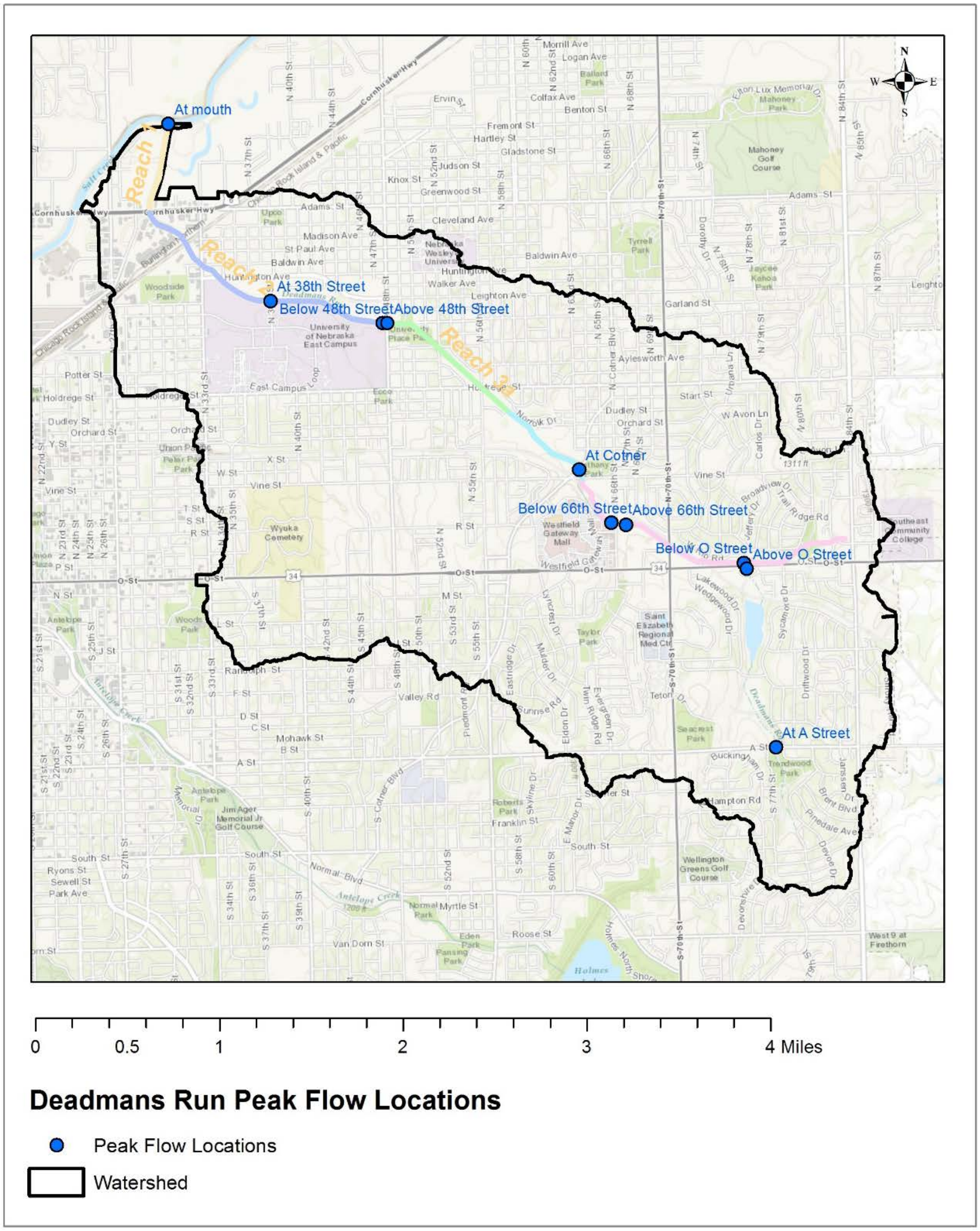

Figure 16. Peak Flow Locations

7.2 Soil Losses

The SCS Curve Number soil loss method was replaced with the Initial and Constant loss method. Originally, the scope of work created by USACE called for the SCS Curve Number soil loss method to be replaced with the Green and Ampt method using SSURGO soils information. It was later agreed between

USACE and URS to use the Initial and Constant loss method as the model was used to simulate event hydrographs and not continuous rainfall events.

Soils data were obtained from SSURGO soil data, the City of Lincoln land use data, the City of Lincoln building footprint data, and the USACE Engineering Manual 1110-2-1417, *Flood-Runoff Analysis* (USACE 1994). However, sensitivity testing with soil loss parameters showed that soil losses were not that sensitive due to the level of urbanization in the watershed. The final loss parameters were 1.5 inches for initial loss and 0.3 inches per hour for constant loss.

7.3 Transform Method

The SCS Curve Number transform method was replaced with Kinematic Wave transformation following guidance in the Hydrologic Engineering Center (HEC) technical document *Introduction and Application of Kinematic Wave Routing Techniques Using HEC-1* (HEC 1993). It was assumed that the storm and sanitary sewer were not modeled because floods above the 10-year event are the focus of the study and the storm drainage system does not handle these events.

7.4 Precipitation

Precipitation was changed from the NRCS Type II 24-hour storm distribution from the City of Lincoln Drainage Criteria Manual (City of Lincoln 2000) to NOAA Atlas 14 depths. The interval of the original precipitation data was 6 minutes. The NOAA Atlas 14 precipitation was entered into the HEC-HMS model using the Frequency Storm option with durations of 5- and 15-minutes and 1-, 2-, 3-, 6-, and 12-hours. The storm area entered in the model was 9.618 square miles, the same size as the Deadmans Run watershed to the mouth. The model time step was updated to 5-minutes to match the duration of the smallest frequency storm depth.

Table 6 shows the precipitation-frequency depths used in the hydrologic model. These are the recommended partial-duration values of NOAA Atlas 14.

Table 6. Precipitation depths used in model

	Average Recurrence Interval (Years)							
Duration	**2**	**5**	**10**	**25**	**50**	**100**	**200**	**500**
5-min	***0.457***	***0.579***	***0.679***	***0.818***	***0.924***	***1.03***	***1.14***	***1.28***
15-min	***0.816***	***1.03***	***1.21***	***1.46***	***1.65***	***1.84***	***2.03***	***2.29***
1-hr	***1.56***	***1.98***	***2.32***	***2.81***	***3.18***	***3.56***	***3.95***	***4.47***
2-hr	***1.92***	***2.43***	***2.87***	***3.47***	***3.95***	***4.43***	***4.93***	***5.61***
3-hr	***2.11***	***2.67***	***3.15***	***3.84***	***4.39***	***4.95***	***5.54***	***6.35***
6-hr	***2.42***	***3.05***	***3.61***	***4.43***	***5.09***	***5.8***	***6.55***	***7.59***

7.5 Channel Routing

Muskingum-Cunge routing cross sections were updated with new light detection and ranging (LiDAR) data. Channel details are provided in the tables in Appendix A. Channel Mannings roughness values were increased outside of textbook value ranges to account for additional losses in the urban system not accounted for in the model. These elevated roughness values were included in the original CDM HMS model the model of this study was based upon. In addition, identical channel roughness was used in the August 1996 Antelope Creek Feasibility Study (USACE 1996) which also used the kinematic wave rainfall-to-runoff transformation. This increase is to represent losses not directly modeled such as losses due to bridges. The average main channel Mannings roughness value in the case of the Deadmans Run model was 0.053.

7.6 Sensitivity to Rainfall

URS preformed sensitivity analyses for different sets of 100-year rainfall data due to differences in source, durations, magnitudes and distributions used in past studies. Simulation results were compared using the peak flow values published in the 1993 Section 205 regulation (USACE 1993) and in the City of Lincoln 2007 Master Plan (City of Lincoln 2007). Table 7 and Table 8 summarize the input rainfall data and compare the peak flows generated by the rainfall. Refer to Table 7 for the information on the A through E scenarios used by URS.

Table 7. Point rainfall values for Deadmans Run

Storm Scenario	100-Year Rainfall Data				
	Source	Duration	Distribution	Magnitude (inches)	Comments
A	NOAA Atlas 14	6-hour	Frequency Storm*	5.81	Used in URS model
B	NOAA Atlas 14	6-hour	SCS Type II	5.81	SCS Type II applied for 6-hour
C	NOAA Atlas 14	24-hour	SCS Type II	7.29	SCS Type II applied for 24-hour
D	TP40	6-hour	SCS Type II	5.22	Technical Paper 40 (Ref. 11) SCS Type II applied for 6-hour
E	CDM Model	24-hour	SCS Type II	6.73	Used in CDM Model (Ref. 3)
*Frequency storm distribution is shown an in Table 1.					

Table 8. Rainfall sensitivity analysis in 100-year peak flows

Location	HMS Element	Drainage Area (Mi^2)	100-year peak flows (cfs)						
			Section 205 (Ref. 4)	CDM 2007 (Ref. 3)	URS * (A)	URS (B)	URS (C)	URS (D)	URS (E)
At mouth	Outlet	9.618	9,660	9,078	***9,890***	10,497	10,292	9,049	9,286
At 38th Street	38 Street	6.931	8,410	8,193	***8,397***	9,060	8,858	7,801	7,960
Below 48th Street	UNLTrib	6.571	8,530	8,628	***8,489***	9,210	9,020	8,000	8,160
Above 48th Street	48 Street	5.709	7,210	7,426	***7,045***	7,640	7,450	6,567	6,717
At Cotner	Cotner	4.259	5,780	6,350	***5,645***	6,336	6,177	5,330	5,536
Below 66th Street	66 Street D/S	3.559	4,980	5,764	***5,336***	6,168	5,975	5,316	5,387
Above 66th Street	66 Street U/S	3.373	3,330	5,534	***4,976***	5,674	5,514	4,861	4,858
Below O Street	O Street D/S	1.901	2,790	3,066	***3,148***	3,627	3,548	3,060	3,146
Above O Street	O Street U/S	1.239	1,760	1,876	***2,031***	2,266	2,232	1,932	1,985
At A Street**	A Street	0.424	1,360	1,007	***1,599***	2,003	1,883	1,746	1,662

*URS rainfall data and final model results
**Element "A Street" drainage area is listed as 1.1 square miles in Section 205 Study (Ref. 4).

7.7 Sensitivity to Soil Infiltration Losses

URS preformed a sensitivity analysis for different soil infiltration rates (0.15, 0.3, and 0.45 inches per hour). Simulation results were compared using the peak flow values published in the 1993 Section 205 regulation (USACE 1993) and the City of Lincoln Master Plan (City of Lincoln 2007). Table 9 summarizes the results based on different infiltration rates.

Table 9. Soils loss rate sensitivity analysis

Location	HMS Element	Drainage Area (Mi^2)	100-year peak flows (cfs)				
			Section 205 (Ref. 4)	CDM 2007 (Ref. 3)	URS (0.15 in/hr)	URS* (0.30 in/hr)	URS (0.45 in/hr)
At mouth	Outlet	9.618	9,660	9,078	10,227	***9,890***	9,602
At 38th Street	38 Street	6.931	8,410	8,193	8,641	***8,397***	8,196
Below 48th Street	UNLTrib	6.571	8,530	8,628	8,675	***8,489***	8,295
Above 48th Street	48 Street	5.709	7,210	7,426	7,202	***7,045***	6,866
At Cotner	Cotner	4.259	5,780	6,350	5,779	***5,645***	5,469
Below 66th Street	66 Street D/S	3.559	4,980	5,764	5,413	***5,336***	5,247
Above 66th Street	66 Street U/S	3.373	3,330	5,534	5,133	***4,976***	4,794
Below O Street	O Street D/S	1.901	2,790	3,066	3,223	***3,148***	3,068
Above O Street	O Street U/S	1.239	1,760	1,876	2,092	***2,031***	1,980
At A Street**	A Street	0.424	1,360	1,007	1,637	***1,599***	1,560

*URS rainfall data and final model results
**Element "A Street" drainage area is listed as 1.1 square miles in Section 205 Study (Ref. 4).

7.8 Results Comparison

URS developed final model parameters for the Deadmans Run watershed based on sensitivity analysis results considering loss rates and rainfall data. Final model parameters are shown in the tables in Appendix A. Simulation results for the 100-year peaks at various study locations were compared against results from the Section 205 study (USACE 1993), the *City of Lincoln Master Plan* (City of Lincoln 2007), and USGS regional regression relationships. The *City of Lincoln Master Plan* used the CDM model provided to URS for update in this study. Table 10, Table 11, and Figure 17 compare the 100-year peak flows.

USGS regional regression relationships were determined by URS with the USGS publication WRIR 99-4032, *Peak-Flow Frequency Relations and Evaluation of the Peak-Flow Gauging Network in Nebraska*. Basin slope and the permeability of the least permeable layer were determined as 24.5 feet per mile (at the channel mouth) and 0.12 inches per hour, respectively.

Figure 18 shows a comparison of the peak flow frequencies from the 1993 Section 205 study, 2008 City of Lincoln Master Plan (CDM Study), USGS regional regression relationships determined by URS, and the adopted URS model. All peak flows are estimated at the mouth of Deadmans Run. Results show that all the model peak flows are larger than the regional equation peak flows, which is expected as Deadmans Run is urbanized and the USGS regional equations were developed for rural watersheds. The updated peak flows (URS adopted model) are slightly higher than the 1993 Section 205 flows but both curves are nearly parallel.

Based on the comparison of 100-year flow model results in Table 10, updates made during this study do not show significant impact on the overall peak flow frequency results for the 100-year event. Peak flows are within 10% for all compared study locations along Deadmans Run for the 100-year event.

Table 10. Comparison of 100-year peak flows

Location	HMS Element	Drainage Area (Mi^2)	100-year peak flows (cfs)		
			1993 Section 205 (Ref. 4)	CDM 2007 (Ref. 3)	URS
At mouth	Outlet	9.618	9,660	9,078	***9,890***
At 38th Street	38 Street	6.931	8,410	8,193	***8,397***
Below 48th Street	UNLTrib	6.571	8,530	8,628	***8,489***
Above 48th Street	48 Street	5.709	7,210	7,426	***7,045***
At Cotner	Cotner	4.259	5,780	6,350	***5,645***
Below 66th Street	66 Street D/S	3.559	4,980	5,764	***5,336***
Above 66th Street	66 Street U/S	3.373	3,330	5,534	***4,976***
Below O Street	O Street D/S	1.901	2,790	3,066	***3,148***
Above O Street	O Street U/S	1.239	1,760	1,876	***2,031***
At A Street*	A Street	0.424	1,360	1,007	***1,599***

*Element "A Street" drainage area is listed as 1.1 square miles in Section 205 Study (Ref. 4).

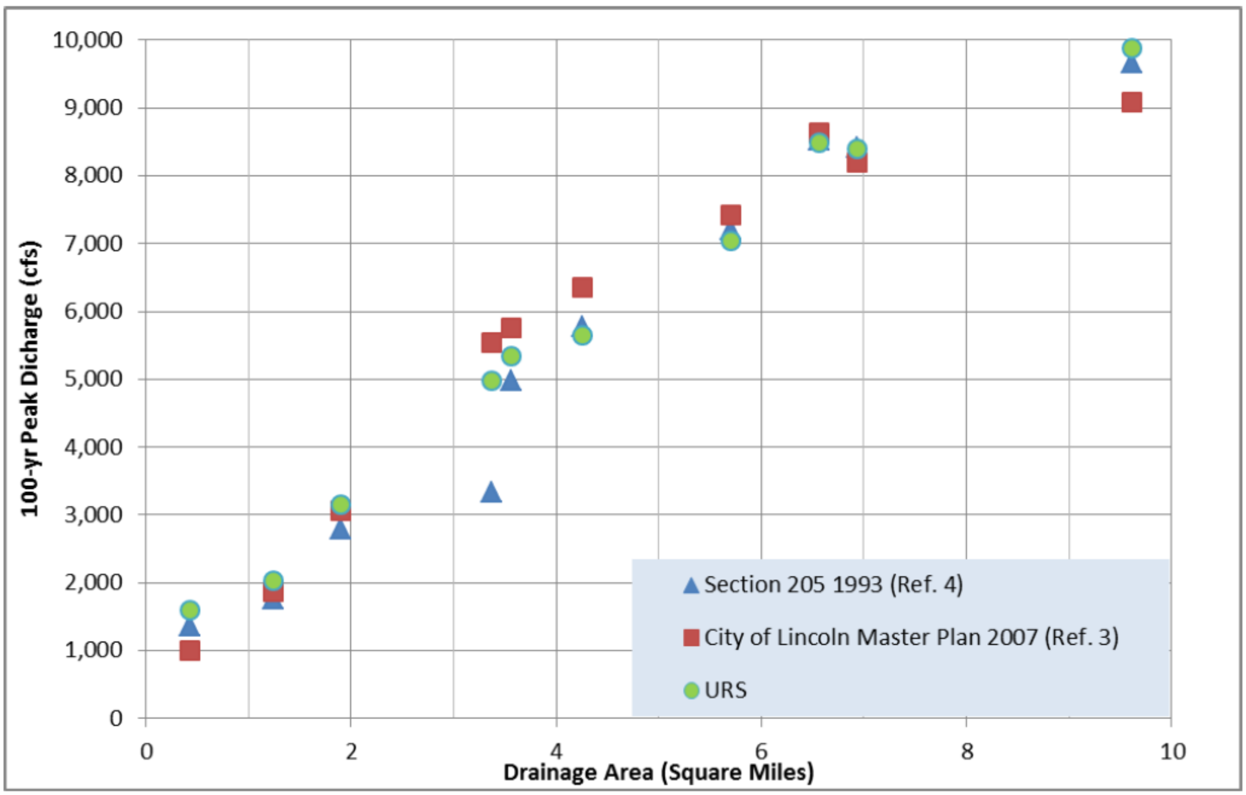

Figure 17. Comparison of model results

Table 11. USGS Regional equation peak flows at mouth of Deadmans Run

Return Period	Drainage Area (Mi^2)	Regression Flows (cfs)	Regression Standard Error	Regression + Standard Error (cfs)	Regression - Standard Error (cfs)	URS
2-year	9.618	444	0.461	648	239	1681
5-year	9.618	1259	0.297	1633	885	3053
10-year	9.618	2074	0.251	2594	1553	5026
25-year	9.618	3397	0.243	4222	2572	6940
50-year	9.618	4624	0.254	5799	3450	8399
100-year	9.618	6053	0.272	7699	4406	9890
200-year	9.618	7751	0.293	10022	5480	11677
500-year	9.618	10358	0.322	13693	7022	14174

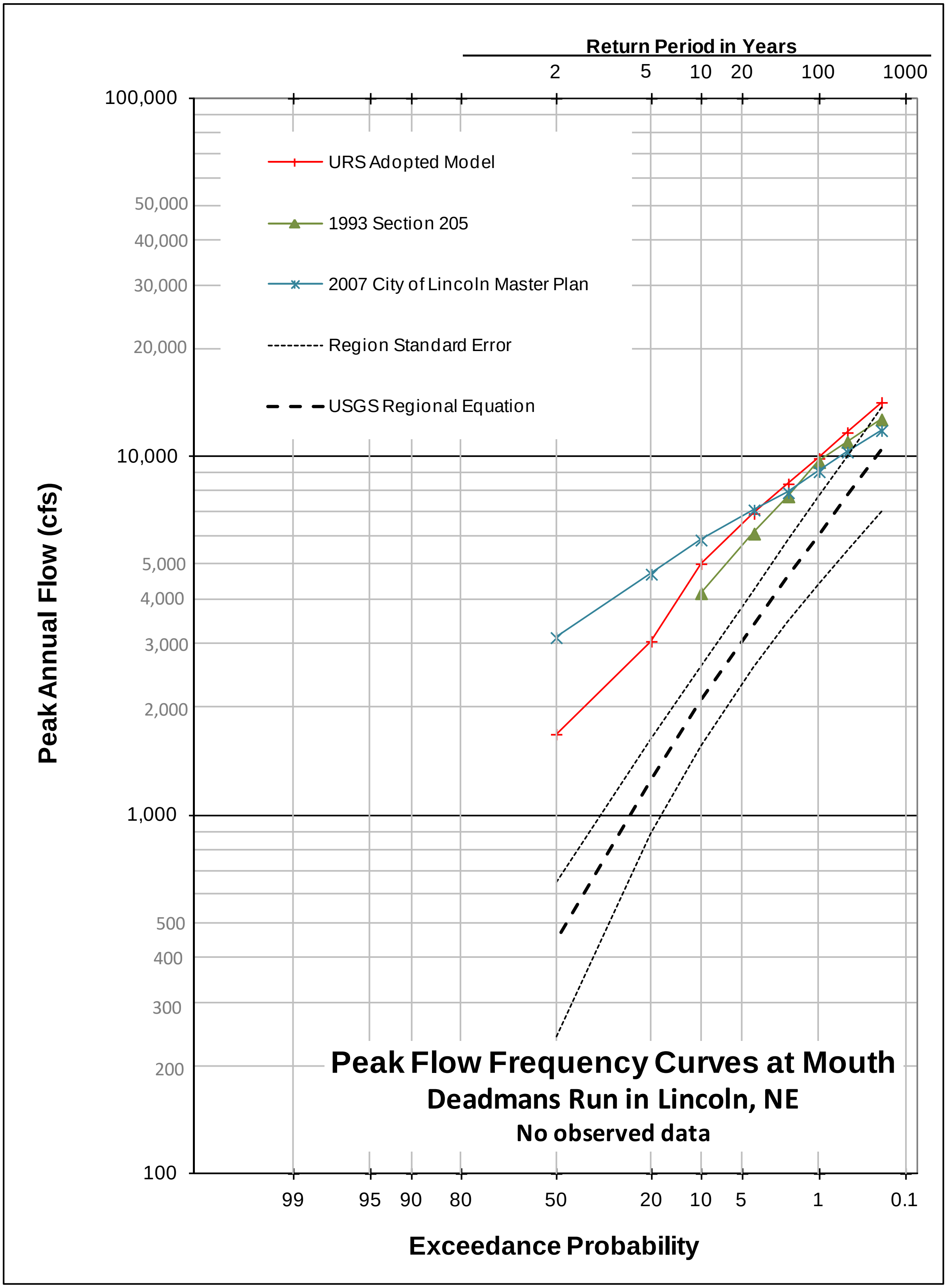

Figure 18. Comparison of study results at mouth of Deadmans Run

7.9 Model Verification

The Deadmans Run model was simulated with the September 31 – October 1, 2014 rainfall observations from the Weather Underground (Weather Underground 2015) and the peak compared with the USGS peak flow estimate at the 38th Street Bridge. The model estimated a peak flow of 3,020 cfs at the 38th Street Bridge while the USGS estimated a peak flow of 3,680 cfs. Note that the USGS estimate was not available at the time the HMS model was being calibrated otherwise the contractor would have been instructed to calibrate to this estimated flow. The difference between these two flows is 22% with the model result the lower of the two values. It should be kept in mind, however, that the October 2014 flow was not captured at a gauge but estimated from an indirect measurement with high water marks using a provisional rating curve (USGS 2015).

7.10 Adopted Hydrologic Model Results

URS used the updated HEC-HMS model to complete the simulations for the 2-, 5-, 10-, 25-, 50-, 100-, 200-, and 500-year frequency storms using NOAA Atlas 14 rainfall depths. Table 12 summarizes the simulation results for all frequencies at critical locations along Deadmans Run. Figure 19 shows the locations of the peak flows reported in the table.

Table 12. Adopted peak flow results

Location	Drainage Area (Mi^2)	Frequency Storms							
		2-year	5-year	10-year	25-year	50-year	100-year	200-year	500-year
At mouth	9.618	1,681	3,053	5,026	6,940	8,399	9,890	11,677	14,174
At 38th Street	6.931	1,440	2,644	4,429	5,981	7,163	8,397	9,839	11,929
Below 48th Street	6.571	1,409	2,627	4,483	6,167	7,320	8,489	9,871	11,922
Above 48th Street	5.709	1,207	2,228	3,742	5,102	6,045	7,045	8,259	10,105
At Cotner	4.259	922	1,722	2,815	3,833	4,676	5,645	6,768	8,376
Below 66th Street	3.559	842	1,627	2,833	3,796	4,615	5,336	6,388	8,042
Above 66th Street	3.373	794	1,534	2,623	3,489	4,187	4,976	6,133	7,684
Below O Street	1.901	434	858	1,483	2,094	2,594	3,148	3,695	4,477
Above O Street	1.239	317	602	1,012	1,390	1,683	2,031	2,369	2,845
At A Street*	0.424	161	338	711	1,082	1,358	1,599	1,888	2,237

*Element "A Street" drainage area is listed as 1.1 square miles in Section 205 Study (Ref. 4).

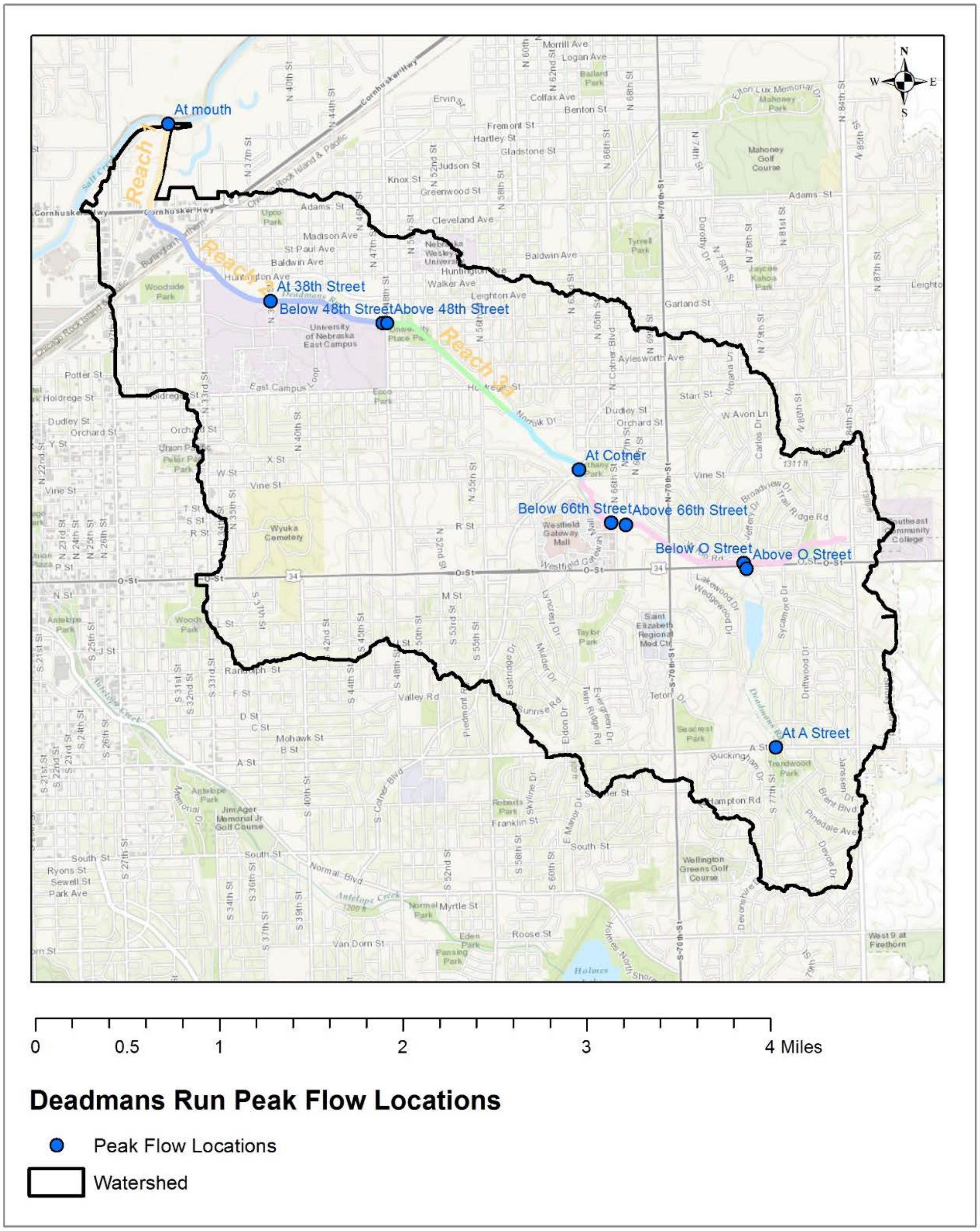

Figure 19. Peak Flow Locations

8.0 Climate Change Analysis

The U.S. Corps of Engineers *Engineering and Construction Bulletin No. 2016-25* (ECB, USACE 2016) requires a qualitative analysis of the impacts of climate change on the climate variables that may affect the hydrology of a project. This analysis does not affect the numerical results of a study but indicate potential climatic trends. The ECB consists of both a first-order trend analysis on stream gauges in the area, a literature review of regional climate studies, and the implementation of USACE web based Climate Tools (USACE 2017). The climate change analysis conducted by URS included a stream gauge trend analysis, a regional climate forecast model analysis, and a review of regional analysis studies. Analysis with USACE Climate Tools was added with the update of the ECB in 2016.

Flooding on Deadmans Run would be sensitive to change in peak rainfall intensity, especially for shorter duration storms of 3 hours or less. Trends in streamflow and precipitation models were evaluated in order to determine if there are any current trends that could be used to project future without project rainfall and runoff conditions that would be different from the current conditions. Additionally, regional climate trend analysis studies were evaluated to determine if there were implications to the rainfall-runoff regime on flood flow frequency relationships in the future.

8.1 Current Climate

Lincoln, Nebraska has a Köppen hot-summer humid continental climate characterized by cold winters (average temperatures between 52 and 14°F with high wind chill) and hot and humid summers (average temperatures between 89 and 39°F). The average annual precipitation is 28.9 inches with the majority falling in the summer months. Flooding on Deadmans Run has historically been caused by intense, short duration storms due to its small size and short time of concentration. The average annual snowfall is 26 inches with the majority falling from December through March (average 5 to 6 inches per each of those months) (U.S. Climate Data 2017).

8.2 Stream Gauge Trend Analysis

The USACE Climate Hydrology Assessment Tool was used to develop trends for stream gauges in and near Lincoln, NE. The gauge on Deadmans Run itself was installed in October 2014 and its record is too short for statistical trend analysis. Analysis of gauge data on Salt Creek was assumed representative of the region. Stream flow from USGS gauge 6803000, Salt Creek at Roca, Nebraska (data from 1951 to 2014), and USGS gauge 6803500, Salt Creek at Lincoln, Nebraska (data from 1949 to 2014) were analyzed by the USACE tool. Figure 20 and Figure 21 show plotted flows along with a best fit linear trend line representing the data trend. Both stream gauges show a downward trend in peak stream flows over time. The trend at the Roca gauge is statistically significant because the p-value is less than 0.05. The trend at the Lincoln gauge is not statistically significant because the p-value is greater than 0.05. All other Salt Creek gauges tested also showed trends that were not statistically significant.

The downward trend in annual peak stream flows cannot likely be attributed to climate change because ten reservoirs were constructed in the 1960s on tributaries to Salt Creek for the purpose of flood control. These structures are likely the reason for the downward trend in peak streamflow over time and not climate change.

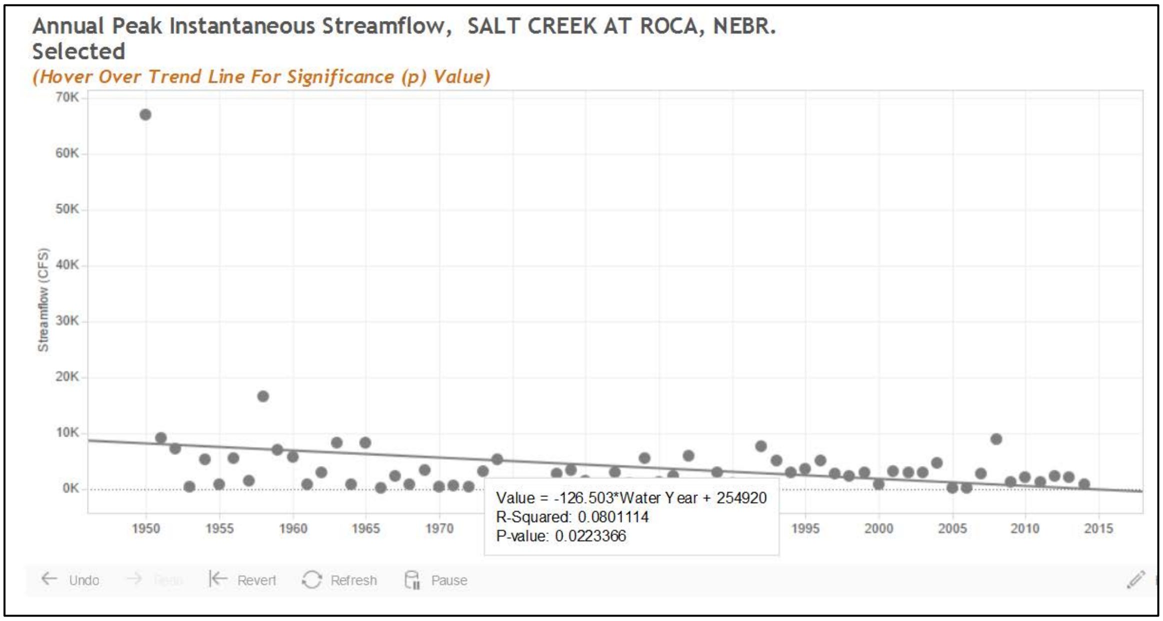

Figure 20. Annual maximum instantaneous streamflow for USGS gauge Salt Creek at Roca, Nebraska

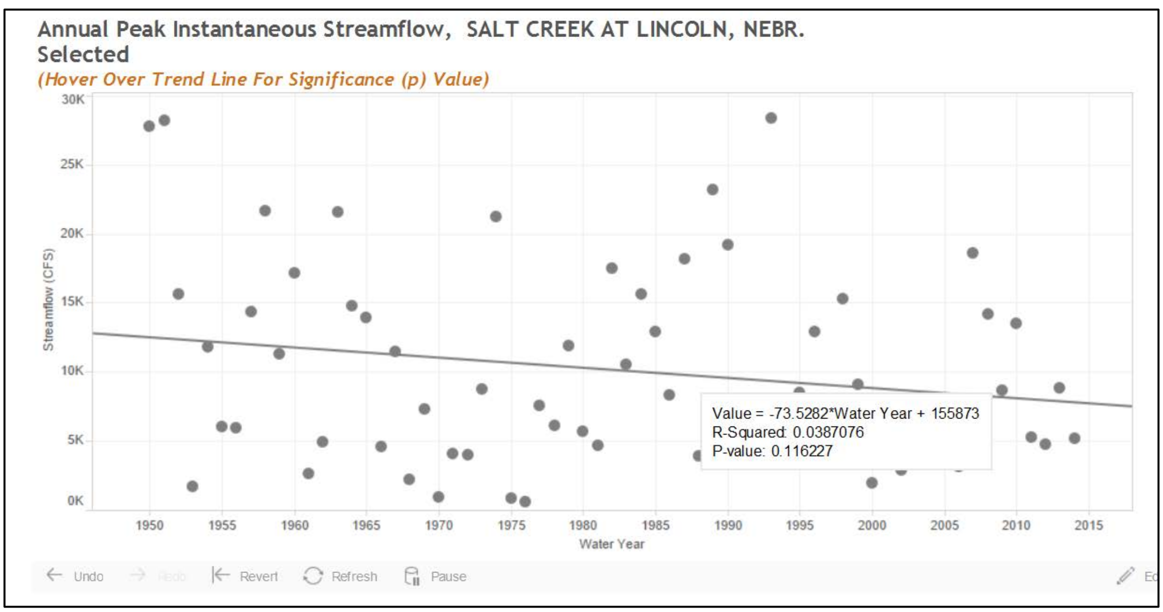

Figure 21. Annual maximum instantaneous stream flow for USGS gauge Salt Creek at Lincoln, Nebraska

8.3 Nonstationarity

The USACE Nonstationarity Detention Tool was used to detect changes in the stream gauge record statistics with time. If a stream gauge record is stationary, it can be assumed that the statistical characteristics of the time series data are constant through time and have not been affected by climate change or anthropogenic activity.

The Heatmap for the Roca gauge shows only one test (Energy Divisive Method) was triggered for the year of 1980 which is negligible evidence of change in the record. The Heatmap for the Lincoln gauge had no tests triggered which indicates the record is very homogenous and has not been affected by changes in peak flows from climate change or anthropogenic activity. Sensitivity parameter default values were used for both gauges. Results are shown in Figure 22 and Figure 23.

The nonstationarity test also includes trend analysis of the annual maximums. This analysis shows that both the Roca and Lincoln gauges have no statistically significant trend in annual maximum stream flow. In the case of the Roca gauge, this lack of trend contradicts the results of the Climate Hydrology Assessment tool in the previous section which showed a statistically significant downward trend. This difference in results is likely due to different methods being used on the same data. Other stream gauges along Salt Creek showed no statistically significant trends in the annual peak flow data which indicates there is more evidence of no trend than there is for a downward trend.

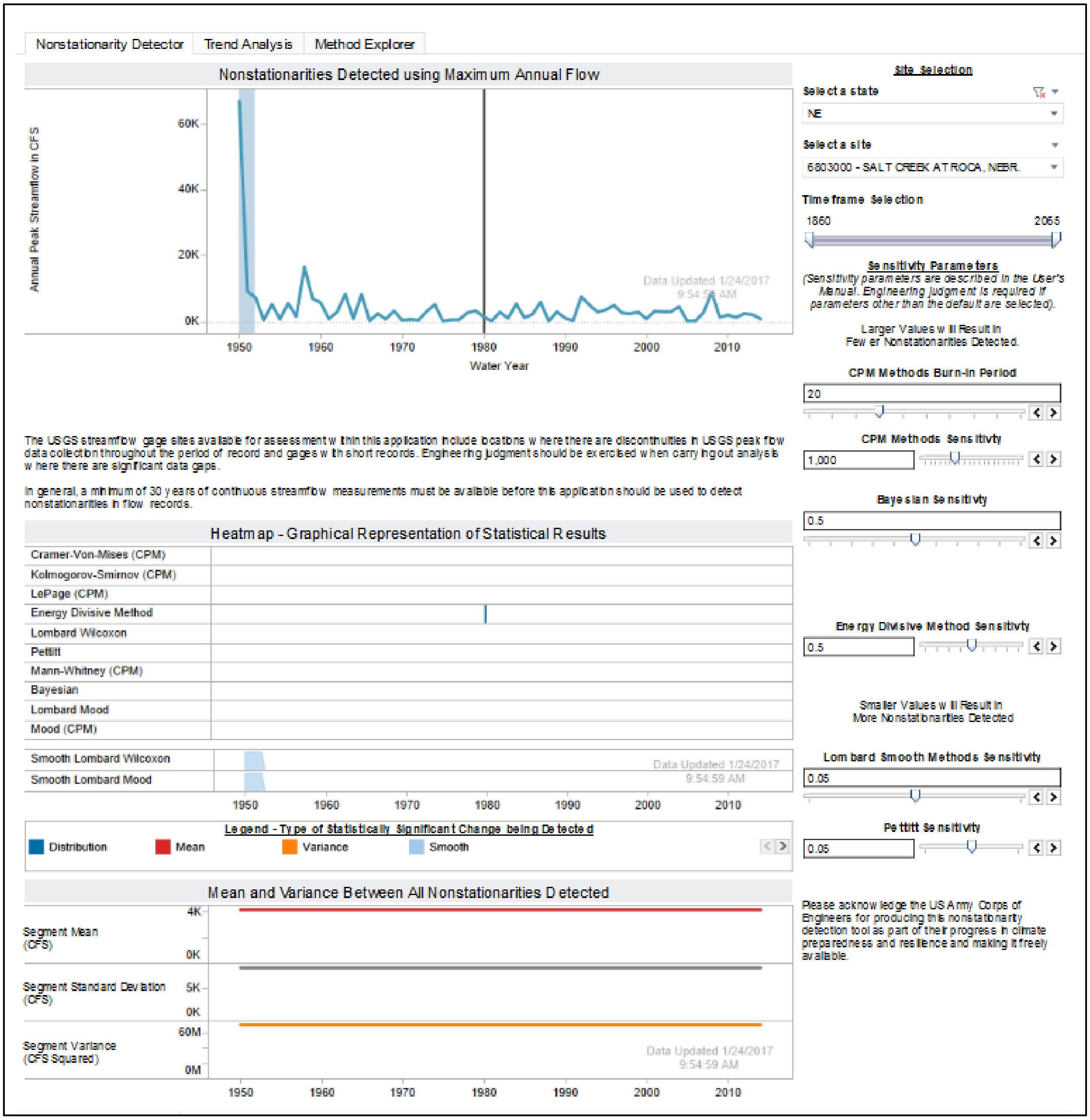

Figure 22. Nonstationarity Test results for Salt Creek at Roca

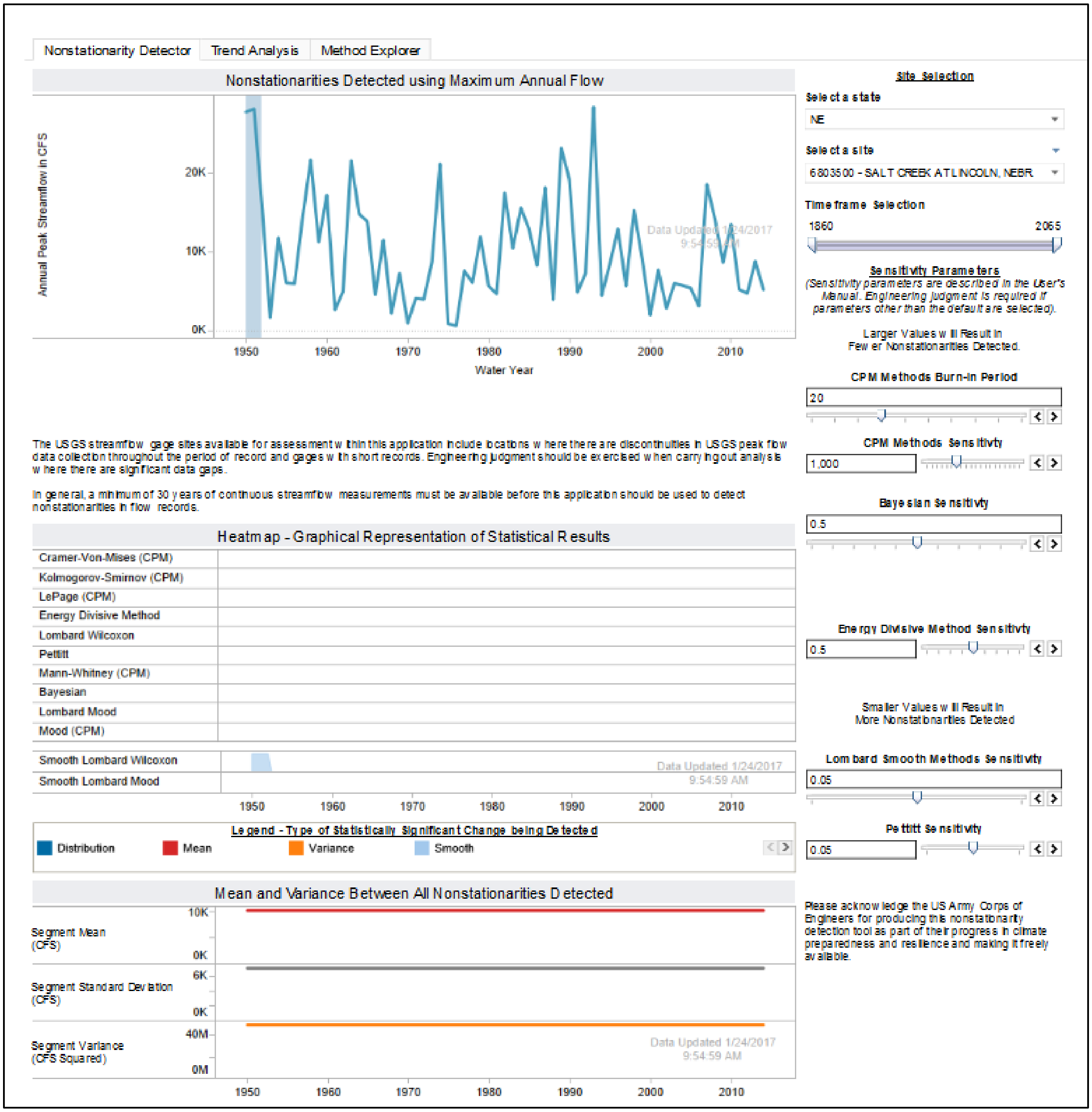

Figure 23. Nonstationarity Test results for Salt Creek at Lincoln

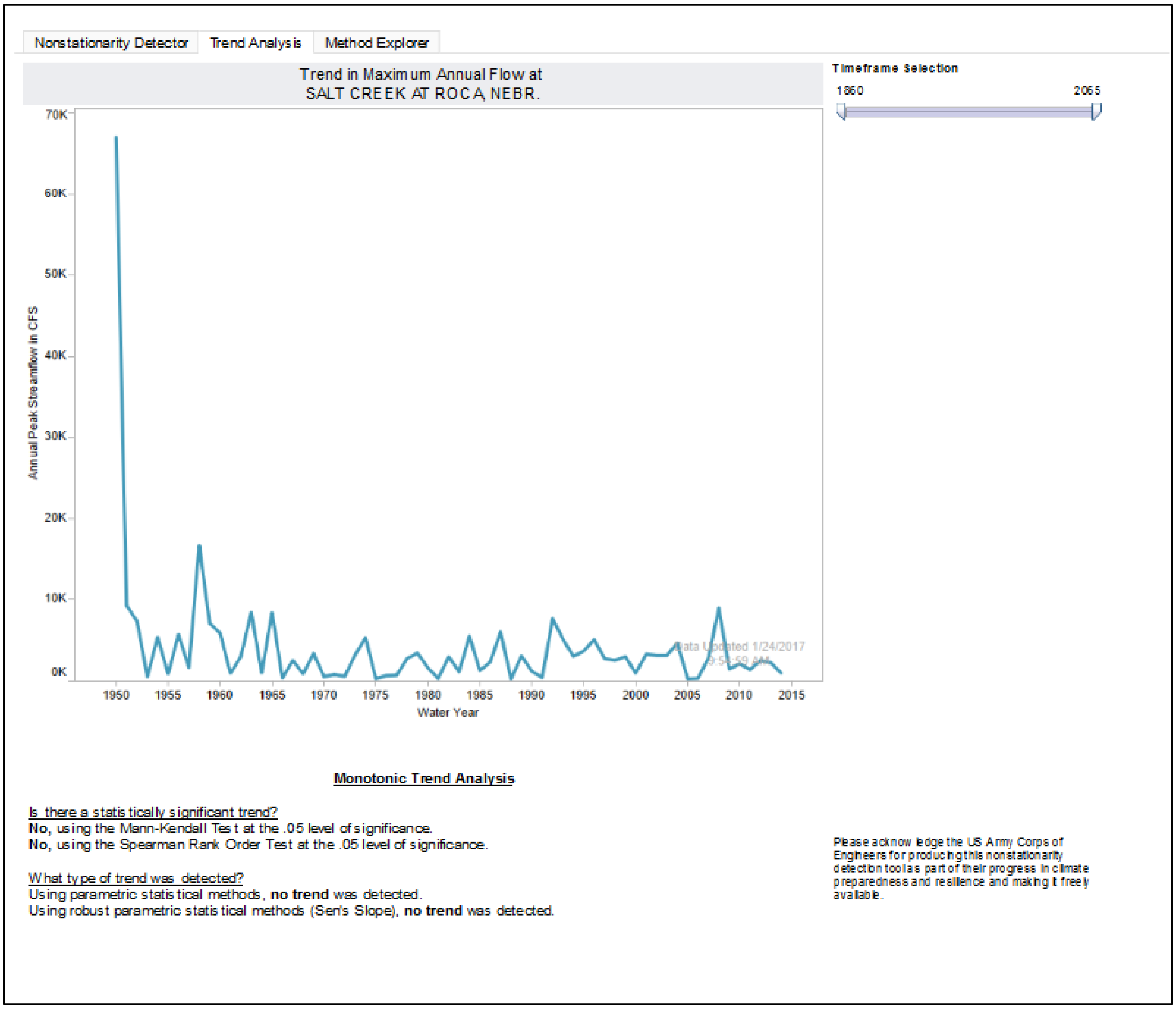

Figure 24. Roca gauge trend in maximum annual flow

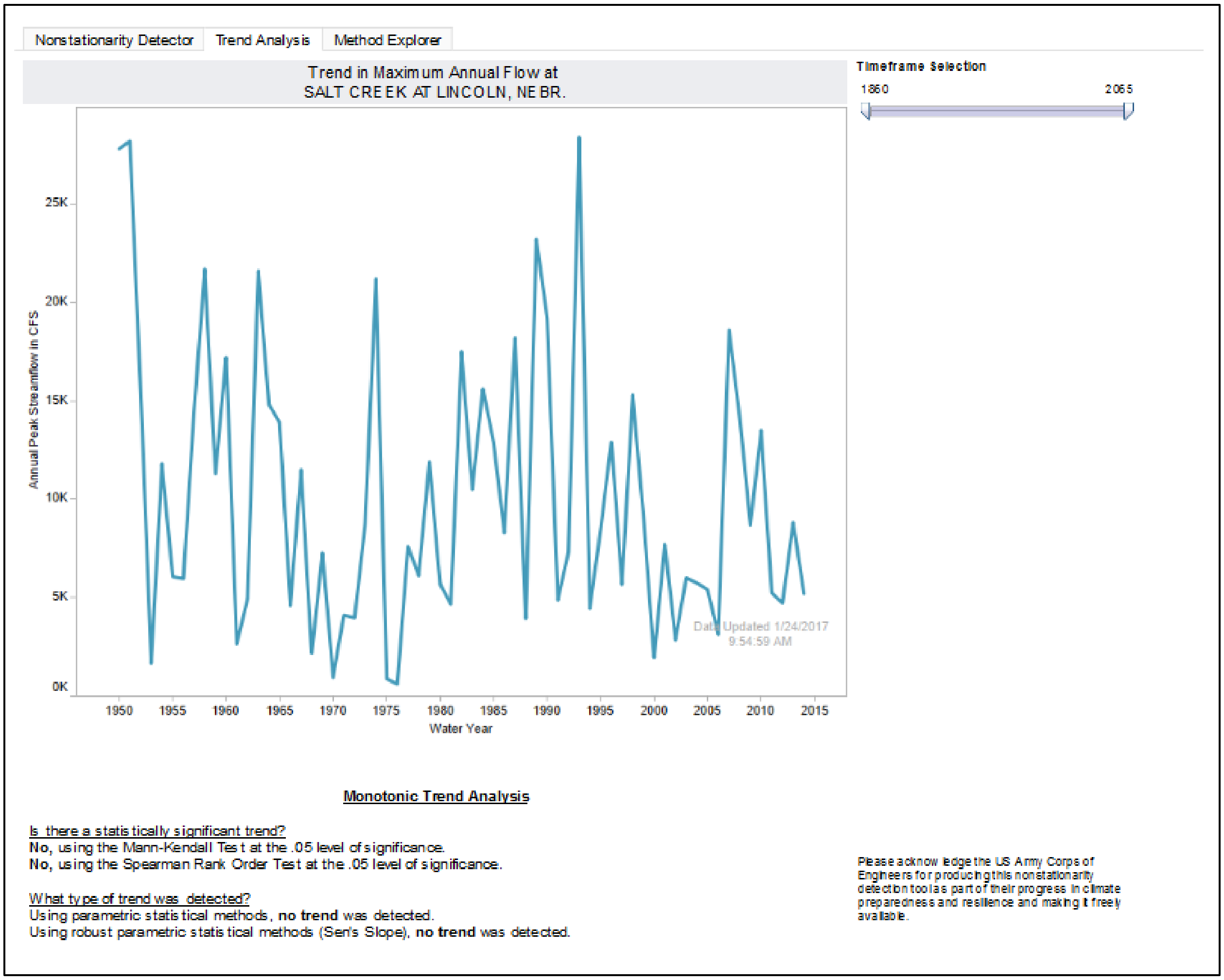

Figure 25. Lincoln gauge trend in maximum annual flow

8.4 Watershed Vulnerability Assessment

The USACE Watershed Vulnerability Assessment tool was used to examine the vulnerability of the project area to future flood risk. The City of Lincoln, NE is in the Platte River HUC. Results from the tool for the Platte River HUC indicate a future flood vulnerability due mainly to flood magnification for the 2050 Dry, 2050 Wet, and 2080 Wet scenarios.

8.5 Precipitation & Runoff Regional Climate Models

Data was collected from the coupled Model Inter-Comparison Project Phase 3 (CMIP3) multi-model dataset organized by the Program for Climate Model Diagnosis and Intercomparison (PCMD 2015). Output from a model that uses data sets of historical runoff and precipitation, along with various greenhouse gas emission forecasts to forecast rainfall and runoff, was used to model precipitation and overall watershed runoff for the expected 50-year project life.

Two scenarios of greenhouse gas emissions were used, one with continuing high greenhouse gas emissions, and the other with a maximum reduction in greenhouse gas emissions. Emissions Scenario A2 assumes high greenhouse gas emissions continuing into the future while Scenario B1 assumes a maximum reduction in greenhouse gas emissions over the next few decades. Figure 26 through Figure 29 show the results for average runoff and precipitation for both scenarios.

The results for both emission scenarios project a very slight upward trend in rainfall and runoff for the Lincoln area. According to a linear best-fit line to the achieved model results, both rainfall and runoff are projected to increase by only $3.9x10^{-6}$ inches per year. Results were the same for both greenhouse gas emissions.

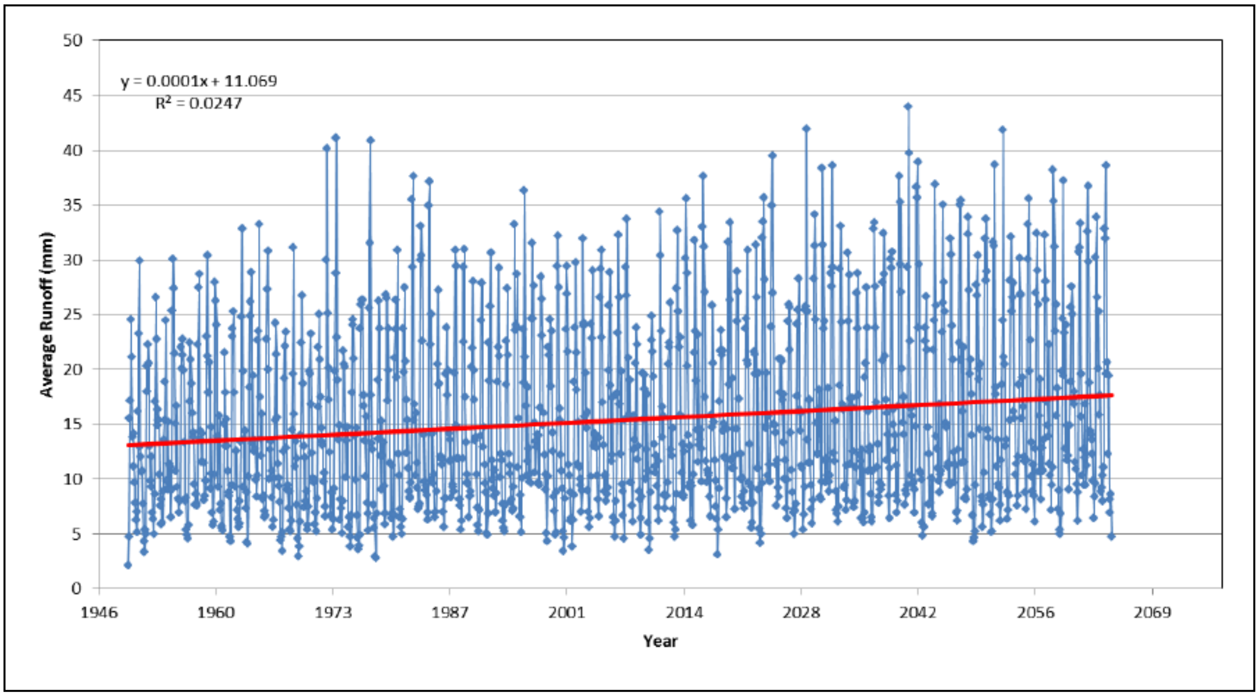

Figure 26. CMIP3 runoff Scenario A2

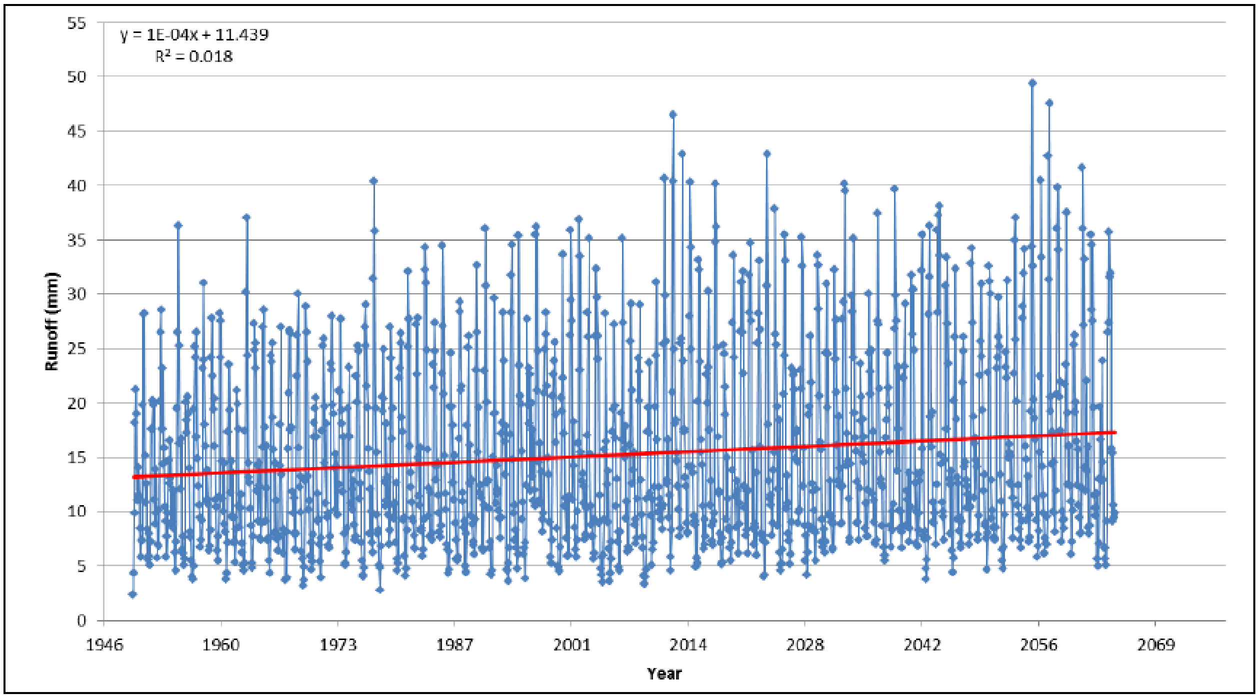

Figure 27. CMIP3 runoff Scenario B1

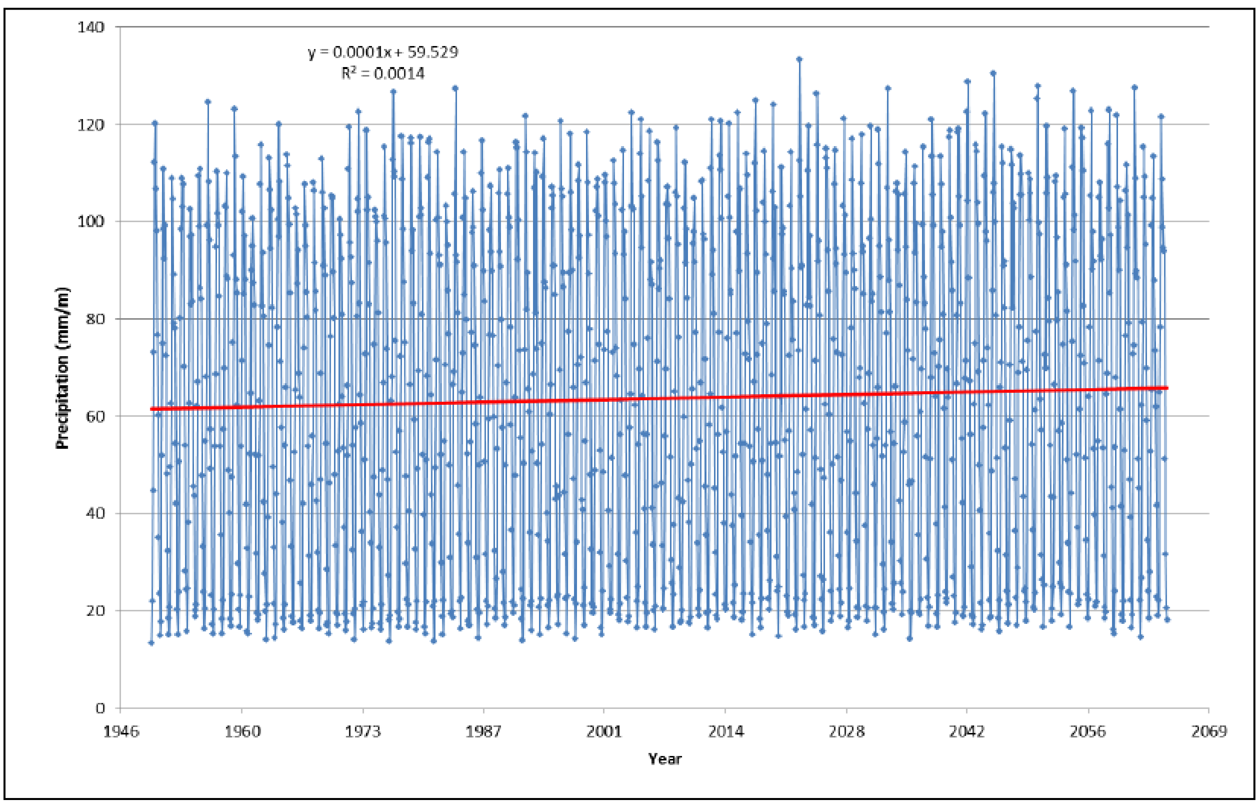

Figure 28. CMIP3 precipitation Scenario A2

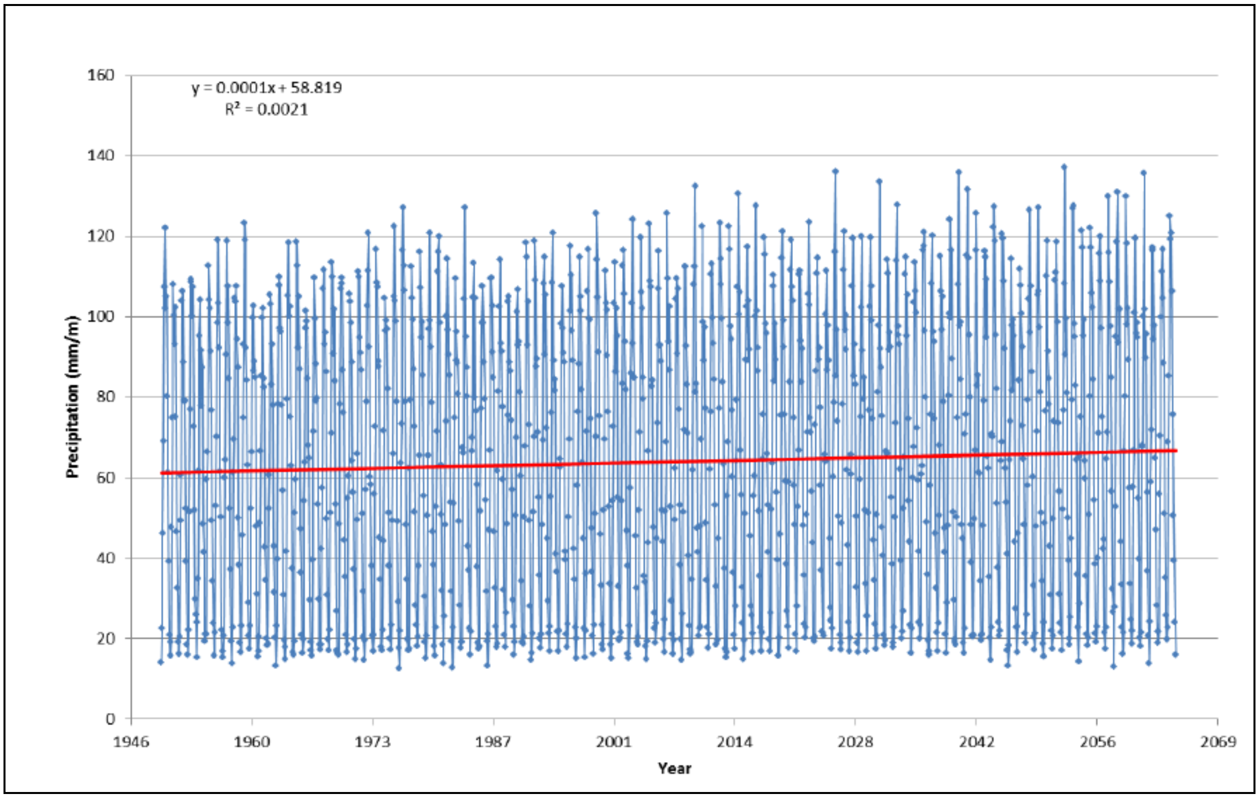

Figure 29. CMIP3 precipitation Scenario B1

8.6 Regional Analysis Studies

The National Oceanographic and Atmospheric Administration (NOAA) studies regionalized scenarios of historic trends and possible future climate in NOAA Technical Report NEDIS142-4, *Regional Climate Trends and Scenarios for the U.S. National Climate Assessment* (Part 4. Climate of the U.S. Great Plains). The report summarizes datasets of historical records and possible future conditions based on several climate simulation models and several possible future realization scenarios. Analysis of percentage of change for precipitation and runoff are summarized below.

Figure 30 shows simulation model results for the future forecast of precipitation trends in the Great Plains region under emissions Scenarios A2 (high greenhouse gas emissions) and B1 (maximum reduction in greenhouse emissions). Generally, the figure shows an increase in precipitation in the north and a reduction in the south. The Deadmans Run watershed is in the southeast corner of the state of Nebraska as marked by a red star in the figure. In the figure, the use of color alone indicates that less than 50% of the models show a statistically significant change in precipitation. Color with hatching indicates that more than 50% of the models show a statistically significant change in precipitation, and more than 67% agree on the sign of the change. Whited-out areas indicate that more than 50% of the models show a statistically significant change in precipitation, but less than 67% agree on the sign of the change.

For the first simulation period (2021 to 2050), the trend varies between the two scenarios. Scenario A2 shows an increase of 3% in rainfall while Scenario B1 shows a decrease of the same magnitude (-3%). The following time period simulations show that the models did not agree on tend for this area because there is no color. Therefore, according to this study, a minor change in precipitation magnitude is expected. However, the direction of the change is not known and the change may not have a significant impact on the hydrologic variables.

In addition to the regional analysis studies review conducted by URS described in the previous paragraph, the USACE investigated additional literature. According to the U.S. National Climate Assessment U.S. Global Change Research Program's report *Climate Change Impacts in the United States* (Melillo et al. 2014), the Great Plains Region including Nebraska will experience more frequent and intense extreme events like droughts and large precipitation events. The northern plains are expected to become wetter while the southern plains are expected to become dryer. The source does not address Nebraska directly and since it is in the central plains region between the two extremes, it is likely changes are inconclusive as it is a transition zone.

According to *The Changing Nature of Flooding Across the Central United States* (Mallakpour & Villarini 2015), research shows an increase in the frequency of large flood events in the Midwest but not in annual peak maximum flows. This study examined the magnitudes and frequencies of flood events at 774 stream gauges in the Midwest and determined that while annual flood peaks are not increasing, there is strong evidence that the frequency of large floods is increasing.

8.7 Climate Change Conclusions

The climate change analysis required by Engineering Construction Bulletin No. 2016-25 indicates largely negligible changes in annual peak stream flow and precipitation. Stream gauge annual peak flows show a downward trend in peak flow with time but the trends are largely not statistically significant.

The following are general conclusions:

- The first-order trend analysis on the Salt Creek gauges showed a downward trend in annual peak flows but the trend was not statistically significant in the majority of cases. However, the literature review indicates a very slight upward trend in both rainfall and runoff for the area. Thus, while annual max peak flows (one selected per year) may remain consistent in magnitude it is likely the number of other flows not captured by the annual analysis are increasing or likely to increase in magnitude.
- The nonstationarity analysis showed no significant evidence of change in the stream gage record, however, the literature review indicates that the frequency of large peak flows is increasing. The analysis may not be capturing this for the Salt Creek gauges because only one peak annual streamflow is used in the analysis while other large events are ignored.
- The nonstationarity analysis of annual peak flows showed no statistically significance trend.
- The literature review of a combination of models indicates precipitation amounts are likely to change but there is not strong agreement on if it will decrease or increase with time.
- The Great Plains Region, including Nebraska, will experience more frequent and intense extreme events like droughts and large precipitation.
- Precipitation and runoff forecasted by regional climate models for two scenarios of greenhouse gas emissions indicate a very slight upward trend of 3.9×10^{-6} inches per year in rainfall and runoff. Results were the same for both greenhouse gas emission scenarios, one that assumes high greenhouse gas emissions and one that assumes a maximum reduction in greenhouse emissions.
- Review of regional climate model data indicates that precipitation and runoff are forecasted to increase at a negligible rate given the expected 50-year project life. The frequency of flood events will likely increase over time but their annual peak flow magnitudes do not show a significant increase. Precipitation analysis from climate model results show there is a rising trend over the next few decades. However, the annual increase is not significant. Regional studies show that the trend depends on the scenario considered. However, the range of variation is between -3 and 3%.
- An evaluation of streamflow and precipitation data did not indicate quantifiable climate change trends evident in the recent past that could be projected forward over the projected 50-year economic life.

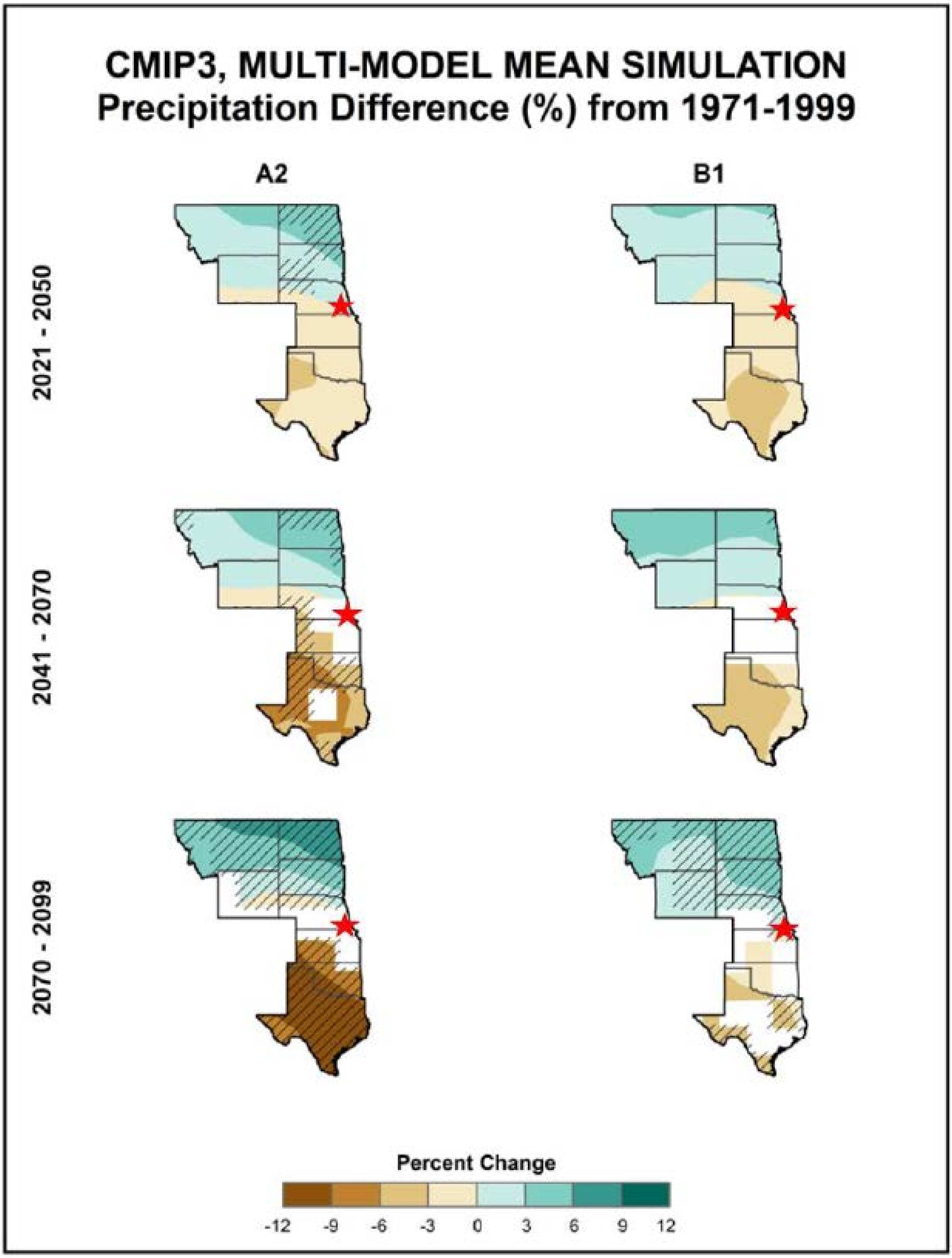

Figure 30. Simulated difference in annual mean precipitation (%) for the Great Plains Region (NOAA 2013)

9.0 Conclusions

The purpose of this report was to organize the existing conditions hydrology results for the Deadmans Run Section 205. Hydrologic analysis included the generation of a USGS regional peak-flow frequency, analysis of historic precipitation events, documentation of a high-water marks survey for the October 2014 event, development of a current-conditions hydrologic model, and a qualitative climate analysis.

The USGS regional peak-flow frequency was developed by the consultant URS. The regional peak flows were determined using the USGS publication WRIR 99-4032, *Peak-Flow Frequency Relations and Evaluation of the Peak-Flow Gauging Network in Nebraska* (USGS 1999). Peak flows from this regional analysis were lower than those determined through hydrologic models considered in this study but this is to be expected given the large amounts of urbanization within the Deadmans Run watershed.

An analysis of historic precipitation events was undertaken to determine why the October 2014 precipitation event did not produce flooding on Deadmans Run. The October 2014 storm is estimated to be a 24-hour 60-year event, however, the peak discharge estimated at the watershed mouth was less than a 10-year discharge based on the peaks of the adopted hydrologic model. Hourly rainfall depths were collected at applicable rain gauges and the largest 24-hour period of precipitation determined for several historic rainfall events. An analysis of depths over several durations revealed that while the longer rainfall durations were significant frequency events for many of the events considered, the shorter duration events (less than 3-hours) were much more frequent and not extreme events. Given the Deadmans Run watershed's short time of concentration, it is the rainfall durations less than the 3-hour that are important to flooding and not the longer durations. This is why the July 1957 rainfall resulted in flooding and the October 2014 rainfall did not.

High-water marks (HWMs) were collected for the October 2014 rainfall event by four members of the USACE Omaha District. Locations and elevations of these HWMs were documented in this report. These HWMs confirm that no overbank flooding occurred during the October 2014 event along Deadmans Run.

A current-conditions hydrologic model was developed in version 4.0 of the Hydrologic Modeling System (HEC-HMS) using NOAA Atlas 14 recommended rainfall depths. The model was developed by the consultant URS from an existing HEC-HMS version 3.0 computer model provided from USACE. Changes in the soil loss and rainfall-to-runoff transformation methodologies were made to the model along with conversion to HEC-HMS version 4.0, updates in the watershed delineation, and change in the precipitation to NOAA Atlas 14 depths. Model results were compared to past model flows and the indirect measurement at the 38th Street gauge for the October 2014 event.

A qualitative climate analysis was undertaken using the U.S. Corps of Engineers *Engineering and Construction Bulletin No. 2016-25*. Projected changes in annual maximum precipitation and annual peak discharges are negligible over the 50-year project life but it is likely that the frequency of extreme events will increase. Therefore, project alternatives would benefit from including resiliency for future increases in the number of large flood events.

10.0 References

City of Lincoln (2000). *City of Lincoln Drainage Criteria Manual*. Available at: http://lincoln.ne.gov/city/pworks/watershed/dcm/.

City of Lincoln (2007). *Dead Man's Run Watershed Masterplan.* December 2007.

HEC. 1993. *Introduction and Application of Kinematic Wave Routing Techniques Using HEC-1*. Technical Document Number 10 (TD-10). U.S. Army Corps of Engineers Hydrologic Engineering Center. Accessed 2014 at: http://www.hec.usace.army.mil/publications/.

HEC. 2000. *Hydrologic Modeling System HEC-HMS Technical Reference Manual.* U.S. Army Corps of Engineers Hydrologic Engineering Center. Accessed 2014 at: http://www.hec.usace.army.mil/software/hec-hms/documentation.aspx.

Mallakpour, I. and Villarini, G. 2015. The Changing Nature of Flooding Across the Central United States. Nature Climate Change. Accessed October 2015 at: http://www.nature.com/nclimate/journal/v5/n3/full/nclimate2516.html.

Melillo, J., Richmond, T., and Yohe, G. Eds. 2014. Highlights of Climate Change Impacts in the United States: Thirst National Climate Assessment. U.S. Global Change Research Program.

NOAA. 2014. NOAA Atlas 14 Point Precipitation Frequency Estimates. Hydrometeorological Design Studies Center Precipitation Frequency Data Server (PFDS). Accessed October 2014 at: http://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=ne.

PCMDI. 2015. UCRP CMIP3 Multi-Model Dataset Archive at PCMDI. Program for Climate Model Diagnosis and Intercomparison. Accessed October 2015 at: http://www-pcmdi.llnl.gov/ipcc/about_ipcc.php.

USACE. 1993. *Hydrologic Report for Reconnaissance Phase of the Dead Man's Run, Section 205 Study for Lincoln, Nebraska.* January 1993.

USACE. 1994. Engineering Manual 1110-2-1417, *Flood-Runoff Analysis*. Available at: www.publications.usace.army.mil.

USACE. 1996. *Antelope Creek Feasibility Study Antelope Creek, Lincoln, Nebraska*. U.S. Army Corps of Engineers. Omaha District.

USACE. 2016. *Engineering and Construction Bulletin No. 2016-25: Guidance for Incorporating Climate Change Impacts to Inland Hydrology in Civil Works Studies, Designs, and Projects.* U.S. Army Corps of Engineers.

USACE. 2015. *Deadmans Run Lincoln, Nebraska: September 30-October 1, 2014 Storm.* U.S. Army Corps of Engineers Omaha District.

USACE. 2017. Climate Preparedness and Resilience COP Applications Portal. U.S. Army Corps of Engineers. Accessed February 2017 at: https://maps.crrel.usace.army.mil/projects/rcc/portal.html.

US Climate Data: Temperature, Precipitation, Sunshine, Snowfall. Accessed February 2017 at: http://www.usclimatedata.com/climate/lincoln/nebraska/united-states/usne0283.

USGS. 1999. *Peak-Flow Frequency Relations and Evaluation of the Peak-Flow Gauging Network in Nebraska.* Water Resources Investigations Report 99-4032-1999.

USGS. 2015. *Deadmans Run streamgage in Lincoln – Stages and Discharges 1 and 2*. Email sent June 18, 2015.

Weather Underground Rainfall Data. 2015. Weather History for KNELINCO08. Accessed January 2015 at: http://www.wunderground.com/weatherstation/WXDailyHistory.asp?ID=KNELINCO8&d.

Appendix A. Watershed Parameters

Table A1. Kinematic wave flow plain parameters

Flow Planes

Basin	Length(ft)	Slope (ft/ft)	Roughness	Imp Area (%)
DR27	360.4586	0.046967	0.35	35.31
DR26	661.0901	0.021423	0.35	41.22
DR29	165.9652	0.02481	0.35	24.27
DR30	531.6353	0.037632	0.35	26.93
DR40	218.0186	0.032672	0.35	24.63
DR28	144.9541	0.01929	0.35	38.04
DR49	145.6697	0.030862	0.35	39.65
DR21	350.7129	0.028418	0.35	29.37
DR25	149.6215	0.025656	0.35	30.77
DR24	190.0031	0.001	0.35	27.13
DR23	273.5522	0.038967	0.35	43.63
DR33	367.3339	0.040542	0.35	38.28
DR51	322.3292	0.016621	0.35	47.32
DR32	485.0676	0.04164	0.35	37.96
DR31	537.2374	0.009365	0.35	38.18
DR34	157.5699	0.031029	0.35	27.94
DR19	87.3242	0.018346	0.35	42.19
DR20	71.9196	0.023606	0.35	45.95
DR53	565.2221	0.039407	0.35	35.55
DR10	652.178	0.04231	0.35	39.46
DR55	202.3108	0.042037	0.35	38.10
DR36	282.698	0.012235	0.35	34.68
DR50	161.8628	0.013693	0.35	33.42
DR52	674.6495	0.03435	0.35	31.83
DR35	257.7066	0.040021	0.35	26.11
DR18	264.5659	0.036272	0.35	24.84
DR47	467.7297	0.052329	0.35	36.37
DR47A	659.9198	0.025723	0.35	45.44
DR46	555.0478	0.030886	0.35	31.59
DR48	236.2568	0.023227	0.35	30.25
DR17	240.5246	0.016784	0.35	43.93
DR16	238.3819	0.017465	0.35	47.71
DR06	603.0359	0.034188	0.35	33.09
DR07A	661.9328	0.02612	0.35	43.20
DR07C	532.2975	0.013413	0.35	1.18
DR07B	575.8234	0.030315	0.35	40.09

DR41	217.084	0.034261	0.35	42.77
DR42	174.4166	0.025437	0.35	40.02
DR03A	646.1692	0.030774	0.35	38.79
DR03B	518.4547	0.046298	0.35	32.49
DR03C	189.5839	0.011144	0.35	36.91
DR03D	621.654	0.042137	0.35	38.47
DR05	557.3222	0.031146	0.35	39.64
DR22	183.9939	0.025763	0.35	20.68
DR01	616.8213	0.020238	0.35	45.64
DR37	240.6091	0.022659	0.35	13.81
DR37A	73.2183	0.03199	0.35	11.88
DR39	459.9833	0.008139	0.35	34.48
DR43	322.0279	0.003319	0.35	29.27
DR44	364.7888	0.017655	0.35	45.05
DR14	262.9005	0.006694	0.35	11.35
DR04	483.1161	0.034802	0.35	38.38
DR02C	195.6734	0.023558	0.35	14.94
DR02B	604.0179	0.031194	0.35	30.78
DR02A	343.191	0.03882	0.35	40.70
DR02D	783.9528	0.016797	0.35	24.09
DR02E	340.6629	0.031217	0.35	11.72
DR02F	436.0069	0.015516	0.35	22.64
DR02G	697.5053	0.015539	0.35	42.73
DR02I	369.1528	0.017378	0.35	31.88
DR02K	649.7264	0.023318	0.35	42.30
DR02H	204.2829	0.024372	0.35	38.29
DR38	486.9947	0.013973	0.35	19.07
DR02J	230.6093	0.013503	0.35	27.80
DR54	489.2605	0.00745	0.35	10.54
DR15	633.9509	0.002032	0.35	13.11
DR13	355.9493	0.00407	0.35	33.24
DR45	324.6044	0.008368	0.35	27.95
DR12	500.6887	0.003847	0.35	26.70
DR11	286.8021	0.001711	0.35	22.45

Table A2. Kinematic wave collector channel parameters

Collector (Sub & Collector)

Basin	Length(ft)	Slope (ft/ft)	Manning's n	Area (sqmi)	Shape	Width(ft)
DR27	2487.69	0.023908	0.08	0.424	Rectangle	30
DR26	840.5613	0.027176	0.08	0.041	Rectangle	12
DR29	3525.523	0.022326	0.08	0.197	Rectangle	30
DR30	2618.666	0.001	0.08	0.099	Rectangle	25
DR40	1569.303	0.011049	0.06	0.232	Rectangle	10
DR28	1096.85	0.024665	0.08	0.141	Rectangle	15
DR49	1997.291	0.020812	0.08	0.048	Rectangle	20
DR21	885.2024	0.031261	0.08	0.057	Rectangle	10
DR25	1420.162	0.027049	0.08	0.167	Rectangle	20
DR24	490.0209	0.001	0.08	0.029	Rectangle	15
DR23	661.5893	0.018491	0.08	0.097	Rectangle	15
DR33	887.2083	0.024162	0.08	0.023	Rectangle	20
DR51						
DR32	715.3103	0.03451	0.08	0.063	Rectangle	5
DR31	2245.927	0.021354	0.08	0.061	Rectangle	20
DR34	1041.497	0.040888	0.08	0.059	Rectangle	10
DR19	301.7574	0.013711	0.08	0.01	Rectangle	25
DR20	2695.104	0.029902	0.08	0.066	Rectangle	30
DR53						
DR10						
DR55	1518.594	0.028836	0.08	0.154	Rectangle	15
DR36	3345.451	0.022018	0.08	0.151	Rectangle	25
DR50						
DR52	1710.672	0.02894	0.08	0.106	Rectangle	25
DR35	1729.985	0.031428	0.08	0.156	Rectangle	15
DR18	583.4468	0.045963	0.06	0.07	Rectangle	15
DR47	4471.88	0.017475	0.08	0.186	Rectangle	20
DR47A	1461.789	0.001	0.08	0.053	Rectangle	20
DR46						
DR48	944.7471	0.055166	0.06	0.071	Rectangle	15
DR17	6426.033	0.013656	0.08	0.401	Rectangle	30
DR16	866.3223	0.041571	0.08	0.323	Rectangle	15
DR06	3966.705	0.012744	0.08	0.273	Rectangle	30
DR07A	3518.635	0.016115	0.08	0.221	Rectangle	5
DR07C						
DR07B	3963.25	0.014399	0.08	0.301	Rectangle	25
DR41	3594.934	0.001	0.08	0.178	Rectangle	20
DR42	4219.628	0.001	0.08	0.143	Rectangle	25
DR03A						

DR03B						
DR03C	571.4387	0.040219	0.08	0.109	Rectangle	15
DR03D	2959.716	0.018828	0.08	0.139	Rectangle	30
DR05						
DR22	1948.615	0.00273	0.08	0.116	Rectangle	15
DR01	733.2941	0.026785	0.08	0.147	Rectangle	15
DR37	4385.902	0.01541	0.08	0.213	Rectangle	15
DR37A	652.2314	0.038799	0.08	0.011	Rectangle	15
DR39	1453.953	0.007542	0.08	0.115	Rectangle	10
DR43	411.451	0.006307	0.08	0.078	Rectangle	10
DR44	2873.647	0.001978	0.08	0.291	Rectangle	15
DR14	592.4356	0.024251	0.06	0.035	Rectangle	15
DR04	5249.908	0.016169	0.08	0.375	Rectangle	25
DR02C	874.3139	0.022566	0.08	0.073	Rectangle	15
DR02B						
DR02A	2388.813	0.026914	0.08	0.06	Rectangle	25
DR02D	1197.197	0.025669	0.08	0.088	Rectangle	5
DR02E	2602.234	0.022907	0.08	0.112	Rectangle	25
DR02F						
DR02G						
DR02I	729.9816	0.033098	0.08	0.092	Rectangle	15
DR02K						
DR02H	1787.678	0.013468	0.08	0.166	Rectangle	15
DR38	882.5046	0.020255	0.08	0.114	Rectangle	15
DR02J	976.1145	0.011498	0.08	0.13	Rectangle	15
DR54	602.8036	0.00132	0.06	0.07	Rectangle	10
DR15	177.8292	0.012018	0.08	0.016	Rectangle	10
DR13	1399.008	0.006127	0.08	0.123	Rectangle	25
DR45	2640.239	0.010805	0.08	0.096	Rectangle	15
DR12						
DR11	1707.226	0.017688	0.06	0.078	Rectangle	15

Table A3. Kinematic wave channel parameters

Channel							
Basin	**Route US**	**Length(ft)**	**Slope (ft/ft)**	**Shape**	**Manning's n**	**Width (ft)**	**Slope**
DR27	No	2768.82	0.013457	Trapezoid	0.03	6	3
DR26	No	455.5986	0.03238	Trapezoid	0.045	60	3
DR29	No	442.9966	0.009518	Trapezoid	0.03	10	3
DR30	No	1164.187	0.003938	Trapezoid	0.03	6	3
DR40	No	2385.591	0.00312	Trapezoid	0.03	600	3
DR28	No	3791.559	0.020141	Rectangle	0.08	25	
DR49	No	482.5781	0.013369	Rectangle	0.08	20	
DR21	No	1251.969	0.00998	Trapezoid	0.03	20	3
DR25	No	3266.779	0.009087	Rectangle	0.08	30	
DR24	No	1724.124	0.025117	Rectangle	0.08	25	
DR23	No	1725.274	0.024733	Rectangle	0.08	25	
DR33	No	316.0359	0.039994	Trapezoid	0.03	6	3
DR51	No	2752.175	0.016134	Rectangle	0.08	15	
DR32	No	1438.542	0.020645	Rectangle	0.08	25	
DR31	No	169.3245	0.006734	Trapezoid	0.03	6	3
DR34	No	1685.645	0.006721	Trapezoid	0.03	6	3
DR19	No	1056.516	0.013215	Trapezoid	0.03	10	3
DR20	No	301	0.011535	Trapezoid	0.03	10	3
DR53	No	4196.116	0.021039	Rectangle	0.08	15	
DR10	No	3629.805	0.016972	Rectangle	0.08	30	
DR55	No	2042.335	0.016451	Rectangle	0.08	20	
DR36	No	573.9993	0.010637	Trapezoid	0.03	6	3
DR50	No	3672.194	0.019654	Rectangle	0.08	20	
DR52	No	795.9203	0.017009	Trapezoid	0.035	6	3
DR35	No	2045.242	0.007672	Trapezoid	0.03	10	3
DR18	No	2278.278	0.012016	Rectangle	0.08	6	
DR47	No	97.9428	0.107188	Trapezoid	0.03	10	3
DR47A	No	215.5186	0.007964	Trapezoid	0.03	10	3
DR46	No	3722.314	0.020889	Rectangle	0.08	45	
DR48	No	753.5747	0.004967	Trapezoid	0.03	10	3
DR17	No	899.3669	0.00608	Trapezoid	0.03	12	3
DR16	No	5506.435	0.011641	Rectangle	0.08	30	
DR06	No	1551.327	0.009286	Trapezoid	0.045	10	3
DR07A	No	1641.147	0.004518	Trapezoid	0.045	6	3
DR07C	No	542.7649	0.010645	Trapezoid	0.045	10	3
DR07B	No	313.4257	0.033449	Trapezoid	0.03	10	3
DR41	No	91.8942	0.001	Trapezoid	0.04	18	3
DR42	No	734.9704	0.010992	Trapezoid	0.03	10	3
DR03A	No	2761.397	0.020243	Rectangle	0.08	20	

DR03B	No	2337.615	0.021909	Rectangle	0.08	6	
DR03C	No	3485.243	0.018306	Rectangle	0.08	30	
DR03D	No	491.8775	0.024352	Trapezoid	0.03	6	3
DR05	No	3990.177	0.011924	Rectangle	0.08	15	
DR22	No	623.7899	0.001	Trapezoid	0.03	15	3
DR01	No	2370.306	0.008597	Rectangle	0.08	25	
DR37	No	802.1333	0.003805	Trapezoid	0.03	15	3
DR37A	No	275.5747	0.010023	Trapezoid	0.03	6	3
DR39	No	797.384	0.004549	Rectangle	0.08	15	
DR43	No	1898.49	0.001	Rectangle	0.08	25	
DR44	No	364.3603	0.001	Trapezoid	0.05	15	3
DR14	No	1695.397	0.004583	Trapezoid	0.03	12	3
DR04	No	203.4421	0.051166	Trapezoid	0.03	50	3
DR02C	No	657.3342	0.007441	Trapezoid	0.03	6	3
DR02B	No	1747.832	0.013546	Rectangle	0.08	20	
DR02A	No	151.6454	0.002458	Trapezoid	0.035	40	3
DR02D	No	1102.346	0.001827	Trapezoid	0.03	6	3
DR02E	No	743.6006	0.007323	Trapezoid	0.035	6	3
DR02F	No	2875.694	0.013031	Rectangle	0.08	50	
DR02G	No	3576.132	0.008939	Rectangle	0.08	15	
DR02I	No	1348.203	0.002914	Rectangle	0.08	30	
DR02K	No	3490.288	0.004024	Rectangle	0.08	30	
DR02H	No	2911.128	0.010467	Rectangle	0.08	20	
DR38	No	2471.978	0.005691	Rectangle	0.08	15	
DR02J	No	2065.461	0.012584	Rectangle	0.08	30	
DR54	No	345.0685	0.010133	Trapezoid	0.03	15	3
DR15	No	690.2208	0.001	Trapezoid	0.045	12	3
DR13	No	749.9844	0.001656	Trapezoid	0.04	15	3
DR45	No	329.0695	0.020051	Trapezoid	0.03	20	3
DR12	No	1412.573	0.001	Rectangle	0.08	90	
DR11	No	262.3754	0.002336	Trapezoid	0.03	30	3

Table A4. Channel cross sections

R590		**R580**		**R670**	
X	**Y**	**X**	**Y**	**X**	**Y**
0	1280.297	0	1278.244	0	1270.543
193.9638	1273.732	68.50244	1262.232	96.26293	1270.011
271.5494	1272.089	264.2237	1257.254	182.8996	1250.638
290.9458	1271.25	303.3679	1254.187	211.7785	1248.646
300.644	1270.977	313.154	1253.808	221.4047	1249.064
339.4367	1272.422	342.5122	1257.999	240.6573	1251.238
387.9277	1273.06	450.1589	1261.208	327.294	1252.193

601.2879	1280.784

714.3825	1264.204

423.5569	1253.017

R1450

X	Y
0	1243.962
226.3558	1240.995
295.2467	1234.423
472.3947	1233.181
482.2363	1233.198
826.6907	1233.383
885.7401	1240.21
954.631	1245.611

R1460

X	Y
0	1233.423
39.23888	1229.868
137.3361	1228.202
166.7653	1226.627
176.575	1226.962
186.3847	1228.039
215.8139	1233.109
235.4333	1236.723

R480

X	Y
0	1228.012
165.5094	1224.474
262.8678	1223.02
301.8112	1216.596
311.547	1216.139
340.7546	1224.825
447.8488	1225.494
642.5657	1226.603

R520

X	Y
0	1240.479
68.02375	1237.144
145.7652	1236.246
184.6359	1234.86
242.942	1234.941
291.5304	1236.273
349.8364	1237.125
437.2956	1240.713

R700

X	Y
0	1253.262
156.8543	1245.767
254.8882	1238.205
274.495	1234.495
284.2984	1234.439
313.7086	1238.47
411.7425	1238.439
509.7764	1237.715

R730

X	Y
0	1253.212
87.86447	1240.418
273.3561	1235.979
302.6443	1233.754
312.407	1233.713
331.9325	1236.175
439.3224	1243.754
546.7123	1246.035

R470

X	Y
0	1222.049
47.66725	1222.006
85.80105	1222.389
114.4014	1214.103
123.9348	1214.238
152.5352	1221.409
190.669	1220.371
247.8697	1221.809

R460

X	Y
0	1220.156
78.29885	1214.342
176.1724	1214.963
195.7471	1208.352
205.5345	1207.299
234.8966	1214.721
352.3448	1215.356
538.3046	1215.525

R454

X	Y
0	1207.852
234.1977	1207.089
331.78	1201.896
361.0547	1186.562
370.813	1186.141
400.0877	1199.961
429.3624	1203.342
751.3842	1204.917

R490

X	Y
0	1234.034
39.25756	1226.86
245.3597	1224.198
363.1324	1222.941
372.9468	1222.922
412.2043	1227.303

R450

X	Y
0	1242.193
264.0757	1228.247
498.8096	1213.96
528.1513	1208.495
537.9319	1209.314
547.7125	1212.189

Reach-2

X	Y
0	1212.508
116.8597	1208.819
292.1493	1206.245
321.3643	1205.691
350.5792	1205.693
379.7941	1206.165

618.3065	1226.796	596.6154	1213.442	496.6538	1208.859
991.2533	1250.9	694.4212	1221.303	535.6071	1211.215

R1420A		**R1420**		**R1430**	
X	**Y**	**X**	**Y**	**X**	**Y**
0	1194.957	0	1204.33	0	1191.393
106.9242	1195.287	96.4564	1203.805	19.30241	1190.623
184.6872	1194.882	183.2672	1198.156	28.95361	1190.198
223.5687	1180.613	231.4954	1178.279	38.60482	1190.157
233.2891	1182.269	241.141	1178.34	125.4657	1190.15
262.4503	1194.543	279.7236	1191.145	144.7681	1191.134
291.6114	1195.84	366.5343	1192.653	164.0705	1193.996
495.7394	1196.938	453.3451	1193.8	328.1409	1199.531

R290		**R1270**		**R1470**	
X	**Y**	**X**	**Y**	**X**	**Y**
0	1190.177	0	1191.596	0	1174.684
98.31274	1182.658	68.33904	1179.219	295.0571	1173.017
304.7695	1180.035	126.9154	1165.547	481.9267	1173.973
363.7571	1160.924	146.4408	1158.972	560.6086	1157.336
373.5884	1162.068	156.2035	1157.351	570.4438	1156.81
422.7448	1177.697	175.7289	1163.771	619.62	1172.756
560.3826	1183.491	205.0171	1172.285	727.8076	1173.513
648.8641	1185.12	419.7969	1176.646	983.5238	1174.024

R260		**R1040**		**R1080**	
X	**Y**	**X**	**Y**	**X**	**Y**
0	1164.345	0	1238.802	0	1221.995
117.0831	1163.653	117.2679	1232.624	137.6795	1219.595
282.9509	1164.478	195.4465	1228.541	334.3644	1215.595
331.7356	1150.04	234.5358	1224.381	363.8672	1213.663
341.4925	1152.155	263.8527	1224.63	373.7014	1213.781
380.5202	1164.073	351.8036	1228.105	393.3699	1214.874
526.8742	1167.984	420.2099	1225.969	511.3809	1214.719
692.742	1176.049	586.3394	1235.591	776.9056	1224.277

R1110		**R410**		**R1370**	
X	**Y**	**X**	**Y**	**X**	**Y**
0	1205.112	0	1169.9	0	1173.16
107.5056	1205.637	371.8436	1164.367	107.7863	1169.633
332.2901	1187.619	557.7654	1165.502	333.1576	1161.905
478.8887	1189.382	567.5507	1162.771	401.7488	1137.814
664.5802	1186.622	587.1215	1148.876	411.5476	1137.806

869.8182	1187.447	616.4775	1163.576	460.5414	1160.934
1026.19	1190.932	655.619	1164.475	509.5351	1156.578
1338.934	1205.998	1301.453	1162.653	764.3027	1156.907

Reach-1

X	Y
0	1158.253
57.91893	1157.87
135.1442	1156.167
212.3694	1137.603
222.0226	1139.203
260.6352	1156.751
299.2478	1154.216
492.3109	1153.638

R210A

X	Y
0	1158.688
77.8228	1158.329
175.1013	1157.164
243.1963	1134.467
252.9241	1134.708
311.2912	1152.336
437.7533	1151.712
554.4875	1151.141

R210

X	Y
0	1148.645
146.8539	1148.689
264.337	1148.473
332.8689	1135.694
342.6591	1135.835
391.6104	1148.924
420.9812	1149.55
685.3183	1147.256

R206

X	Y
0	1146.487
88.26543	1145.683
284.4108	1147.261
362.869	1128.807
372.6762	1129.567
441.3271	1148.037
578.6289	1146.521
941.4979	1145.388

R1010

X	Y
0	1149.781
68.46941	1148.51
146.7202	1148.249
254.315	1146.554
293.4403	1146.081
332.5657	1147.579
479.2859	1147.929
577.0993	1148.791

R200

X	Y
0	1147.518
96.73491	1145.212
154.7759	1146.404
212.8168	1144.811
261.1843	1144.005
319.2252	1146.635
357.9192	1146.536
444.9806	1145.185

R110

X	Y
0	1145.872
303.198	1140.875
352.1009	1143.518
410.7844	1116.303
449.9067	1129.119
518.3707	1146.965
645.5183	1147.774
704.2018	1141.369

R925

X	Y
0	1196.895
126.3043	1188.636
262.3243	1188.61
291.4714	1185.416
359.4814	1181.688
408.06	1184.279
456.6385	1184.354
738.3942	1199.905

R920

X	Y
0	1184.304
146.5739	1181.201
195.4319	1177.232
283.3763	1176.977
293.1479	1175.582
312.6911	1178.739
576.5242	1188.972
684.0118	1189.25

R340

X	Y
0	1178.567
58.26992	1174.009
135.9632	1174.972
155.3865	1171.162

R940

X	Y
0	1232.996
58.65749	1227.79
244.4062	1225.23
342.1687	1213.252

R900

X	Y
0	1205.232
186.2924	1200.928
313.7555	1200.774
401.9993	1195.718

165.0981	1171.446
194.2331	1176.354
310.7729	1179.385
437.0244	1184.887

R1220

X	Y
0	1175.808
312.8399	1172.468
479.0362	1168.116
508.3649	1165.198
547.4699	1165.194
664.7849	1168.118
742.9949	1168.797
1065.611	1184.273

R1250

X	Y
0	1173.683
127.9221	1170.123
177.1228	1169.698
236.1638	1166.025
432.967	1163.671
521.5284	1167.717
570.7292	1168.471
728.1717	1176.127

R180

X	Y
0	1146.631
97.51453	1142.764
175.5261	1141.72
214.532	1138.031
243.7863	1135.392
273.0407	1144.664
419.3125	1144.503
750.8618	1144.397

R440

X	Y
0	1225.847
28.47016	1225.701
56.94033	1226.136

420.3787	1213.266
469.2599	1222.623
576.7986	1225.21
742.9949	1229.936

R1330

X	Y
0	1169.222
167.0957	1161.715
383.3373	1162.872
461.9706	1161.75
609.408	1164.638
786.3329	1162.639
943.5994	1172.46
1022.233	1171.692

R1380

X	Y
0	1172.164
332.6977	1164.352
362.0533	1164.591
420.7647	1163.485
479.476	1162.035
626.2544	1165.503
733.8919	1164.728
870.885	1169.793

R620

X	Y
0	1245.357
176.3927	1244.761
225.3907	1244.223
264.5891	1243.569
303.7874	1243.589
372.3846	1244.107
411.583	1244.066
597.7753	1248.227

R360

X	Y
0	1188.083
173.6215	1186.389
241.141	1169.013

470.6333	1194.919
529.4625	1195.983
549.0722	1196.116
666.7305	1200.392

R320

X	Y
0	1148.808
127.6646	1147.625
284.7904	1147.806
314.2514	1146.63
324.0718	1146.631
373.1736	1147.578
540.1197	1147.605
736.5268	1148.789

R250

X	Y
0	1154.248
166.0278	1149.006
224.6258	1149.223
361.3546	1147.163
468.7844	1147.6
556.6814	1154.194
576.2141	1153.584
654.3448	1153.484

R550

X	Y
0	1252.498
87.10338	1244.273
154.8505	1244.033
212.9194	1242.326
222.5975	1242.394
261.3101	1244.194
309.7009	1245.158
406.4824	1247.195

R970

X	Y
0	1156.45
29.15605	1156.259
145.7802	1155.819

85.41049	1218.51
94.90054	1217.746
132.8608	1225.167
180.311	1226.23
256.2315	1226.642

R830

X	Y
0	1251.229
107.8402	1246.741
196.0731	1244.752
245.0914	1238.639
254.8951	1238.298
274.5024	1245.451
313.717	1250.664
558.8085	1254.284

R390

X	Y
0	1198.199
19.57408	1198.114
48.9352	1198.207
78.29632	1197.859
88.08336	1198.015
117.4445	1198.347
234.889	1202.051
332.7594	1205.662

R930

X	Y
0	1204.857
88.12084	1200.233
186.0329	1196.206
283.9449	1190.958
323.1097	1192.863
372.0658	1195.19
450.3954	1200.668
548.3074	1204.323

250.7866	1167.794
260.4323	1168.706
299.0149	1181.266
376.18	1186.82
453.3451	1187.653

R1360

X	Y
0	1169.438
127.0564	1169.376
390.9427	1170.286
420.2634	1154.452
430.037	1152.031
469.1312	1170.079
664.6026	1172.767
977.3568	1183.226

R1090

X	Y
0	1215.151
167.0038	1209.06
294.7125	1208.996
373.3025	1205.764
392.95	1205.647
422.4213	1206.818
589.425	1208.838
785.9	1213.948

R350

X	Y
0	1183.182
106.8551	1178.93
262.2808	1178.597
291.4231	1176.063
349.7077	1174.983
417.7064	1178.89
543.9898	1181.626
611.9885	1187.108

R240

X	Y
0	1148.999
97.57	1148.799

194.3737	1151.065
204.0923	1150.908
252.6857	1154.87
340.1539	1155.279
524.8089	1154.112

R208

X	Y
0	1147.943
106.9321	1149.948
174.9797	1149.824
204.143	1131.496
213.8641	1130.327
272.1907	1148.159
495.7759	1146.346
602.7079	1144.011

R150

X	Y
0	1145.386
166.9766	1146.914
304.4868	1146.958
363.4197	1125.109
373.2419	1125.645
422.3526	1146.448
481.2856	1149.167
736.6616	1150.252

R230

X	Y
0	1148.756
48.54321	1144.485
242.7161	1145.102
262.1333	1144.267
281.5506	1139.57
310.6765	1141.385
388.3457	1142.457
533.9753	1144.25

156.112	1150.449
195.14	1142.558
253.682	1144.003
390.28	1145.996
536.635	1146.537
575.663	1148.288

US Army Corps of Engineers ®
Omaha District

DEADMANS RUN
LINCOLN, NEBRASKA

SECTION 205 – FLOOD RISK MANAGEMENT

FEASIBILITY REPORT

APPENDIX F
HYDRAULIC ENGINEERING

AUGUST 2018

US Army Corps of Engineers ®
Omaha District

APPENDIX F – Hydraulic Engineering
Deadmans Run
Lincoln, NE
Section 205 Study
August 2018

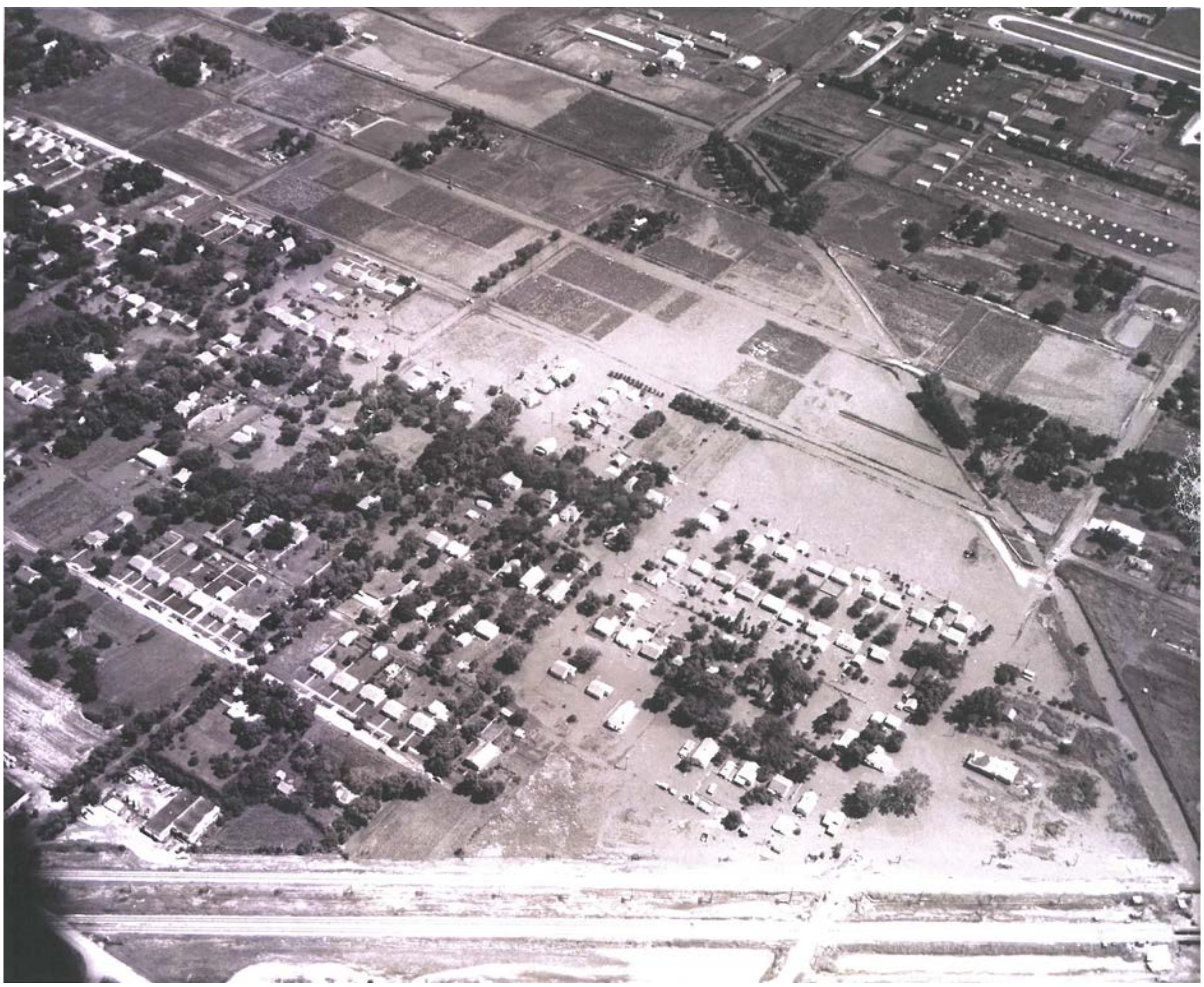

Figure 1. 1951 Flood which inundated 52 residents

Deadmans Run Lincoln, NE
Hydraulic Alternative Analysis

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Introduction

The purpose of this hydraulic analysis is to help determine whether there is a federal interest in a flood risk management project in the Deadmans Run watershed. In summary, several alternatives were evaluated for hydraulic effectiveness and the watershed will likely require a combination of bridge modifications, channel improvements, possibly a flume under the mainline railroad bridge and/or a short levee in order to exclude the flood damages from the high damage reaches discussed below.

In order to divide up the watershed into areas that can each be assessed for a potential project, the Deadmans Run study area was divided into 4 damage reaches shown in Figure 2. The main focus of this study was on damage Reach 2 (BNSF Bridge to 48th St) and Reach 3 (48th St to Cotner Blvd), which have the potential to provide reasonable cost benefit ratios due to the high damages in the overbanks during the 100yr flood. The alternatives presented in this analysis may propose structural solutions extend outside of these reaches, but only if they provide a benefit to reaches 2 or 3 (i.e., widening the channel below a reach to reduce stages upstream).

The hydraulic analysis consisted of unsteady hydraulic modeling with HEC-RAS v5.0.1. Results of the hydraulic model were used to evaluate water surface elevations for existing conditions, structural alternatives, and nonstructural alternatives.

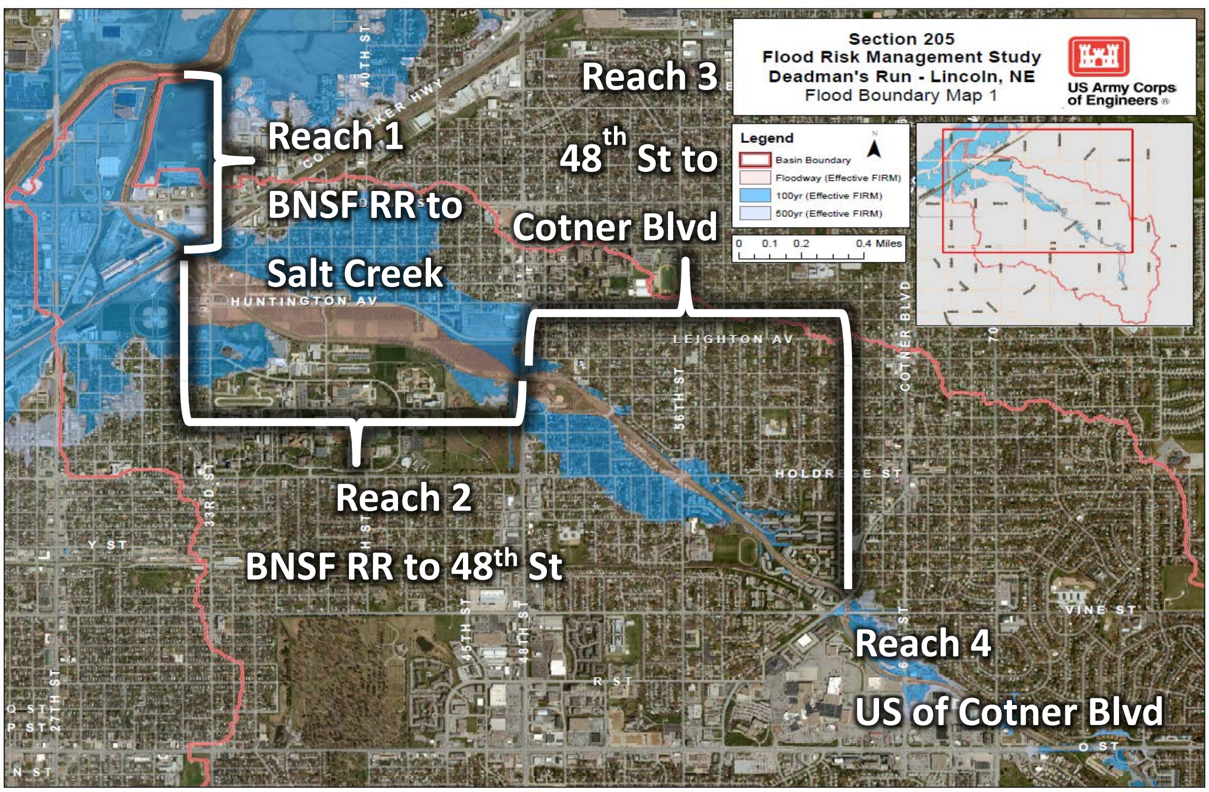


Figure 2. 2007 Effective Floodplain map

1. Hydraulic Modeling

Hydraulic modeling was used to evaluate water surface elevations for existing conditions and several alternatives. The computed water surface profiles were used for several purposes:

- Stage-discharge relationship used in economic modeling
- Sensitivity analyses to determine uncertainty for use in economic modeling
- Preliminary screening of various structural flood risk management alternatives
- Sizing of channel improvement features
- Determination of levee elevations
- Evaluation of nonstructural flood risk management alternatives

1.1 Previous Studies

Flood insurance study updates with updated hydrology on the Deadmans Run watershed were published these years: **1979**, **1982** and **1991**.

In **1993** the US Army Corps of Engineers Omaha District began a Section 205 Reconnaissance Study with the purpose of reviewing the past Flood Insurance Studies (FIS) to determine if they were representative of the watershed.

In December **2007**, the Deadmans Run Watershed Master Plan Study was completed by CDM. The study was sponsored by the City of Lincoln, Nebraska (City) and Lower Platte South Natural Resources District (NRD). The study produced a steady state HEC-RAS v3.1.3 model from Wedgewood Lake to the confluence of Deadmans Run with Salt Creek. The study also proposed $50 million in storm water conveyance and local flood control improvements. This HEC-RAS model was used to make the current effective Flood Insurance Rate Map (FIRM) for Deadmans Run.

The floodplain mapping developed from the **2007** HEC-RAS model was published with the April **2013** Flood Insurance Study. In 2013 the City and the NRD came to the Corps of Engineers to initiate a Section 205 study. The Corps began the Section 205 study in **2014**, beginning first with contracting out the HEC-RAS model and hydrology to be further developed/updated by URS.

In April **2015**, URS completed a Hydrologic Analysis of Deadmans Run, including an updated HEC-RAS model (v5.0), which was developed into an unsteady state with updated cross-sections and also the addition of the West Tributary of Deadmans Run. Hydrology was updated for this Section 205 study and incorporated into the flow files. The model, as developed by URS, was submitted to the US Army Corps Omaha District (USACE) for use in development of Section 205 flood control alternatives for the Deadmans Run watershed. The model was further developed by USACE before alternatives during this study.

1.2 General Modeling Information

The difference from the existing effective flood insurance map (100yr) and the flooding extents output by the updated unsteady HEC-RAS model obtained from URS are shown in Figure 3. Also, shown in Table 1 are the difference in water surface elevations (WSE) between each bridge, moving from upstream to downstream for the CDM, URS, and the final developed USACE model. For more details on the differences between the CDM and URS model, reference the URS Hydrologic Analysis Report. Section 1.3 below details changes that the US Army Corps made to the URS model.

Table 1. CDM, URS and final USACE model peak flows, water surface elevations and energy grades at bridges along Deadmans Run and West Tributary.

			Existing 100yr (USACE Model finished 2016)		Existing 100yr (URS Model finished 2015)		Existing 100yr (CDM Model effective FIS, finished 2007)	
Reach	Bridge Name	Cross-Section STA	Q Total	W.S. Elev	Q Total	W.S. Elev	Q Total	W.S. Elev
			(cfs)	(ft)	(cfs)	(ft)	(cfs)	(ft)
Deadmans Run	Cornhusker	2709	6696.82	1141.31	8328.95	1137	9460	1140.65
Deadmans Run	Mainline Railroad Bridge west of 33rd	4126.17	6221.4	1144.01	7844.11	1144.89	7794	1147.75
Deadmans Run	Rail Spur Bridge west of 33rd	4197.29	6221.48	1144.3	7845.31	1145.31	7794	1147.98
Deadmans Run	35th & Huntington Avenue	4952.94	6039.8	1148.82	8136.73	1148.24	7997	1149.48
Deadmans Run	East Campus bridge	7270.68	6832.05	1152.13	8510.39	1152.13	8193	1152.46
Deadmans Run	48th & Garland Bridge	10837.9	7749.19	1164.18	5208.84	1162.58	7426	1164.34
Deadmans Run	1st Bridge East of 48th & Garland	11265.4	7765.04	1165.94	8711.58	1164.62	7422	1164.94
Deadmans Run	52nd and Francis	12558.7	7802.52	1169.11	7800.84	1169.13	7422	1168.32
Deadmans Run	2nd Bridge west of Cotner	16640.7	7041.62	1178.31	7055.94	1178.26	6350	1177.3
Deadmans Run	1 St Bridge West of Cotner	17220	7059.21	1178.9	7080.06	1178.86	6350	1178.12
Deadmans Run	North Cotner	17987.72	7064.29	1186.7	7113.49	1186.74	6350	1183.24
Deadmans Run	1 St Bridge North of Vine and Cotner	18139	6391.19	1188.61	6449.06	1188.69	6350	1187.75
Deadmans Run	Vine Street	18233.06	6093.62	1191.46	6157.42	1191.61	5486	1189.64
Deadmans Run	1st Bridge South of Vine and Cotner	18350.8	6105.12	1191.99	6163.19	1191.99	5764	1190.79
Deadmans Run	66th Street	20033.4	6277.29	1195.98	6233.06	1196.08	5534	1196.67
Deadmans Run	Wedgewood Lake North Bridge	25322.8	1957.9	1228.06	1974.51	1228.02	1772	1225.97
West Tributary	Cargil North Spur	1812	613.98	1145	837.75	1144.58	N/A	N/A
West Tributary	Cargil Mainline Bridge	1953.561	602.12	1145.17	812.51	1145	N/A	N/A
West Tributary	Cargil South Spur	2022.994	643.38	1145.46	813.09	1145.6	N/A	N/A

1.2.1 URS and CDM Model Comparison

Comparison of the WSE differences between the 2015 URS and the 2007 CDM model for all cross sections showed that the mean difference for Deadmans Run (DMR) was -0.09 feet with a maximum difference of -2.42 feet. The mean difference for DMR West Tributary was -2.64 feet with a maximum difference of 3.89 feet. Significant differences were investigated further for explanations as to why the differences were occurring. The URS Team determined that differences in WSEs can be attributed to the addition of the lateral weir and flow balancing, and that updates to flow rates, HEC-RAS bridge modeling approaches, cross section overbank geometry, Manning's n-values, and blocked obstructions also influenced WSE changes. The West Tributary differences can be attributed to unsteady flow modeling. The hydrograph peaks do not coincide, and the West Tributary hydrograph is able to route downstream before the Deadmans hydrograph peak arrives at the confluence of the two streams.

1.2.2 USACE and URS Model Comparison

Comparison of the WSE differences between the 2016 USACE and the 2007 CDM model for all cross sections showed that the mean difference for DMR was -0.41 feet with a maximum difference -3.85. The mean difference for DMR West Tributary was -2.18 feet with a maximum difference of -3.2 feet. Significant differences were investigated further for explanations as to why the differences were occurring. USACE determined that the differences in WSEs can be attributed to the adjustments of ineffective areas and adding a 10yr Salt Creek Backwater to the downstream boundary condition, instead of normal depth (0.0018). The West Tributary stages are slightly higher than the URS model because of the 10yr Salt Creek backwater that was added to the downstream boundary condition.

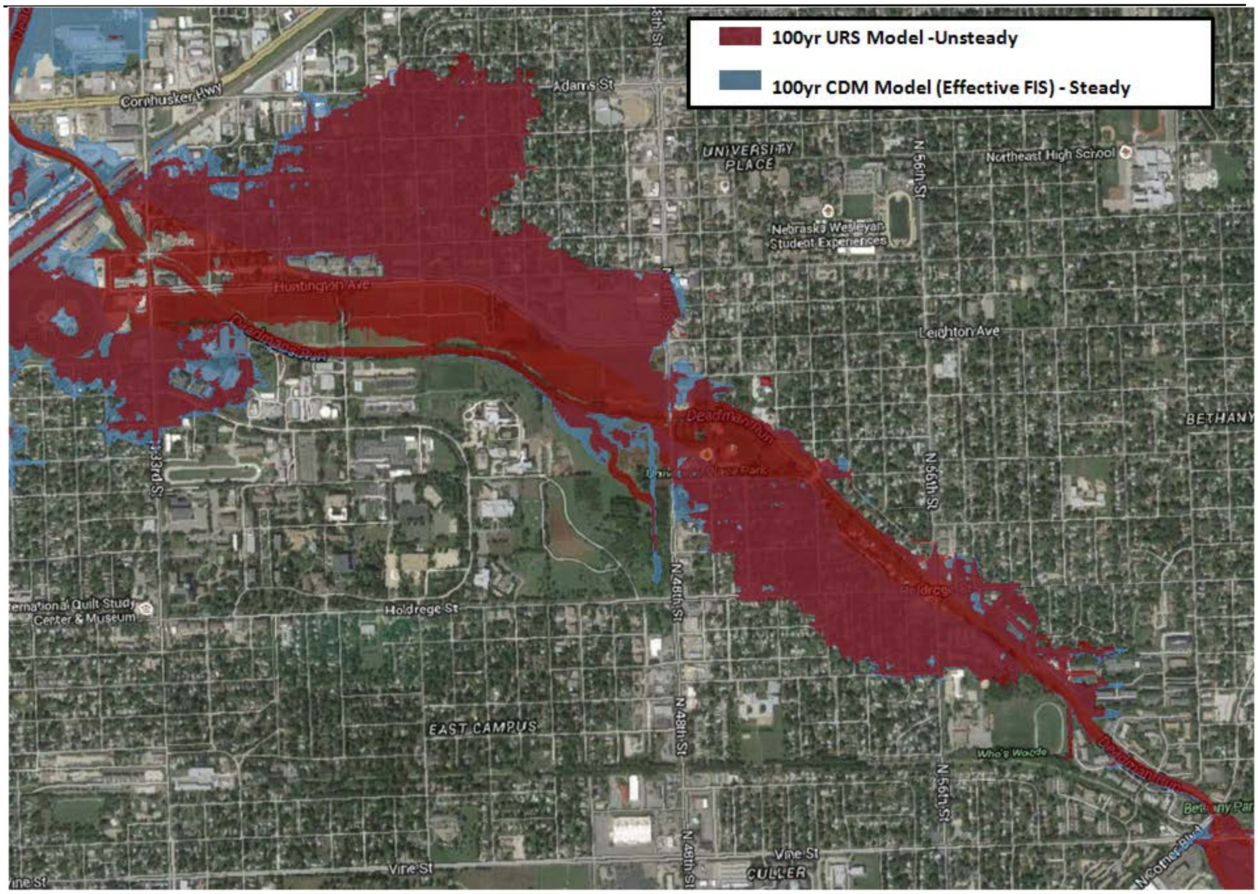


Figure 3. Existing FIS vs Unsteady Model 100yr Flooding Extents

1.3 Model Troubleshooting

In some cases (but not the final alternatives), implementing a project alternative by adding channel improvements and bridge modifications to the model resulted in a 4-5ft water surface elevation difference upstream and downstream of the East Campus Bridge (38th St). 100yr flows that were previously attenuated in the existing conditions by upstream bridges and out of banks overflows into the high damage area are now trained into the channel, resulting in higher stages at 38th St Bridge. However, the 100yr water surface and the energy grade do not reach the low chord of the bridge in either the existing conditions, or the alternatives. No obvious discontinuities at the bridge were observed in the existing conditions. The alternative measures implemented increased flows through the bridge and the model solved the downstream water surface elevation with a supercritical answer downstream. This causes a rise upstream of the bridge which is thought to be unreasonable. Because of this, several measures were analyzed to determine if the geometry was correct, there was possibly a numerical error, or if the results may actually be correct. The measures taken included:

- Adding more cross-sections around the bridge
- Adjusting ineffective flow stations
- Reducing/increasing the Manning's n value in and around the bridge.
- Reducing/increasing the timestep of the computations
- Changing the bridge modeling approach equations
- Modifying the Local Partial Inertia factors to increase model accuracy, but reduce model stability.
- Removing the bridge and simulating piers with cross-sections
- Modeling the 38th St as a culvert instead of a bridge.

The only measures which reduced the water surface upstream of the bridge were 'removing the bridge and simulating piers with cross-sections' and 'modeling the 38^{th} St bridge as a culvert instead of a bridge'. These approaches effectively reduced the water surface to within an elevation that excludes the high damage area from the 100yr floodplain.

As noted in the URS Hydrologic Study Report; "The maximum error was found in the 38th St Bridge upstream high-water marks record; this could be associated with model stability, defined bank locations and roughness coefficients, rainfall data and flow routing mechanisms. Since the majority of the locations show reasonable estimated results, the URS Team made no additional model parameter refinements, because the applied rainfall data obtained from point rainfall station KNELINCO8, which is outside of the watershed. The uncertainty of spatial and temporal distribution of rainfall over the watershed area may cause unrealistic model results compared to observed high water marks." When necessary the bridge was replaced with a culvert for some of the alternative analysis, however, the final alternatives did not require anything be done to the bridge.

Other changes or trouble shooting included:

1. A 2D area was added above the West Tributary upstream boundary condition in order to more smoothly capture the transition of the Deadmans Run main channel into the West Tributary.
2. The 'Lincoln – Salt Creek Right Bank & Deadman's Run Right Bank' levee was added to the downstream right bank of the model as a levee, which excludes any storage or ineffective flow from entering the right bank for the downstream 2000ft of the model.
3. Cross-sections (XS) near the confluence of DMR and West Trib in some cases dog legged over Cornhusker Hwy. These cross-sections were straightened along the left bank so that they did not project unrealistic water surfaces downstream of Cornhusker Hwy (XS 623.9687 to 2530.72).
4. Cross-sections (XS) at the upstream end of the West Trib were cut short before they crossed railroad tracks on the left bank. They were unrealistically producing ineffective flow, which acts as storage in an unsteady model. XS 2933.719 to 1909.237 had the left bank beyond the railroad removed. Cross-sections immediately downstream of the railroad on the West Trib were then straightened along the railroad (XS 1881.69 to 1855.00).
5. Cross-sections (XS) 1264.14 to 2779 extended into Salt Creek along the left bank. In an unsteady state model, this large low area in the cross-section was being used as ineffective storage. Any cross-sections that crossed the Salt Creek River were modified by deleting out any portion that crossed the Salt Creek.
6. NOTE: Excessive interpolated cross sections were noted in the model. Unsuccessful attempts were made to stabilize an unsteady HEC-RAS model with reduced interpolated cross sections that were replaced with elevation-station points. However, for this level of analysis the numerous interpolated XS is likely acceptable, and can be refined as necessary if design phase is found to be feasible. An ArcGIS shapefile of blocked obstructions were also added to the model but resulted in unsuccessful attempts to stabilize the unsteady model. It is likely that a stabilized model would result in higher stages (for existing conditions, in turn creating higher damages) if the blocked obstructions were added to the model.
7. NOTE: The downstream boundary condition was changed to a 10yr Salt Creek backwater in order to capture any possible coincident flooding. The backwater was entered as an elevation taken from the effective FIS April 16, 2013; elevation of backwater = 1141ft NAVD88.

2. Alternative Development

Several alternatives were suggested during a June 30th 2015 brainstorming session held with the project sponsors (the City and NRD) to determine which options are most feasible in terms of cost, life/safety, 100yr floodplain, channel erosion, impacts to bridges and transportation, real estate, environment, recreation and water quality. The three alternatives that were deemed most feasible are listed below:

1. Channel conveyance improvements with bridge improvements
2. Pervious Land, Rain Barrels and On Site Local treatments
3. Channel conveyance improvements

This hydraulic analysis proceeds in the following order:

1. Preferred Alternatives (Reach 2)
2. Rejected or Preliminary Alternatives:
    a. Bridge Modifications
    b. Channel Improvements
    c. Bridge Modifications and Channel Improvements
    d. Levees
    e. Storage
    f. Storage and Channel Improvements

Table 2. Preliminary Alternatives and their Analysis Conclusion

Preliminary Alternatives		Analysis Conclusion
Bridge Modifications	X	Due to Unsteady HEC-RAS model's ability to attenuate flows as water slows behind bridges, the removal of some upstream bridges may actually increase stages downstream. Removing several bridges in an upstream reach will amplify flows at downstream bridges. Bridge removals are also applied to other alternatives.
Channel Improvements	X	Existing bridge widths and real estate limit the amount of available land to make an effective channel.
Bridge Modifications and Channel Improvements	✓	A combination of bridge modifications and channel improvements effectively reduces the 100yr floodplain in Reach 2. This alternative was further developed into alternatives #1 and #2 in the preferred alternatives.
Levees	X	Levees can effectively contain the 100yr in Reach 2, however, the levees increases stages on the opposite bank while also increasing stages upstream and downstream of the project area.
Storage	X	Potential storage areas would require 750,000 CY of excavation without eliminating 100yr flooding in high damage areas.
Storage and Channel Improvements	X	Would require 750,000 CY of excavation and the channel improvements make the storage less effective because channel improvements lower stages, which lessens the amount of head available to fill the storage area and encroaches on the storages area's storage-elevation curve.

X Rejected

✓ Accepted

2.1 Preferred Alternatives (Reach 2)

The preferred alternatives focus on Reach 2, where a favorable benefit cost ratio is most likely. Other alternatives are listed in this report, but their development was stopped because they are either hydraulically ineffective or it was judged that their cost will likely exceed the B/C ratio or the Section 205 limits. The two preferred structural alternatives below require the least impact to bridges along Reach 2 while excluding the highest damage area along Deadmans Run from the 100yr floodplain. Alternative #1, as described below in Section 2.1.1, was determined to be the tentatively selected plan and was the alternative chosen to move into the Optimization phase (see Section 5).

2.1.1 Selected Plan (Alternative #1)

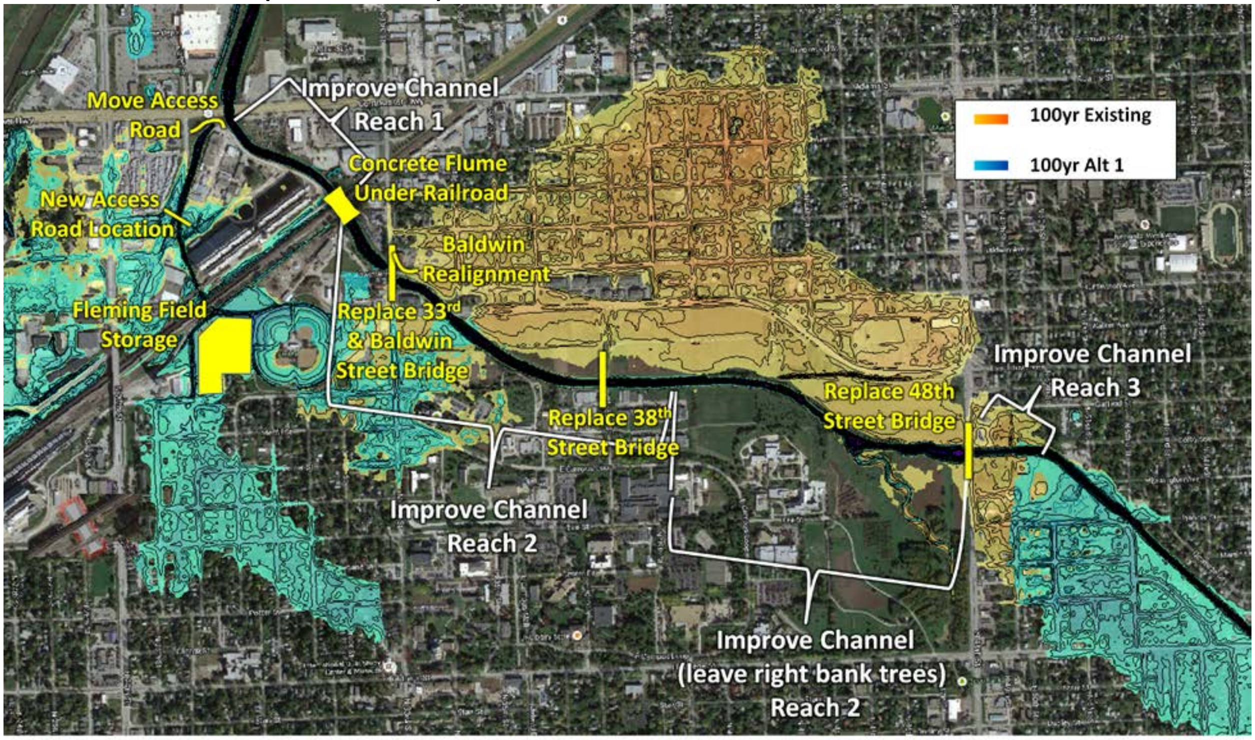


Figure 4. Preferred Alternative #1

Alternative #1 includes the following changes through Deadmans Run and the West Tributary: Channel & Bridge Widening, Flume and Channel Conveyance Improvement (Reaches 1, 2, 3) and can be seen in Figure 4.

a. Channel Widening (XS 2777.996 to 10805.46), Cornhusker to 48th St (Reaches 1, 2, and 3 as seen in Figure 4). Reach 2 is split into two segments; one where the excavations take place only on the left bank in order to keep the trees and riparian habit intact on the right bank (between 48th and 38th St Bridges), and one where the typical channel includes excavations on both banks (from 38th St to Cornhusker). The channel widening cross-sections can be seen in Section 2.3.2.3.
b. Install flume under BNSF Bridge & Rail Spur (see Figure 6 for more details).
c. Improve the conveyance of the Rail Spur Bridge by either removing or streamlining piles from main channel & brace as needed (XS STA 4197.29) .
d. Abandon Baldwin Avenue west of 33rd and shift DMR channel southwestward through that area.
e. Replace long culvert (33rd St & Baldwin Ave) with wider bridge @ 33rd St, south of current intersection.
f. There is a potential to replace the 38th St Bridge with a wider span (XS STA 7270.68). This bridge is replaced in this alternative in the Optimization Phase (Section 5). It allows for a narrower channel upstream of the 38th Street Bridge.
g. Replace 48th St Bridge with wider span, ~50ft replaced with a ~70ft bridge (XS STA 10837.90). A cursory check was done that determined a lesser span was not feasible.
h. Improve DMR channel to limits of economically justifiable ROW, 48th through 52nd St (XS 10920.0 to 11256.14). The channel widening cross-sections can be seen in Section 2.3.2.3.
i. Site-specific nonstructural measures where needed to supplement structural measures
j. Storage area at Flemings Field, soccer fields will be used to create extra storage for West Tributary Storm.

k. Move access road, near confluence of West Trib and DMR. The access road services the large Cargill grain elevator (and several other businesses). The access road will be moved several hundred feet upstream of the confluence.

The effect of Alternative #1 can be seen in Figure 5, where the Existing Conditions 100yr water surface profile is compared to Alternative #1. Stages are either at or below existing conditions, except for the last 4,000ft of channel. Although the stages are slightly raised downstream, these are not damage inducing stages. Between the confluence with Salt Creek and the BNSF RR Bridge, the 100yr Salt Creek backwater is higher than both the Existing Conditions and Alternative #1. The raised stages produced by Alternative #1 will not create higher stages than what is already produced by the 100yr Salt Creek backwater.

A flume under the mainline railroad bridge along with modifications to the railroad spur piers would alleviate the need to modify or replace the mainline bridge and also eliminate the need to coordinate a full bridge replacement with the railroad. However, the Big Papio 84th St in Omaha, NE cost as much as $3.3 million (in 1998) to construct. Although the Big Papio project was designed for approximately 3x more flow, there still may be a large cost associated with a flume (>$1million).

The flume was incorporated into the model (see Figure 6) by increasing the cross-sectional area under the bridge and reducing the Manning's n value along the flumed portion of the bridge from 0.025 to 0.015 (the same value used in design of the Big Papio Flume, ref. MPC-53).

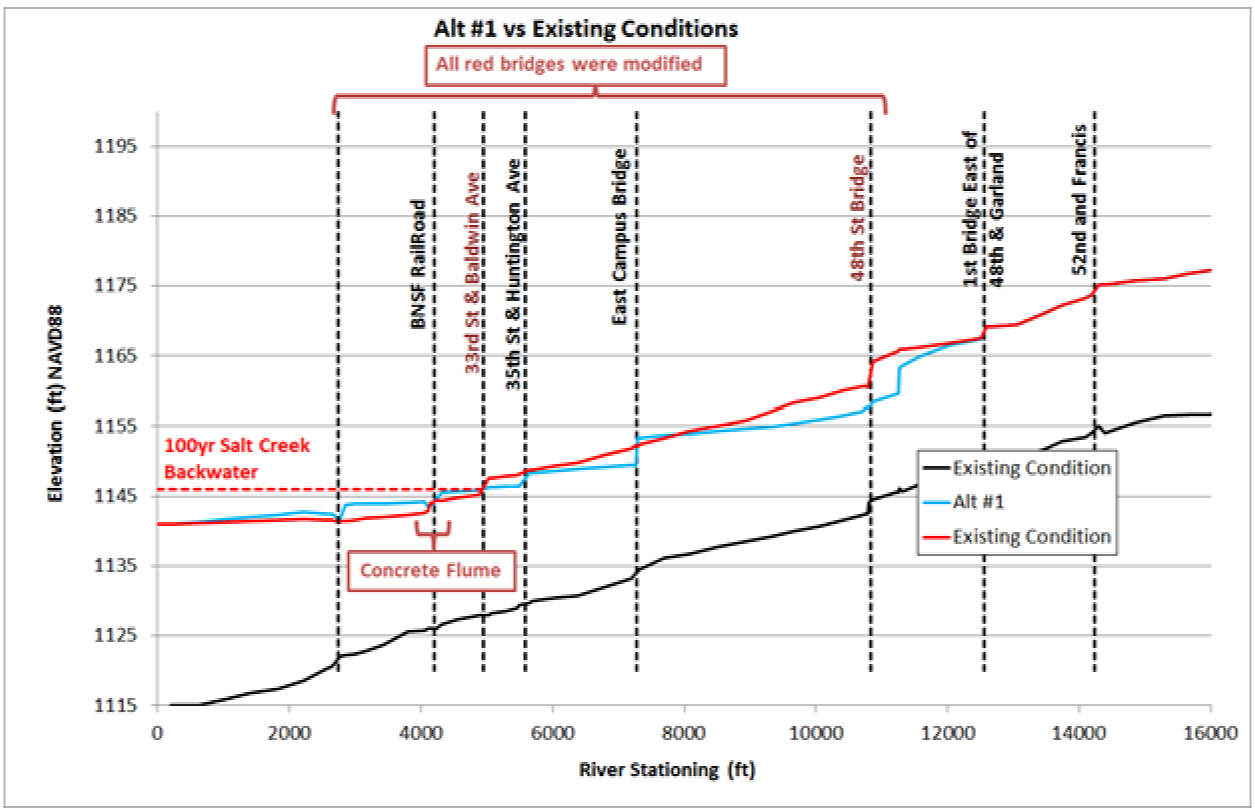


Figure 5. Alternative #1 vs Existing Conditions 100yr water surface profiles

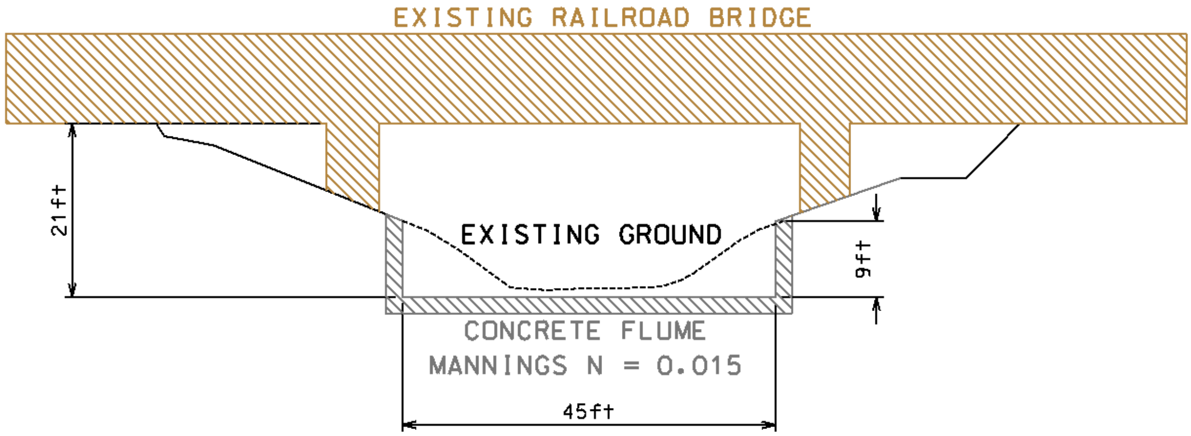


Figure 6. Mainline Railroad Bridge Flume

2.1.2 Updated Selected Plan (Alternative #1)

The Updated Selected Plan is the same as Alternative #1 (see Section 2.1.1) includes the following changes through Deadmans Run and the West Tributary: Channel Widening, Flume and Channel Conveyance Improvement (Reaches 1, 2, 3) and can be seen in Figure 4, except the bridges and detention pond will already be completed by the City of Lincoln. All the same Alternative #1 features are listed below, and those that the City of Lincoln will address are crossed out.

l. Channel Widening (XS 2777.996 to 10805.46), Cornhusker to 48th St (Reaches 1, 2, and 3 as seen in Figure 4). Reach 2 is split into two segments; one where the excavations take place only on the left bank in order to keep the trees and riparian habit intact on the right bank (between 48th and 38th St Bridges), and one where the typical channel includes excavations on both banks (from 38th St to Cornhusker). The channel widening cross-sections can be seen in Section 2.3.2.3.

m. Install flume under BNSF Bridge & Rail Spur (see Figure 6 for more details).

n. Improve the conveyance of the Rail Spur Bridge by either removing or streamlining piles from main channel & brace as needed (XS STA 4197.29) .

~~o. Abandon Baldwin Avenue west of 33rd and shift DMR channel southwestward through that area.~~

~~p. Replace long culvert (33rd St & Baldwin Ave) with wider bridge @ 33rd St, south of current intersection.~~

~~q. There is a potential to replace the 38th St Bridge with a wider span (XS STA 7270.68). This bridge is replaced in this alternative in the Optimization Phase (Section 5). It allows for a narrower channel upstream of the 38th Street Bridge.~~

~~r. Replace 48th St Bridge with wider span, ~50ft replaced with a ~70ft bridge (XS STA 10837.90). A cursory check was done that determined a lesser span was not feasible.~~

s. Improve DMR channel to limits of economically justifiable ROW, 48th through 52nd St (XS 10920.0 to 11256.14). The channel widening cross-sections can be seen in Section 2.3.2.3.

t. Site-specific nonstructural measures where needed to supplement structural measures

~~u. Storage area at Flemings Field, soccer fields will be used to create extra storage for West Tributary Storm.~~

v. Move access road, near confluence of West Trib and DMR. The access road services the large Cargill grain elevator (and several other businesses). The access road will be moved several hundred feet upstream of the confluence.

2.1.3 Alternative #2

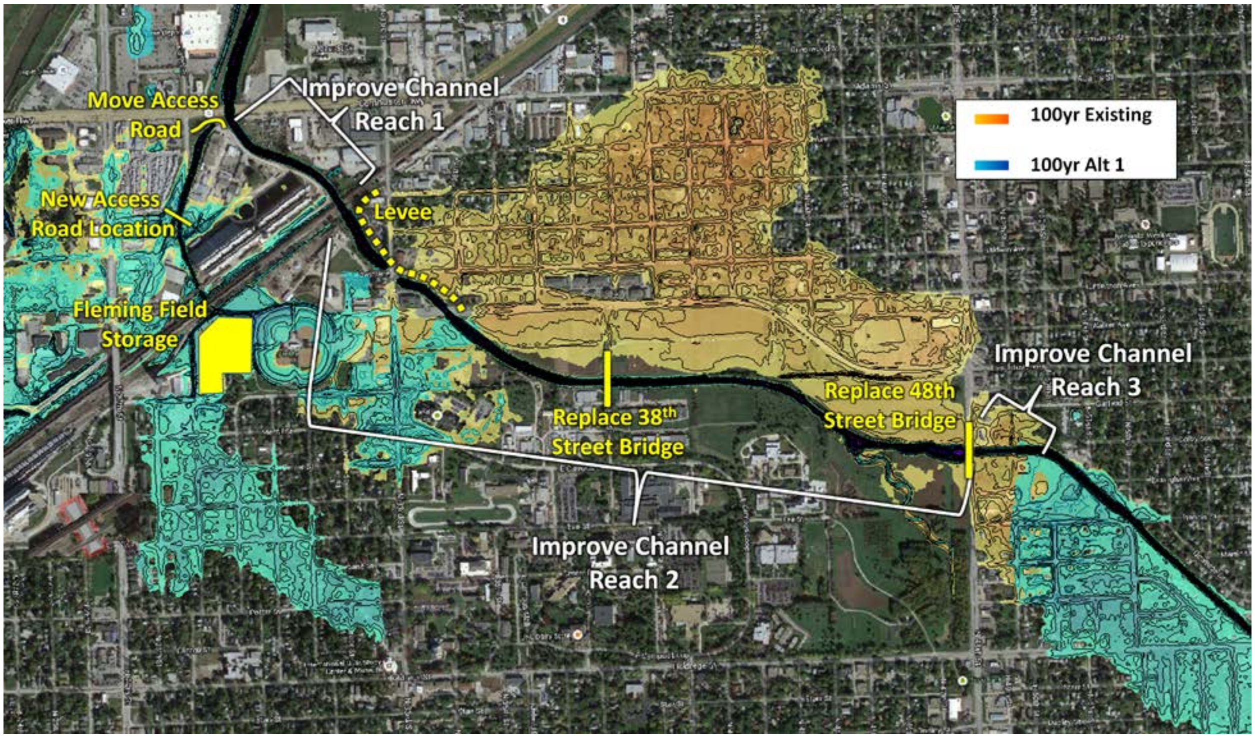


Figure 7. Preferred Alternative #2

Alternative #2 includes the following changes through Deadmans Run: Channel & Bridge Widening, Levee, and Channel Conveyance Improvement (Reaches 1, 2, 3).

a. Channel Widening (XS 2777.996 to 10805.46), Cornhusker to 48th St (Reaches 1, 2, and 3 as seen in Figure 7. Reach 2 is split into two segments; one where the excavations take place only on the left bank in order to keep the trees and riparian habit intact on the right bank (between 48th and 38th St Bridges), and one where the typical channel includes excavations on both banks (from 38th St to Cornhusker). The channel widening cross-sections can be seen in Section 2.3.2.3.
b. Place levee along right bank of channel from RR Bridge to Huntington Ave.
c. Potentially replace the 38th St Bridge (XS STA 7270.68).with a wider span, depending on outcome of ongoing hydraulic evaluation in that reach. 38th St Bridge was replaced in Alternative #1 during the optimization phase. Because Alternative #2 did not move past the preferred alternatives stage, removal/replacement of this bridge was not evaluated.
d. Replace 48th St Bridge with wider span, ~50ft replaced with a ~70ft bridge (XS STA 10837.90).
e. Improve DMR channel to limits of economically justifiable ROW, 48th thru 52nd St. The channel widening cross-sections can be seen in Section 2.3.2.3
f. Site-specific nonstructural measures where needed to supplement structural measures
g. Storage area at Flemings Field, soccer fields will be used to create extra storage for West Tributary Storm.
h. Move access road, near confluence of West Trib and DMR. The access road services the large Cargill grain elevator (and several other businesses). The access road will be moved several hundred feet upstream of the confluence.

A levee along the downstream portion of Reach 2 eliminates the need for a flume under the railroad and also the replacement of 33rd St Bridge. This may be a cheaper alternative, but it also adds an incremental risk due to the addition of a levee to the project. Figure 8 shows a comparison between Alternative #2 and Existing Conditions 100yr water surface profiles.

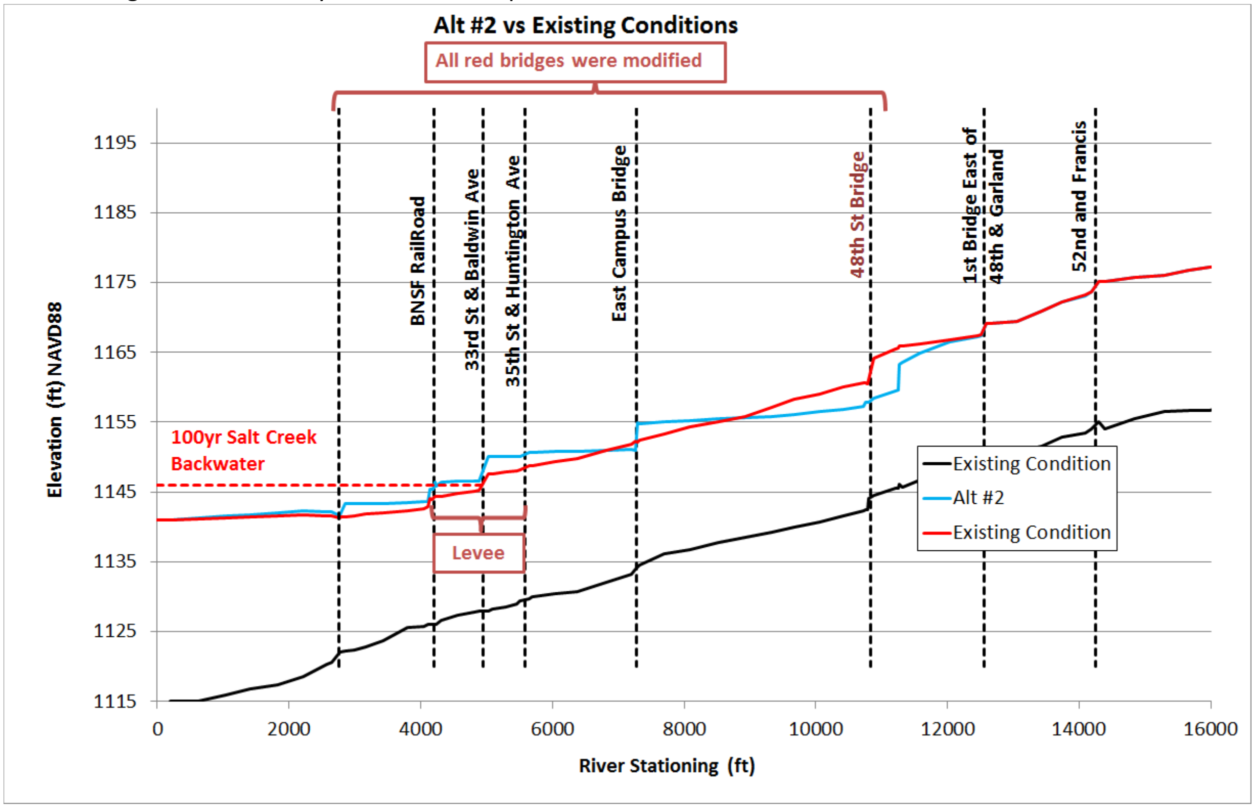


Figure 8. Alternative #2 vs Existing Conditions 100yr water surface profiles

2.2 Preferred Alternatives Summary

The Preferred Alternatives both increase peak flows downstream, however, only Alternative #1 effectively reduces stages. Damages are mitigated in Alternative #2 by adding a levee along the right bank between Huntington Ave and the BNSF RR. Table 3 shows the comparison of 100yr peak flows and stages at the four Bridge locations where modifications are occurring in Alternative #1.

Table 3. 100yr peak flow and stages of the Preferred Alternatives vs Existing Conditions

Alternative	Location	Peak Flow (cfs)	% Existing Flow	Peak WS (ft NAVD88)	Stage Decrease (ft)
Existing Conditions	Railroad Spur (XS 4197.29)	6,221	N/A	1144.30	N/A
	33rd and Baldwin (XS 4952.94)	6,003	N/A	1147.64	N/A
	East Campus Bridge 38th St (XS 7270.68)	6,832	N/A	1152.17	N/A
	48th Street (XS 10837.90)	7,749	N/A	1164.18	N/A
Alternative #1	Railroad Spur (XS 4197.29)	9,992	161%	1144.53	0.23
	33rd and Baldwin (XS 4952.94)	10,072	168%	1146.22	-1.42
	East Campus Bridge 38th St (XS 7270.68)	9,895	145%	1153.40	1.23
	48th Street (XS 10837.90)	8,566	111%	1158.38	-5.80
Alternative #2	Railroad Spur (XS 4197.29)	8,515	137%	1146.37	2.07
	33rd and Baldwin (XS 4952.94)	8,789	146%	1150.04	2.40
	East Campus Bridge 38th St (XS 7270.68)	9,104	133%	1154.88	2.71
	48th Street (XS 10837.90)	8,554	110%	1158.38	-5.80

2.3 Rejected or Preliminary Alternatives

The rejected or preliminary alternatives below were not fully developed because the hydraulic analysis determined they were either not hydraulically feasible, too many damages were being induced downstream, they were not yielding any observable benefit cost ratio, they were constrained by cost and/or real estate, or they needed to be combined with other alternatives to be considered feasible.

2.3.1 Bridge Modifications

There are no standalone bridge modifications that prevent flooding in the overbanks and no isolated bridge improvements which eliminate flooding impacts in either Reach 2 or 3. Removing all bridges throughout both reaches 2 and 3 produces a relative drop in stage of less than a foot. Due to Unsteady HEC-RAS model's ability to attenuate flows as water slows behind bridges, the removal of some upstream bridges may actually increase stages downstream. Removing several bridges in an upstream reach will amplify flows at downstream bridges. Because no standalone bridge modifications exist, this study will attempt to determine which bridges should be removed in conjunction with a channel improvement, levees, or storage retention sites. For the purpose of ruling out a standalone bridge alternative, the analysis used to rule it out is briefly described below.

All bridges below North Cotner Blvd were removed to determine their hydraulic impact. The result of removing all bridges is illustrated in the Table 4 below (red indicates the most significant drop in stages). 48th St, 33rd, 35th and the Rail Road Bridge at 33rd all have significant impacts to the water surface and there may be opportunity to increase capacity at any of these bridges in conjunction with another alternative. Removal of the 48th & Garland Bridge has the most significant, with a water surface drop of 3.17ft. The increase in stages at Cornhusker are an indication of the flows being less attenuated by the bridges in the unsteady modeling, and also an increase in stages due to the coinciding hydrographs of the West Tributary and Deadmans.

Table 4. Water surface drop in feet due to removal of bridges

		Water Surface Drop due to Removal of Bridge		
Bridge Location	**Cross-Section Sta**	**100yr**	**50yr**	**25yr**
Cornhusker	2709 - DMR	-0.78	-0.33	-0.21
Mainline Railroad Bridge west of 33rd	4126.17 - DMR	0.14	0.67	0.43
Rail Spur Bridge west of 33rd	4197.29 - DMR	0.36	0.88	0.63
33rd and Baldwin	4952.94 - DMR	2.39	1.18	1.39
35th & Huntington Avenue	5589.235 - DMR	1.13	0.77	1.29
East Campus bridge	7270.68 - DMR	0.54	-0.25	-0.27
48th & Garland Bridge	10837.9 - DMR	3.17	2.9	3.28
1st Bridge East of 48th & Garland	11265.4 - DMR	1.82	1.69	2.43
52nd and Francis	12558.7 - DMR	1.46	0.69	0.48
56th & Holdrege	14241.1 - DMR	0.59	0.82	1.21
2nd Bridge west of Cotner	16640.7 - DMR	0.28	0.3	0.42
1 St Bridge West of Cotner	17220 - DMR	0.22	0.24	0.33
Cargil North Spur	1812 - West Trib	0.57	0.67	0.47
Cargil Mainline Bridge	1953.561 - West Trib	0.24	0.41	0.24
Cargil South Spur	2022.994 - West Trib	0.54	0.67	0.42
Fleming Field Box Culvert	2613.568 - West Trib	0.25	0.46	0.19

Figure 9 shows the impact on the flooding extents if all bridges in Table 4 are removed from the HEC-RAS model geometry. Flooding extents are slightly reduced in both reaches 2 and 3, but the overall impact is insignificant and about the same as existing conditions.

CDM identified 52nd and 56th St as undersized bridges. 48th St was not identified as an undersized bridge in CDM's Watershed Master Plan, but was noted to be functionally obsolete due to its size, it cannot safely accommodate current traffic volume and vehicle sizes. Initial modeling efforts show that 48th St likely has an impact on the upstream water surface, as well as allowing any water that overtops it to flow into the overbanks downstream.

CDM also noted that during public meetings, stakeholders mentioned that debris gets trapped on 52nd and 56th St bridges. No attempts have been made in this analysis to model the affect debris would have on these bridges.

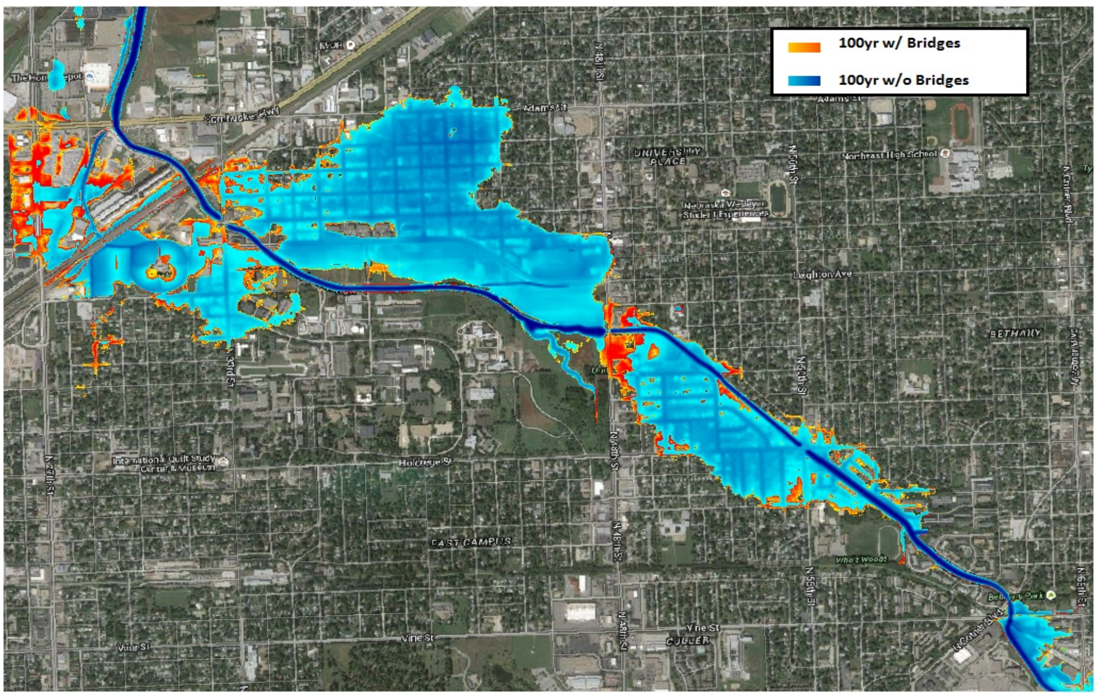


Figure 9. 100yr flooding extents with and without bridges

Quantities

Costs were not evaluated for this alternative, as there are no standalone options that prevent flooding in the overbanks and no isolated bridge improvements which could significantly reduce flooding impacts in either Reach 2 or 3.

2.3.2 Channel Improvements

The feasibility of a standalone channel improvement project was evaluated for Reach 2, but channel improvements are only feasible if done in conjunction with another alternative. Constructing channel improvements ½ mile upstream of 48th St Bridge combined with channel improvements throughout Reach 2 does not provide enough channel capacity to keep the entire right bank (high damage area) out of the floodplain. No standalone channel improvement project can be implemented that would eliminate 100yr flood risk throughout both reaches 2 and 3 due to real estate constraints and existing bridge capacities. The process to determine if channel improvements only are feasible is described below.

To determine if it may be practical to modify the channel without making any bridge improvements, all bridges were left in place in their existing condition. The channel upstream and downstream of all the bridges throughout Reaches 2 and 3 were widened at a divergence and convergence rate of 1:10 (the recommended rate in EM-1110-2-1601 for channels with velocities ranging from 10-15fps). The mean velocity in Deadmans Run during the 100yr event is approximately 7fps, but this was considered to be close enough to 10 fps that a 1:10 ratio was used for this analysis. A cross-section with 2H:1V side slopes and a 50ft bottom width was projected through Reaches 2 and 3 at the 1:10 divergence and convergence ratio. Vertical side slopes could be used, but are likely too expensive to be justified. A stair stepped or terraced cross-section may be more practical, but in this analysis it is assumed that a stair stepped and 2H:1V side slopes would convey almost the same amount of flow.

Figure 10 below shows the possible extents that the channel could be extended to that would potentially allow for the most flow through Reaches 2 and 3 without modifying any of the bridges. Figure 10 also shows the more likely extents allowable through each reach due to real estate constraints, which are already nearly at the extents of the existing conditions.

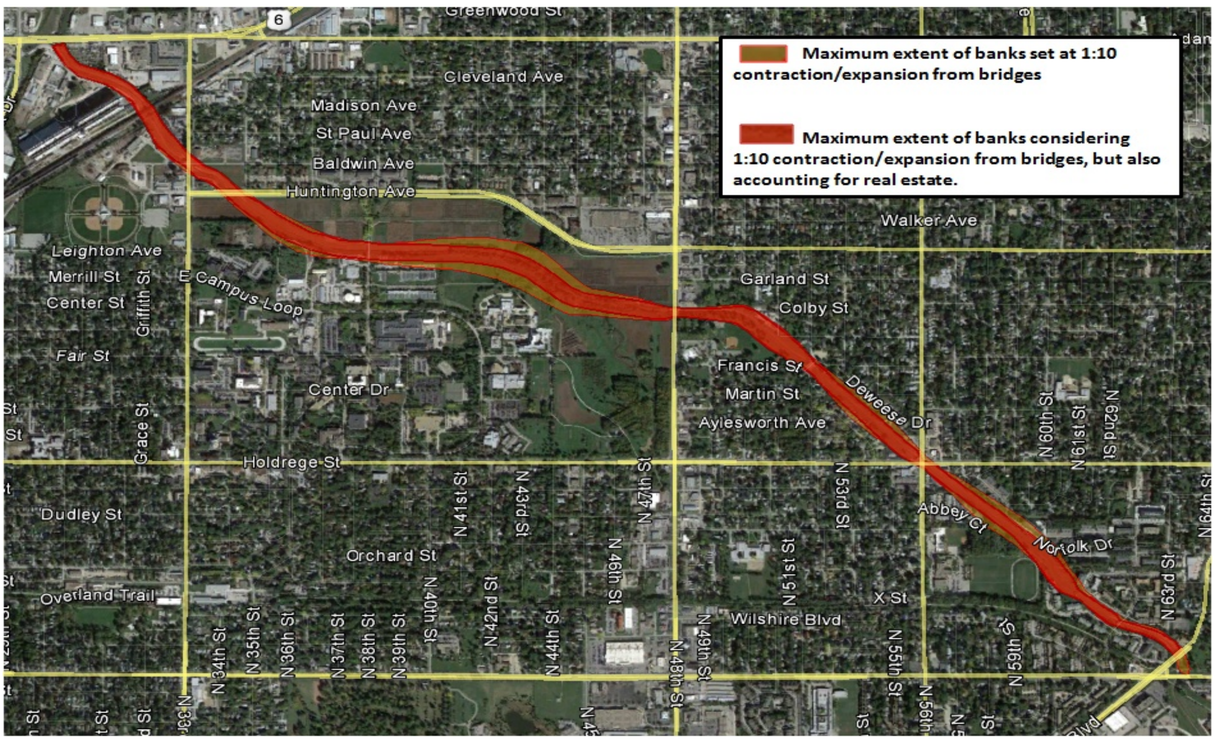


Figure 10. Contraction and Expansion at bridges being optimized to increase flow. Maximum channel extents vs realistic extents based on real estate.

Figure 11 shows that even with the maximum bank extents allowable that the bridges would still impact flow at 56th St and Holdrege St, 33rd St and 35th St and Huntington Ave, and upstream of 48th St Bridge. Although the high damage area appears to not be flooded in Figure 11, there is levee entered along the right bank to keep flows entrained in the channel and simulates the high ground that exist between Deadmans Run and the high damage area. Stages upstream of the Holdrege St and Huntington Ave bridges indicate that these areas can expect overland flooding along the right bank. The flooding extents don't match the channel excavation because the terrain that the floodplain was overlaid on was not modified to have the wider channel. The wider channel configuration was only constructed in the HEC-

RAS model, and used by the HEC-RAS model calculations. The calculations were then applied to an unmodified terrain file, this is why the flooding extents in the mapping do not match the proposed channel widening extents.

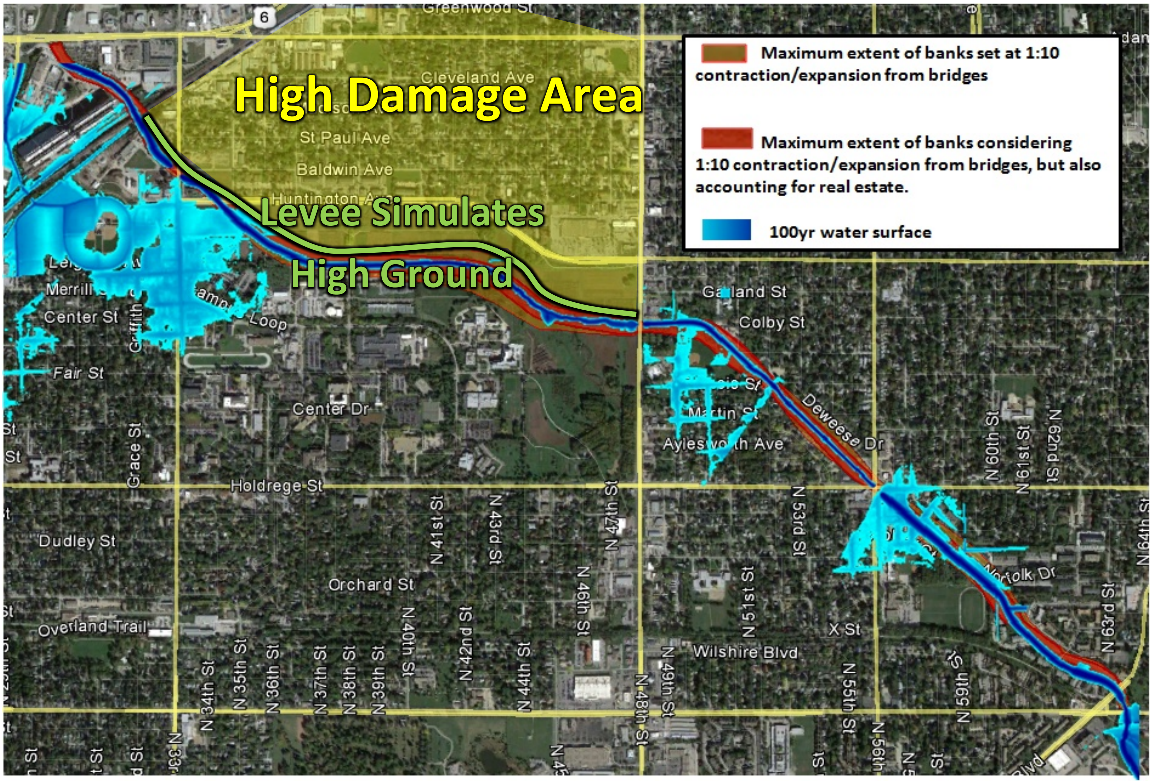


Figure 11. 100yr water surface added to channel only improvement analysis

It is evident that both bridge modifications and channel improvements would be needed in order to find a solution that provides benefits to both Reach 2 and Reach 3 without incurring too much cost. An initial look at this alternative considered a 50ft bottom width channel with 1V:2H side slopes from Cornhusker Road to Cotner Blvd Bridge. The CDM Watershed Master Plan proposed a channel improvement project along this same reach and consists of 20-120ft bottom widths, 20-50ft benching and shallower side slopes (3H:1V and 4H:1V), typically getting wider as it moves downstream. A model developed for a neighboring watershed (Antelope Creek) used a Manning's n value between 0.015 and 0.025 for a concrete lined channel. However, when the model was submitted through the USACE regulatory office, and then to FEMA for a LOMR, the Manning's n value throughout the entire project was adjusted to 0.035 or greater. The CDM model used to develop the effective FIRM for Deadmans Run used a 0.025 in the low channel flow region and 0.04 on the channel banks for a typical composite Manning's n of 0.035 or greater. A conservative approach would be to use a 0.035 throughout the entire channel. The table in Figure 12 below shows various Manning's n values where 0.035 is a natural, straight channel with weeds. This is a conservative Manning's n to use because the improved channel will likely be closer to a riprap lined clean and straight channel with some riparian vegetation in form of a native seed mix.

Channel Descriptions and Associated Manning's n-Values[1]

Channel Description	Initial n-Value	Range of n-Value
Fabriform Mattress[2] - clean channel and sidewalls	0.025	0.020 to 0.030
Fabriform Mattress - rock gabion, grass sidewalls	0.030	0.025 to 0.035
Fabriform Mattress - brush in channel, sidewalls	0.040	0.030 to 0.500
Natural, clean, straight	0.030	0.025 to 0.033
Natural, straight channels, weeds	0.035	0.030 to 0.040
Natural, clean, meandering	0.040	0.033 to 0.045
Natural, meandering, weedy	0.045	0.045 to 0.050
Natural, sluggish, weedy	0.070	0.050 to 0.080
Natural, very weedy, floodways with heavy timber and underbrush	0.100	0.075 to 0.150

1. Source: *Open Channel Hydraulics*, Chow 1959
2. Source: Construction Techniques, Incorporated (CONTECH)

Figure 12. Manning's n values

2.3.2.1 Channel Improvements combined with Bridge Modifications (Reach 2 and 3)

Figure 13 shows that if the channel is improved throughout Reaches 2 and 3 with 9 bridges completely removed, there would be no flooding throughout either reach. This includes replacement of the BNSF RR Bridge and the 2nd Bridge West of Cotner Blvd. Figure 14 shows the effect of replacing only 7 bridges throughout Reaches 2 and 3 in order to reduce flooding as much as possible, leaving the BNSF RR Bridge and the 2nd Bridge West of Cotner Blvd. 100yr flood waters may still flow out of bank near 33rd St & Baldwin Ave and 35th St and Huntington Ave unless a structural measure is taken either at the BNSF RR Bridge or upstream of it. Potential options evaluated in this report are a levee upstream of the BNSF RR Bridge, or a concrete flume that allows the bridge to convey more water.

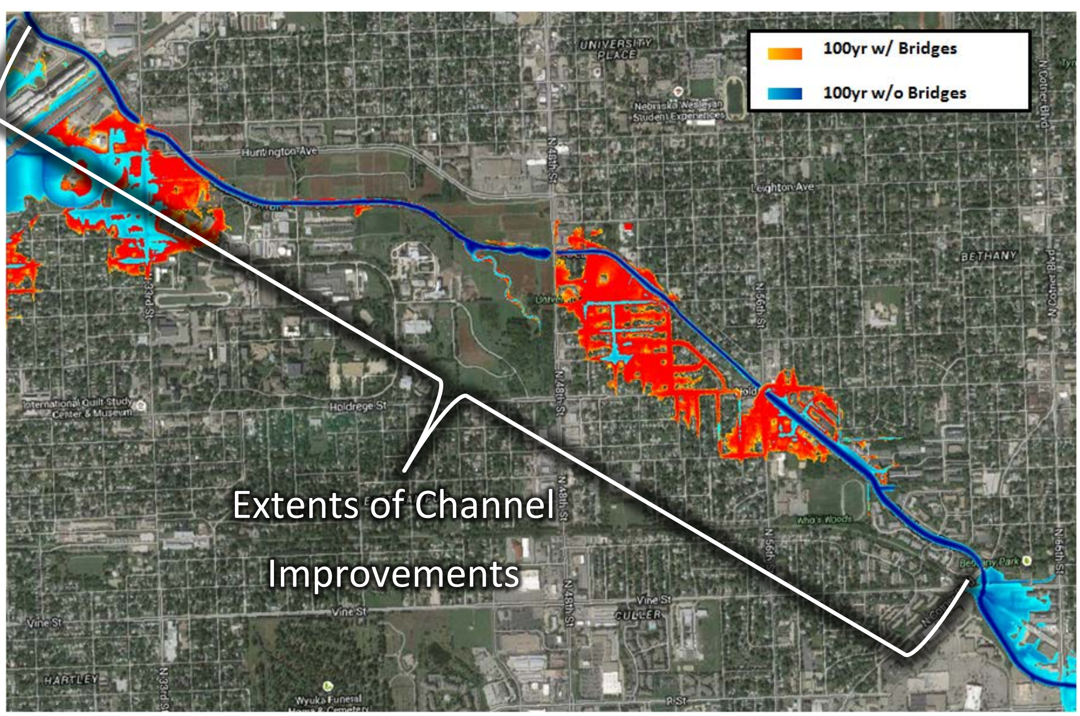


Figure 13. Channel Improvements with Bridge Modifications, all bridges removed.

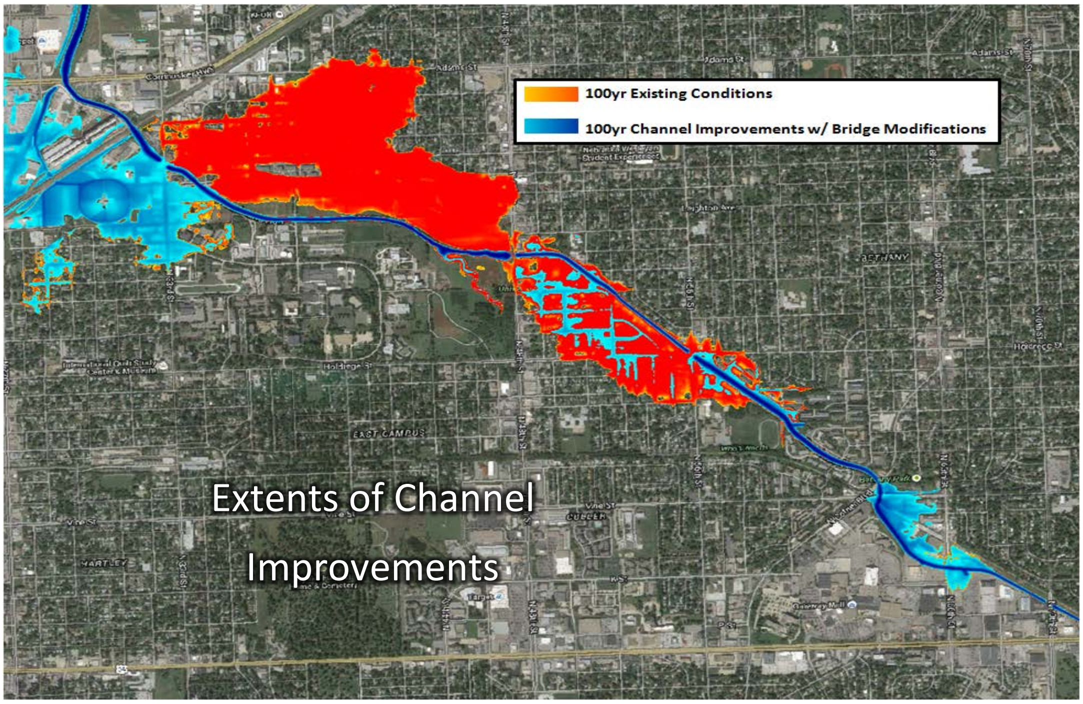


Figure 14. Channel Improvements with Bridge Modifications (7 bridges replaced, see Figure 15) versus Existing Conditions (Reach 2 and 3)

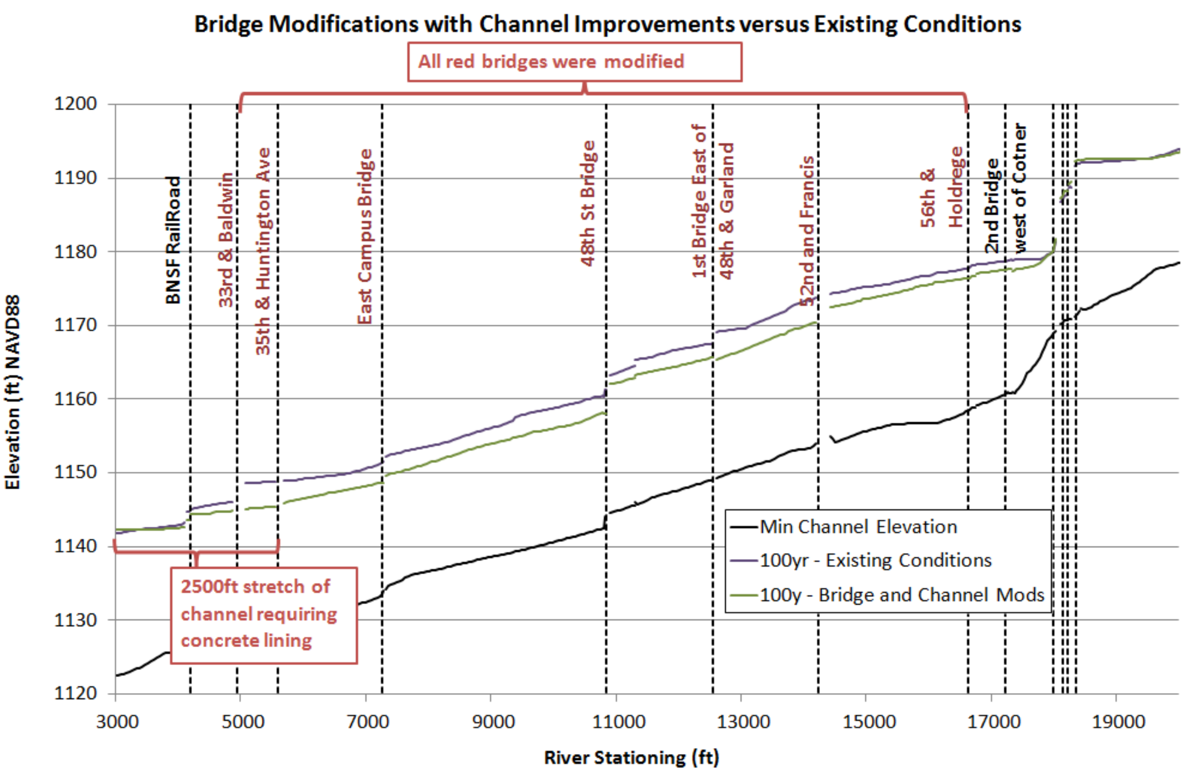


Figure 15. Bridge modifications and Channel Improvements vs Existing Conditions

The existing channel grade was used in the channel improvements. It is possible that a regrading of the channel invert could yield a drop in stage around bridges and at certain locations.

Quantities
The proposed condition would include tearing out the existing channel and gabions throughout Reach 3 and replacing with the proposed channel configuration shown in Figure 18. Consideration was given to the close proximity of homes through the 52nd to 56th St in Reach 3. To maximize the capacity of the channel without impacting the backyards of adjacent residential homes, vertical structural retaining walls using terraces is recommended. The estimated excavation through Reach 2 and 3 is approximately 200,000 and 190,000 CY of soil, respectively. A list of bridges modified for the Channel Improvement and Bridge Modifications (Reach 2 and 3) can be seen in Table 5.

CDM estimated that channel improvements from Cornhusker to 48th St with some bridge improvements would cost approximately $12.5 million. This study produced similar quantities through the reach between Cornhusker and 48th St, CDM estimating 125,000 CY and USACE estimating 120,000 CY. Initial estimates along this damage reach done by USACE economist show there is a potential for a $26 million maximum affordable project.

Table 5. List of bridges in Reaches 2 and 3 that may be impacted by a Channel Improvement and Bridge Modification Alternative (Reach 2 and 3).

	Bridge Name	Bridge Modification
Reach 3	North Cotner Blvd	No modification
	1 St Bridge West of Cotner Blvd	No modification
	2nd Bridge west of Cotner Blvd	No modification
	56th St & Holdrege St	Replaced with 115ft span bridge
	52nd St and Francis	Replaced with 100ft span bridge
	1st Bridge East of 48th & Garland	Widened abutments to 85ft span
Reach 2	48th St Bridge	Widened abutments to 65ft and removed piers
	East Campus Bridge	Widen to 100ft span bridge
	35th St & Huntington Avenue	Width increased to 100ft
	500ft Levee Left and Right Bank	A 5-6ft high levee may be required b/w these bridges Quantity estimated to be 5,000 CY
	33rd St and Baldwin Avenue	Width increased to 55ft (Concrete lined channel to next bridge)
	Rail Spur Bridge west of 33rd St	Concrete lined channel to next bridge
	Mainline Railroad Bridge west of 33rd St	Concrete lined channel to next bridge
	Cornhusker Hwy	No modification

2.3.2.2 Channel Improvements combined with Bridge Modifications (Reach 2 only)
A second bridge and channel modification alternative would be to only make channel improvements and bridge modifications in Reach 2. In this alternative, only 4 bridges are modified and the channel improvements are only between 1st Bridge East of Garland & 48th and the Cornhusker Hwy Bridge. This alternative drops stages through reach 2 by an average of 0.7ft more than channel improvements and bridge modifications through both Reach 2 and 3.

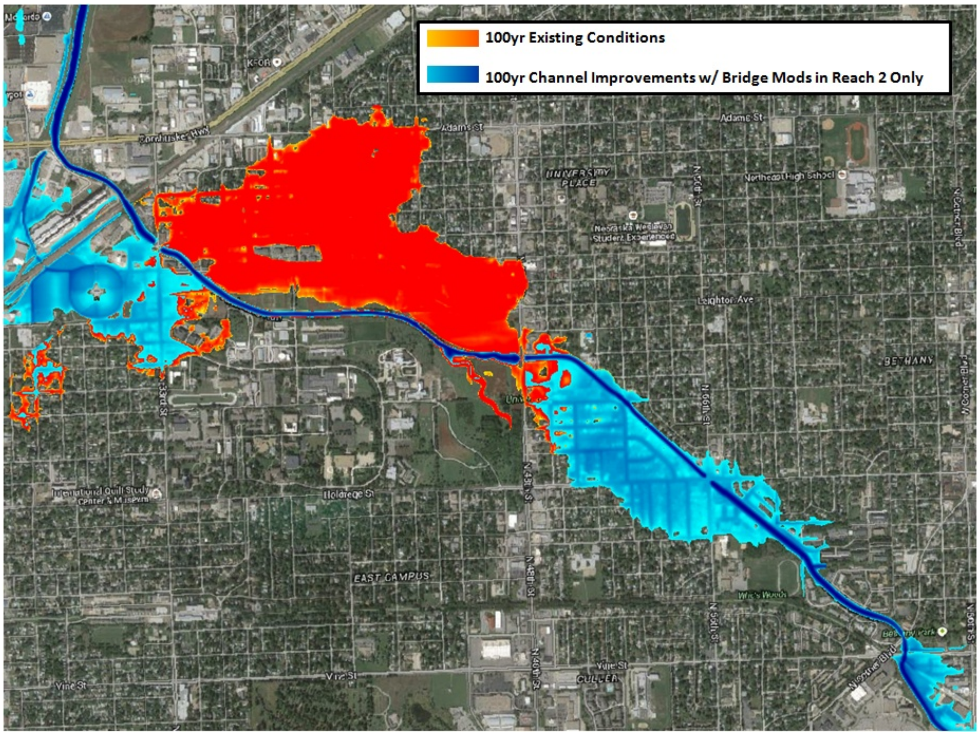


Figure 16. Bridge and Channel Improvements through Reach 2 only 100yr mapping

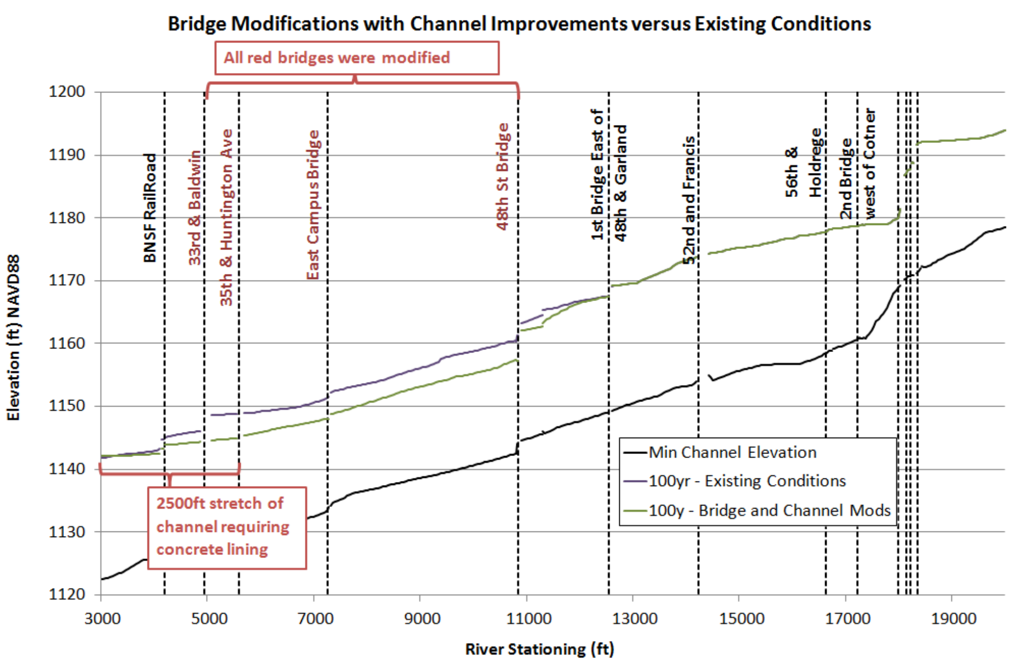


Figure 17. Bridge and Channel Improvements through Reach 2 only 100yr profiles

Table 6. List of bridges in Reaches 2 that may be impacted by a Channel Improvement and Bridge Modification Alternative (Reach 2 only).

Reach 2	48th St Bridge	Widened abutments to 65ft and removed piers
	East Campus bridge	Widen to 100ft span bridge
	35th St & Huntington Avenue	Width increased to 100ft
	500ft LEVEE Left and Right Bank	A 3-4ft high levee may be required b/w these bridges Quantity estimated to be 2,500 CY
	33rd and Baldwin Avenue	Width increased to 55ft (Concrete lined channel to next bridge)
	Rail Spur Bridge west of 33rd	Concrete lined channel to next bridge
	Mainline Railroad Bridge west of 33rd	Concrete lined channel to next bridge
	Cornhusker Hwy	No Modification

2.3.2.3 Channel Improvements Cross-Sections

The cross-sections seen below were used throughout the Channel Improvement Alternatives and the 2 Preferred Alternatives. A potential cross-section through Reach 3 (390ft of channel upstream of 48th St Bridge) is shown in Figure 18. The terraced cross-section was developed to limit the amount of real estate required to convey floods through the backyards between 52nd and 56th St. It is likely that the terracing won't be required through the 390ft of channel leading up to the 48th St Bridge. Real estate to make a wider channel could be more easily acquired to make a wider channel configuration such as what is shown in Figure 19. These channel configuration are the same in all channel improvement alternatives. The existing conditions are shown in a light blue color on each cross-section. The black lines indicate either the proposed new cross-section or the measurements of that cross-section. The existing cross-sections are composed of gabions grassy slopes that range from 3H:1V to 2H:1V.

The channel configuration shown in Figure 19 is proposed to be placed between 48th St Bridge and the East Campus Bridge. The existing condition of this reach has trees on both the left and right bank. In order to eliminate or reduce the amount of environmental disturbance/mitigation required, the right bank of trees as left intact. The mitigation for removal of the trees on the left bank will be to replant trees higher up on the left bank cross-section. The channel configuration shown in Figure 20 is proposed to be placed between East Campus Bridge and Cornhusker Hwy. The existing conditions consist of gabions along the low flow channel, with approximately 2.5H:1V side slopes

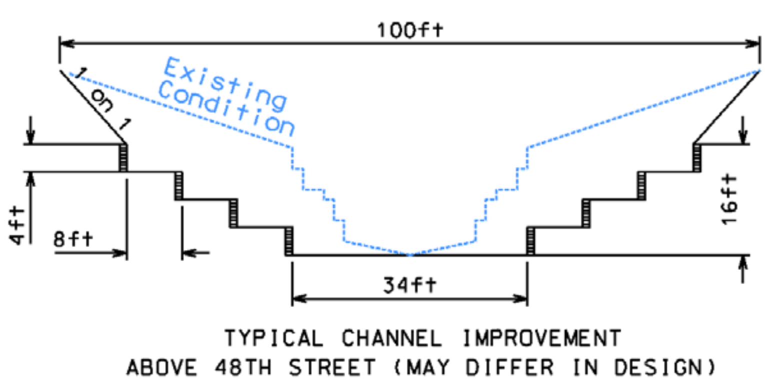


Figure 18. Proposed vs existing channel condition through Reach 3

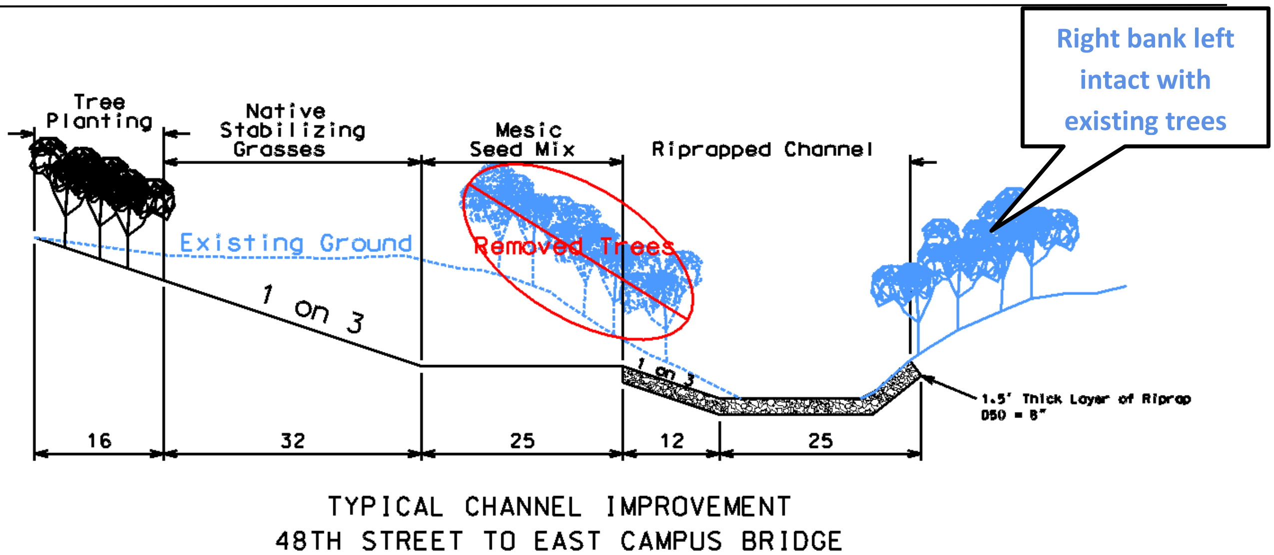


Figure 19. Proposed vs existing channel condition through Reach 2 (48th St Bridge to East Campus Bridge)

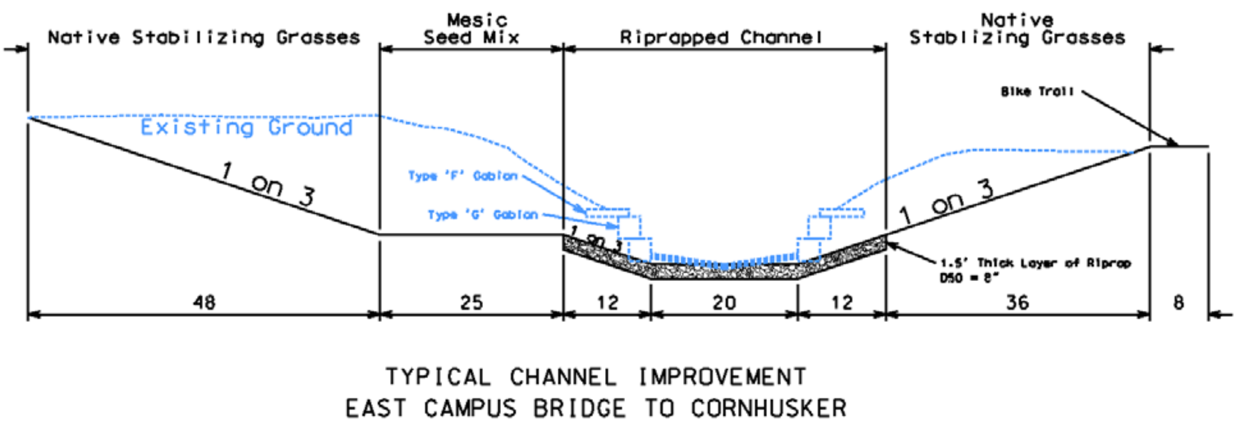


Figure 20. Proposed vs existing channel condition through Reach 2 (East Campus Bridge to Cornhusker)

2.3.3 Levees

Because of real estate constraints along Reach 3, only Reach 2 (BNSF RR Bridge to 48th St Bridge) was evaluated for the potential to construct a levee, which would need to be constructed over the UNL campus agronomy plots. Two levee alignments were evaluated that both include an addition of a right bank levee placed along Reach 2 from the BNSF RR to 48th St Bridge. Alignment #1 places the levee on the very edge of the right bank. Alignment #2 parallels Huntington Ave. Both alignments require real estate along or on top of the agronomy plots. Flooding extents are increased downstream and upstream of the levee as can be seen in Figure 22 below. The alignments would require almost 100ft of buffer of real estate along a 1.3 mile stretch through an urbanized area. As can be seen in Figure 21, the water surface returns to existing condition stages immediately downstream of the BNSF RR Bridge, and a few hundred feet upstream of the 48th St Bridge. Peak flows do not change.

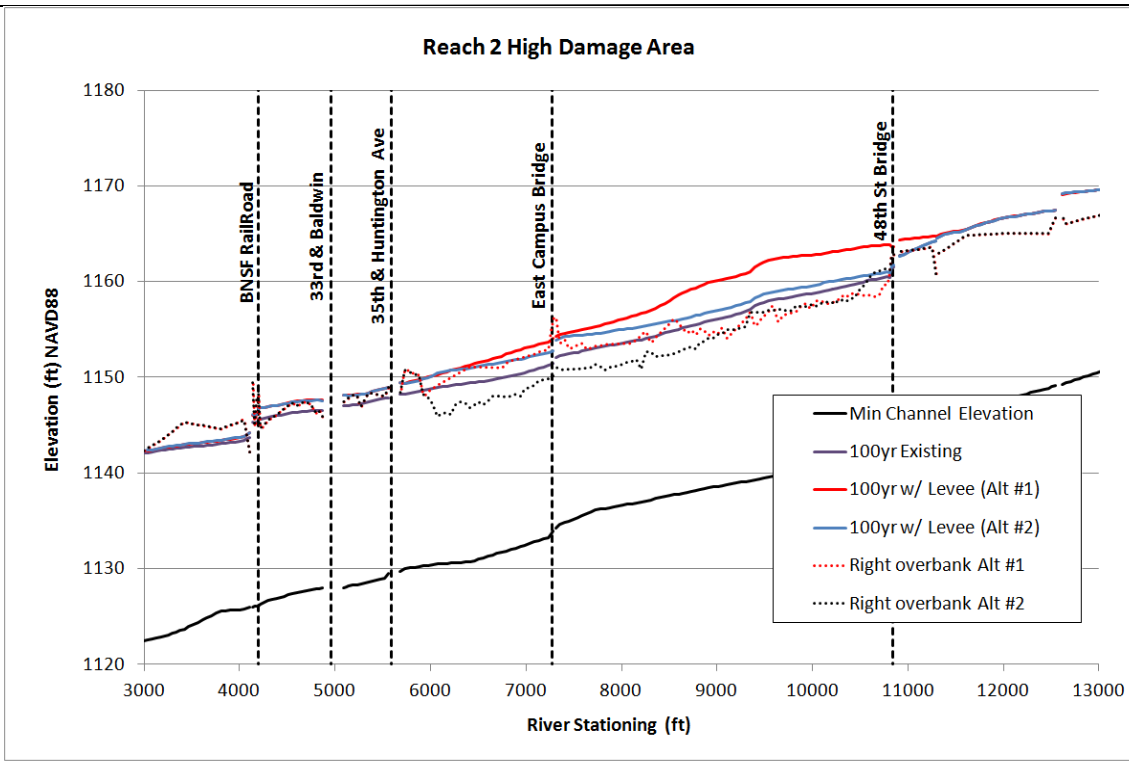


Figure 21. Water surface stage profile for Levee Alt #1 and #2 vs Existing Conditions

2.3.3.1 Levee Alignment #1

The levee height for Alignment #1 averages 5ft with a maximum height of 10ft. This height includes 3ft of freeboard as per NFIP Regulation 65.10(b) – "Minimum freeboard required 3 feet above the Base Flood Elevation (BFE) all along length, and an additional 1 foot within 100 feet of structures (such as bridges) or wherever the flow is restricted." This FEMA regulation is used because one of the objectives of this Section 205 study is to remove as many people from the floodplain as possible. Meeting this required amount of freeboard in the design criteria will increase the chances that this levee will meet NFIP eligibility requirements. Preliminary estimates require 38,000 CY (10ft crest width and 1/3 side slopes) of material to build this levee which is about 1.3 miles long. The water surface resulting from this alignment averages 2.5ft higher than existing conditions, with a maximum difference of 4.3ft.

- Removing bridges 33rd St & Baldwin Ave, 35th St & Huntington Ave, East Campus and 48th St Bridges reduce the water surface elevation an average of 0.3ft.

2.3.3.2 Levee Alignment #2

The levee height for Alignment #2 averages 5ft with a maximum height of 8ft. This height also includes 3 feet of freeboard. Preliminary estimates require 34,000 CY (10ft crest width and 1/3 side slopes) of material to build this levee which is about 1.3 miles long. The water surface resulting from this alignment averages 1.1ft higher than existing conditions, with a maximum difference of 1.9ft. Because this alignment ties back on higher ground along 48th St, it may not require any modifications to the 48th St bridge.

- Removing bridges 33rd St & Baldwin Ave, 35th & Huntington Ave, East Campus and 48th St Bridges reduce the water surface elevation an average of 0.2ft.

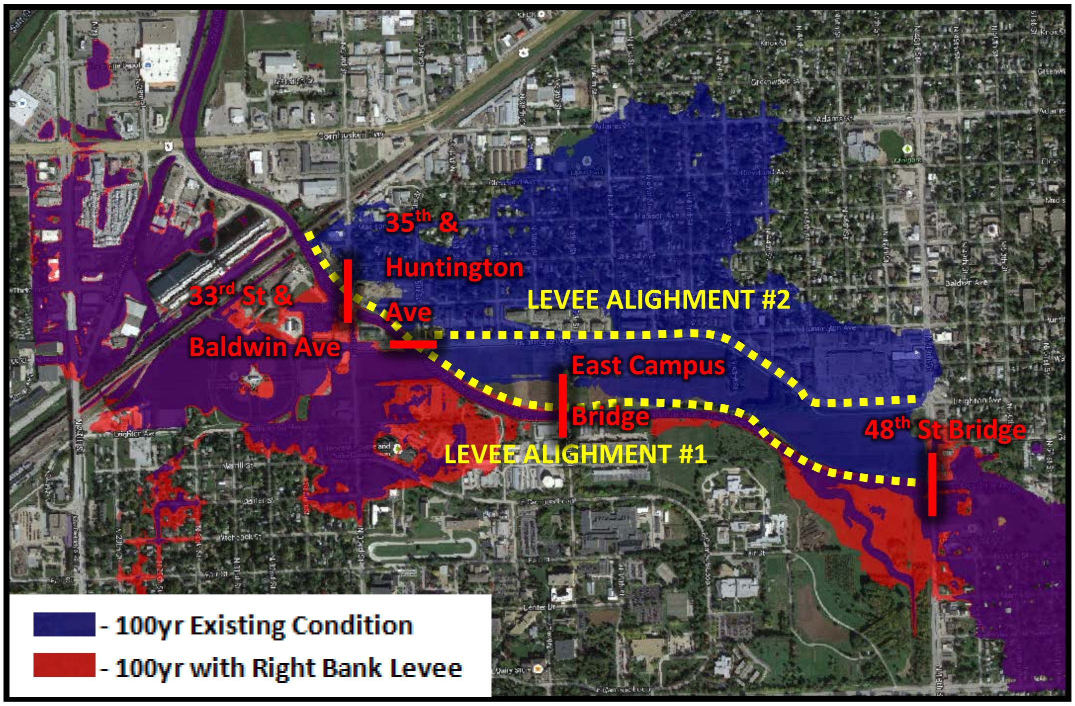


Figure 22. 100yr Existing vs Right Bank Levee

Quantities

Levee alignment #1 and #2 are estimated to take 38,000 CY and 34,000 CY to construct, respectively. Construction quantities assume the levee height has 3ft of freeboard above the 100yr water surface, 3H:1V side slopes and a 10ft crest width. A spreadsheet which compared the water surface elevation +3 feet to the existing ground elevation along each proposed levee alignment was used to estimate the quantities.

2.3.4 Storage

Storage was not a viable alternative because although there is a 30% reduction in flow and a 1.27ft reduction of stage, there is still too much overland flooding in comparison to a channel improvement alternative. There are 2 areas that may have potential storage benefits along the channel, UNL Ponds and Holdrege ponds (see Figure 23 and Figure 24). The storage areas assume approximately a 15-20ft depth (based on the depth of the channel next to the pond) and 5H:1V side slopes. The ponds are connected to the channel with a lateral structure. The lateral structure's elevation matches the existing terrain of the left bank, and assumes a weir coefficient of 2.6. Flooding mapping in Figure 23 shows the 100yr water extents with storage along Reaches 2 and 3 versus the existing conditions.

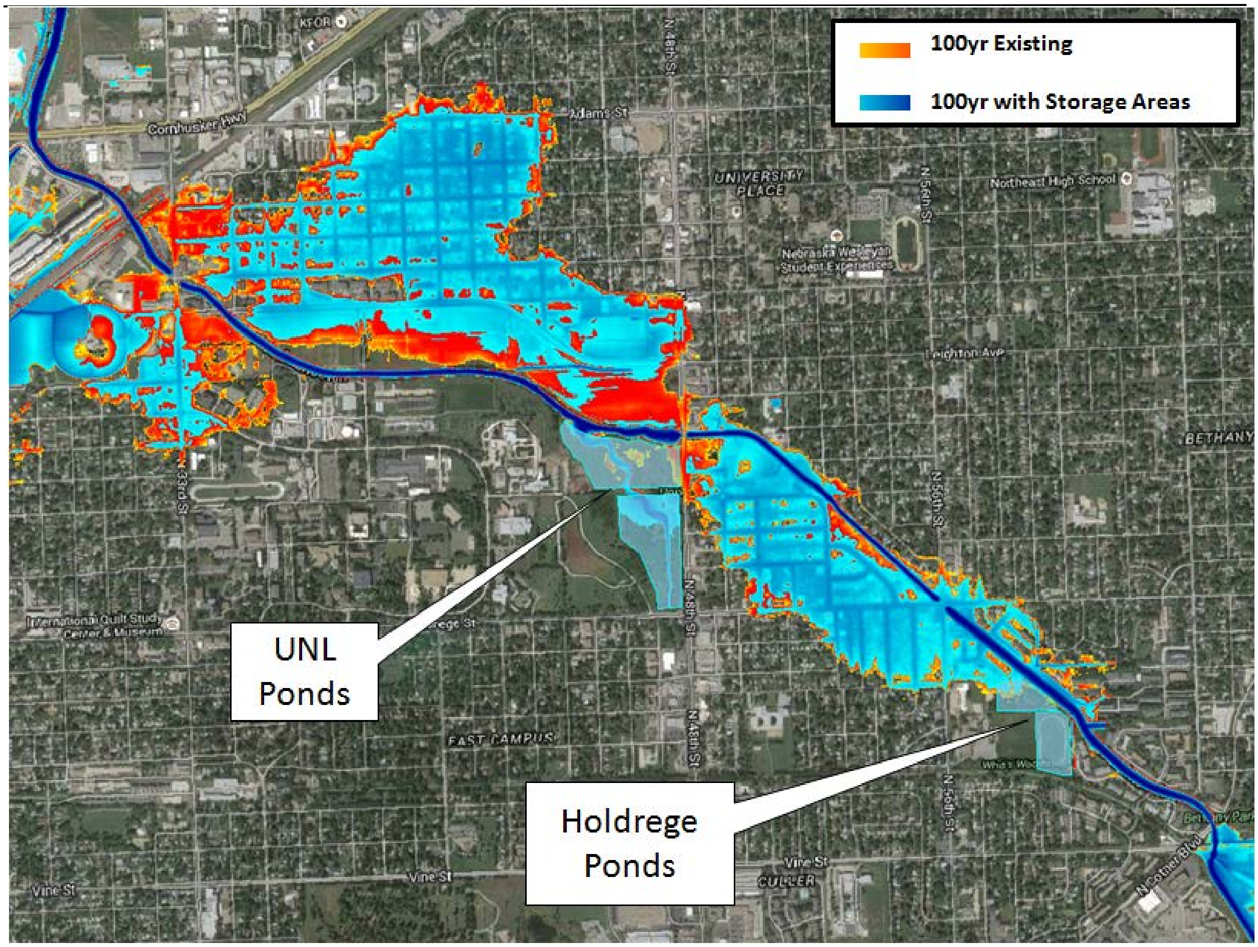


Figure 23. Existing conditions vs Storage conditions

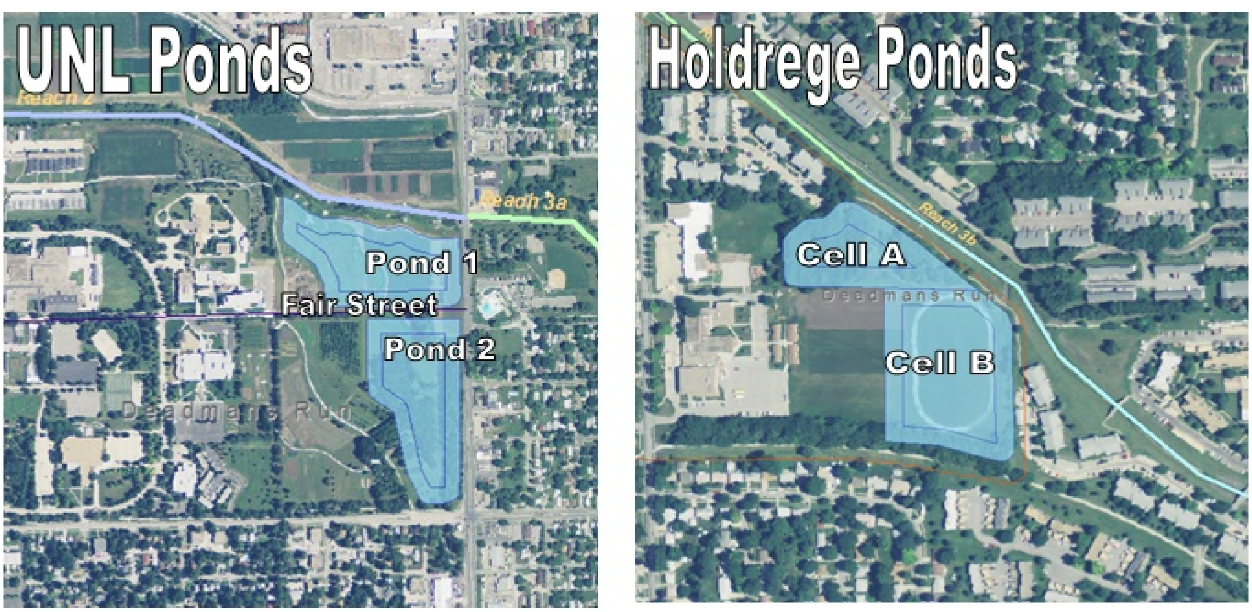


Figure 24. Potential Storage Ponds along Deadmans Run Channel

During a discussion with UNL campus officials, plans were revealed that the campus intends to construct Fair St road to the east until it connects with 48th St. Construction of this road would potentially provide a flood control benefit if a retention pond was built behind it, effectively removing the sub-basin attached to it from contributing to the peak flow along Deadmans Run. The HEC-RAS model's flow file is arranged so that the sub-basins contribute flow every few cross-sections. In order to evaluate the effect that Pond 2 would have on the 100yr event, the 100yr lateral inflow hydrograph flow from cross-section 10755.48 was removed from the channel and placed as a hydrograph input into storage Pond 2 (see Figure 24 for location of ponds).

Figure 25 and Figure 26 show the effect immediately downstream of the UNL Ponds and Holdrege ponds (approximately 1000ft downstream of 48th St Bridge and 100ft downstream of the Holdrege ponds). The UNL ponds show the stage is reduced by 1.27 feet, the flows are reduced by ~37% and the volume of the hydrograph is decreased by ~10%. The total volume contained by the ponds is ~340 AC-FT. The Holdrege ponds show a decrease in stage of 0.2ft, a reduction in flow of 18% and a total volume reduction of the 100yr hydrograph by 3%.

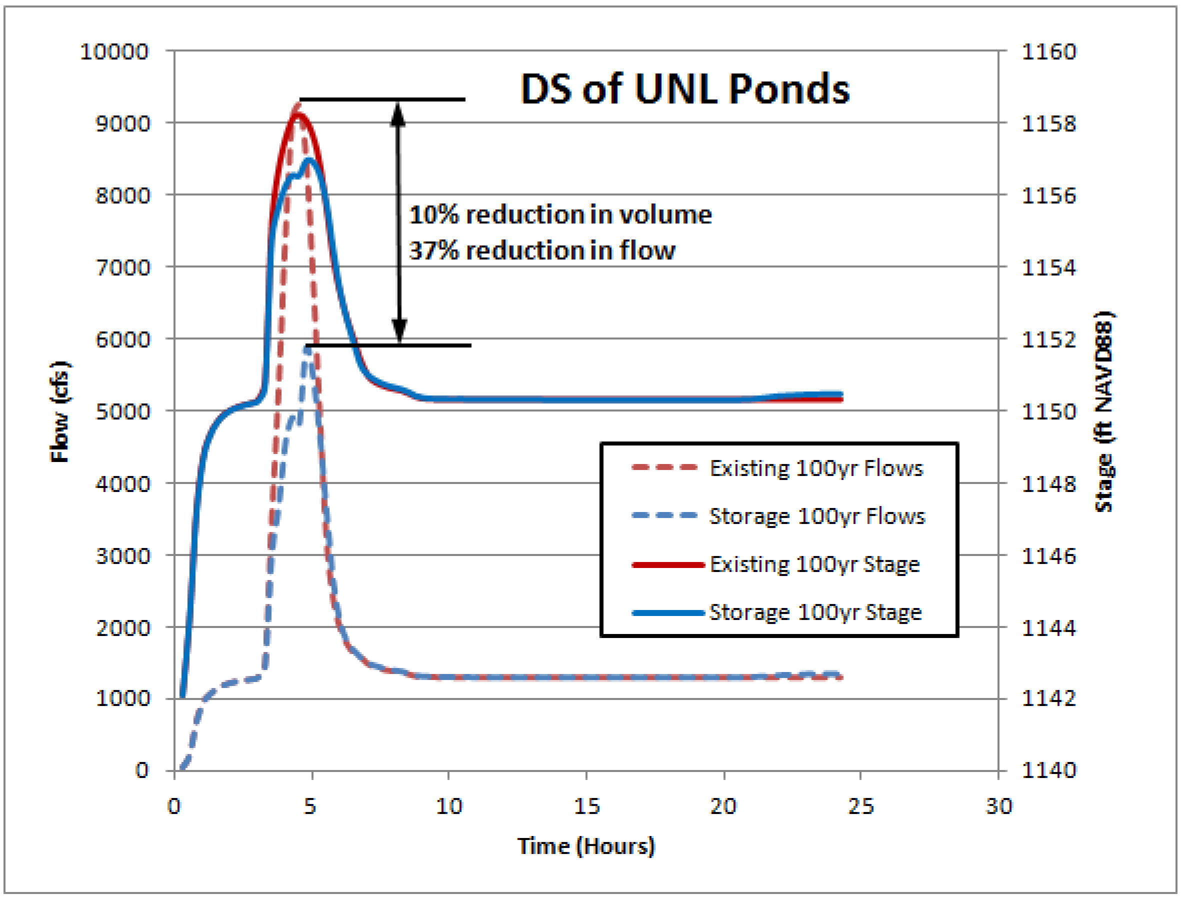


Figure 25. 100yr Hydrograph and Stages immediately downstream of UNL and Holdrege Ponds (HEC-RAS run includes both Holdrege and UNL ponds).

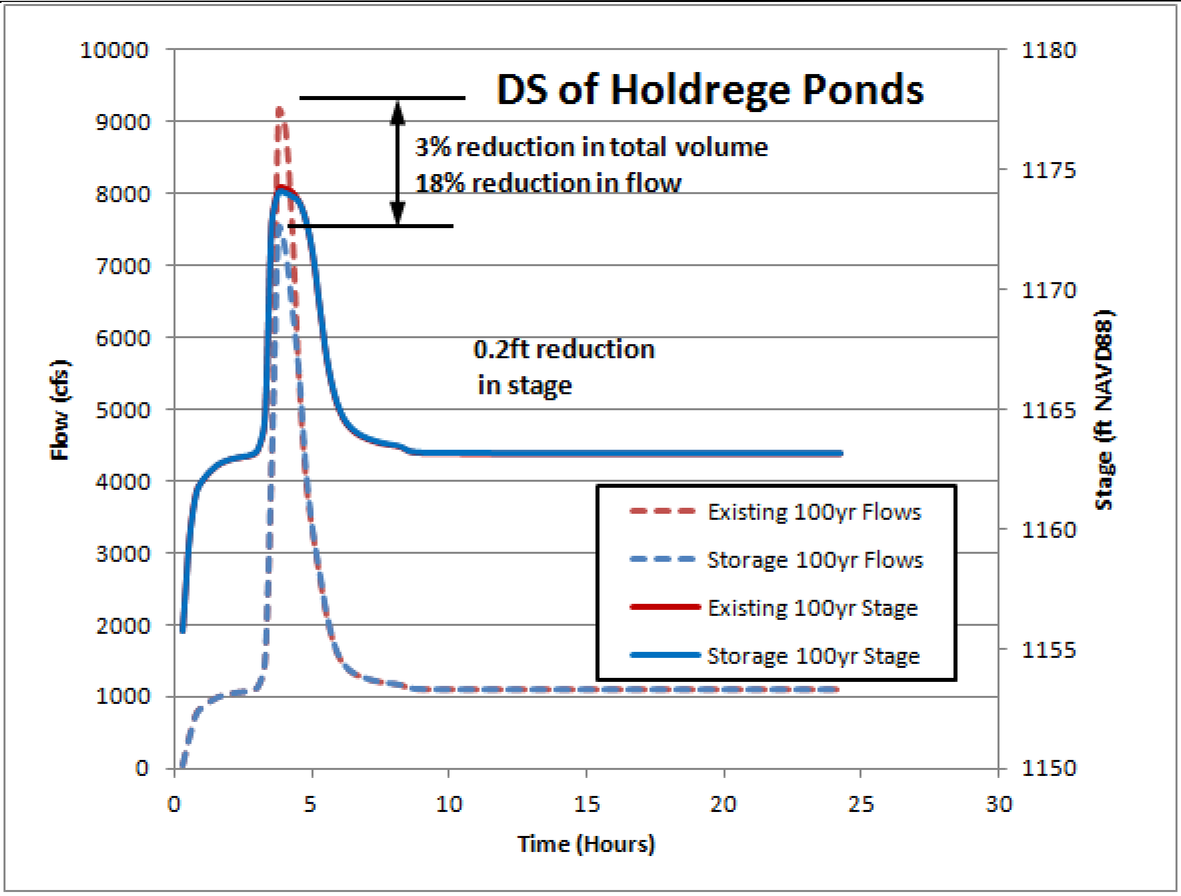


Figure 26. 100yr Hydrograph Immediately downstream of Holdrege Ponds (HEC-RAS run includes both Holdrege and UNL ponds).

The effects of all ponds added can be seen in Figure 27. This graphic shows the existing conditions with and without the inflow hydrograph input at cross-section 10755.48, which is directly downstream of the 48th St Bridge. This hydrograph is what comes into Deadmans Run off of 'No Name Creek'; the creek that outlets into the UNL Ponds before entering Deadmans Run. An analysis was done to determine whether or not the hydrograph of No Name Creek coincides with the hydrograph of Deadmans Run. Figure 27 shows that removal of the hydrograph at No Names Creek will reduce the stages in the vicinity of Reach 2 by approximately 0.4ft, and reduce the peak flow by approximately 1,200 cfs. If all ponds are added (all Holdrege and UNL ponds), the flow can be reduced as much as 1.27ft and peak flows would be reduced by nearly 3,000 cfs.

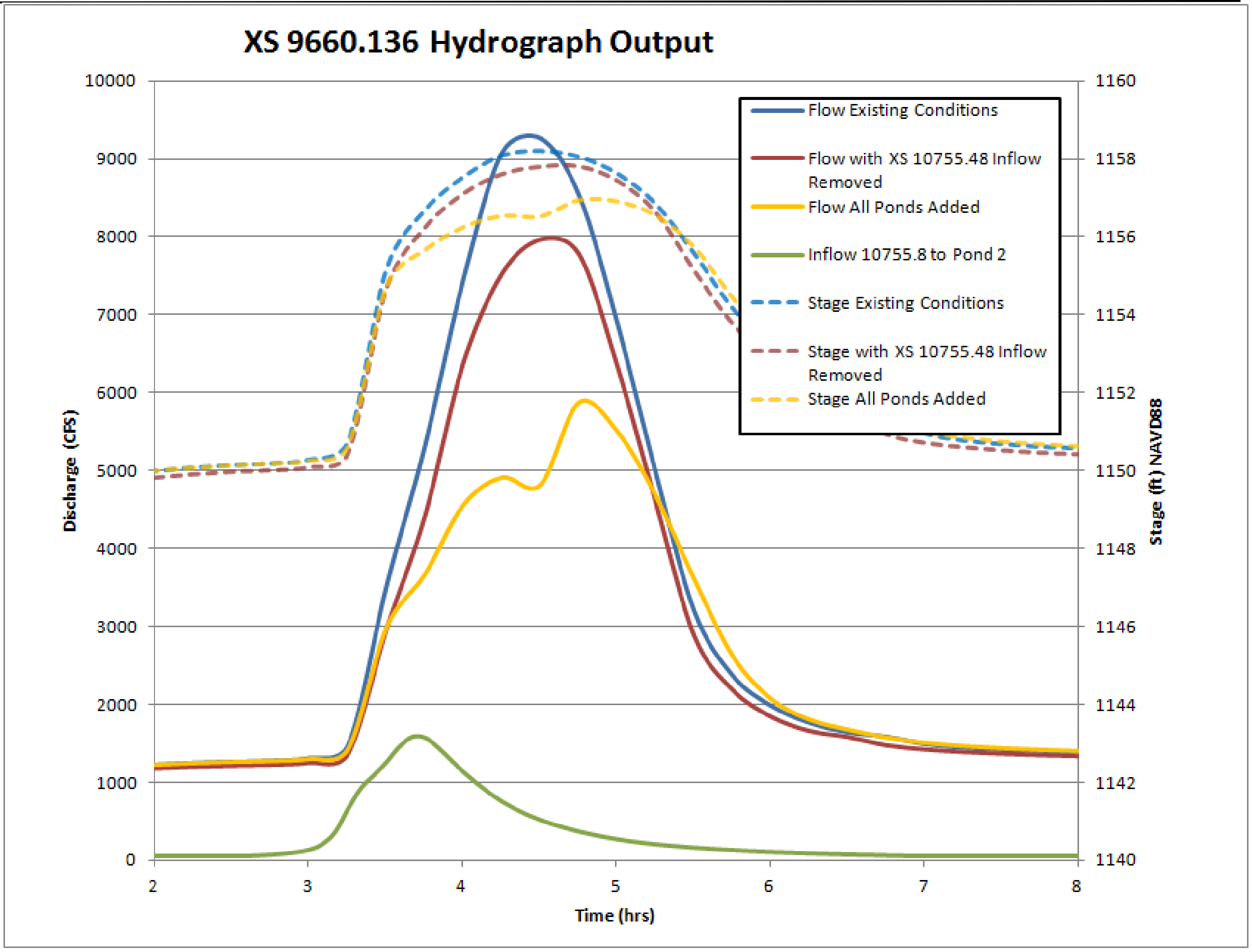


Figure 27. Effect of Storage Areas on Existing Conditions

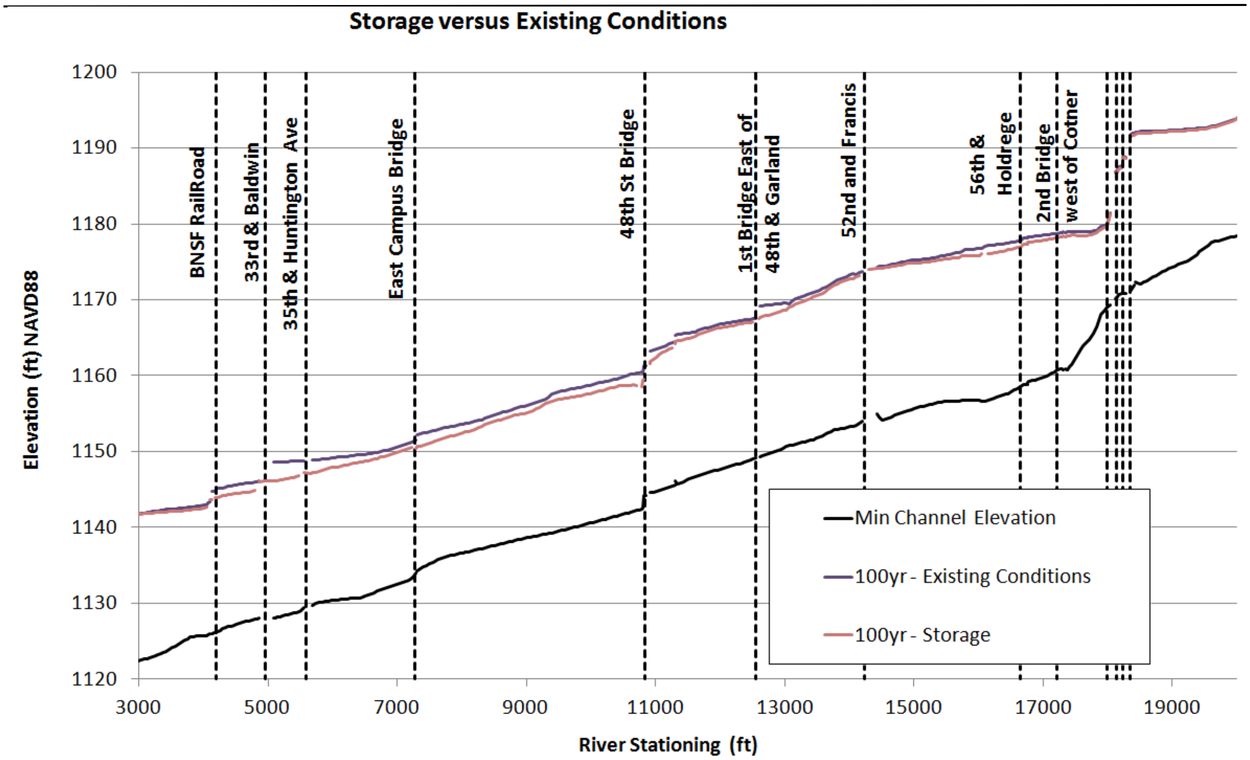


Figure 28. Effects of Storage vs Existing Conditions

Quantities

The UNL and Holdrege storage retention ponds would require approximately 575,000 CY and 165,000 CY of excavation, respectively. In comparison, CDM estimated the Holdrege storage ponds would be approximately 174,000 CY. They did not evaluate any potential storage on UNL campus. Although there is a maximum difference in peak flow of 3,000 cfs directly downstream from the ponds, there is not enough reduction in stage and overland flooding for this alternative to be effective.

2.3.5 Storage with Channel Improvements

Although channel improvements have the most potential impact on reducing the flooding extents, the high stages in the channel are what make storage areas most effective. By widening the channel, the stages in the channel are reduced, rendering the weir less effective because it has less head, while also encroaching on the available volume the storage area would have without channel improvements.

2.3.5.1 Storage with Channel Improvements (Both UNL and Holdrege Ponds)

Even when the storage areas are combined with the channel through Reaches 2 and 3, the area upstream of Holdrege St Bridge is still in the 100yr floodplain. Figure 29 shows that with the addition of storage areas above Holdrege Bridge, the bridge still significantly backs up the water surface and flooding extents upstream. The channel improvements also lessen the effects of the storage areas because the lower stages produced by channel improvements result in less volume being held in storage. The expanded channel also slightly slows velocities, creating higher stages even after flows have been reduced by the storage areas.

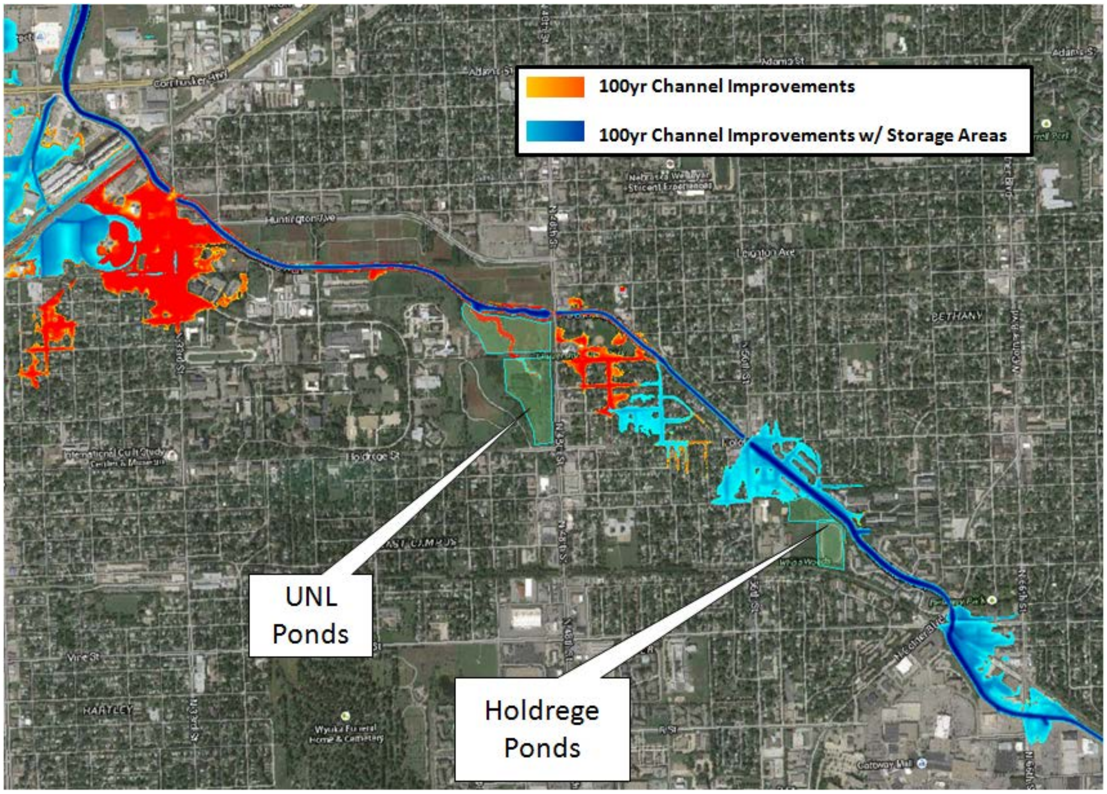


Figure 29. Storage with channel improvements vs channel improvements

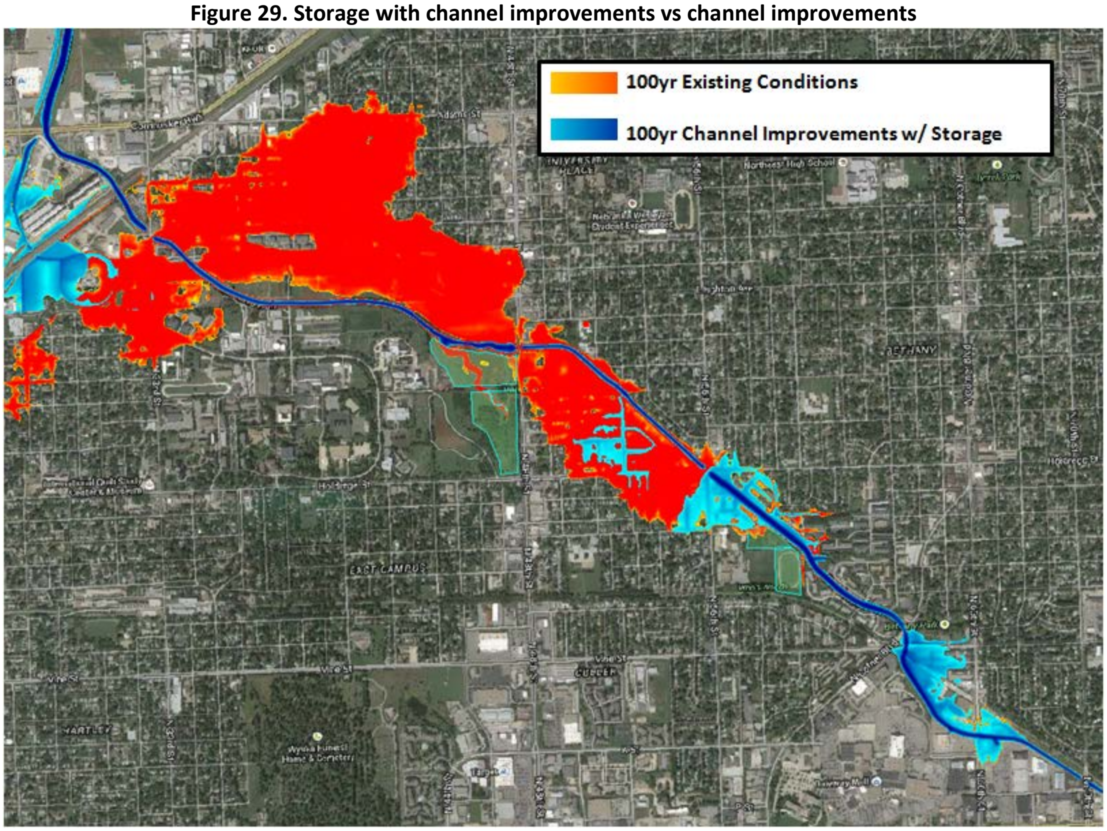


Figure 30. Existing Conditions vs Channel Improvements with Storage

In Figure 30 the existing conditions floodplain is compared to Channel Improvements floodplain with Storage at both the UNL campus and upstream of Holdrege Bridge. Flooding is completely removed from Reach 2, and almost all of Reach 3 except for Holdrege Bridge. The total reduction in flow through Reach 2 is approximately 5ft as can be seen in Figure 31 and Figure 32. Some benefits of Pond 1 at UNL are reduced because of the lower stages produced by channel improvements. Less water is able to weir over into Pond 1 unless the lateral structure connecting the stream is lowered. Lowering the lateral structure from 1155ft NAVD88 to 1150ft NAVD88 reduces the storage capacity of Pond 1 from 121 AC-FT to 73 AC-FT of storage.

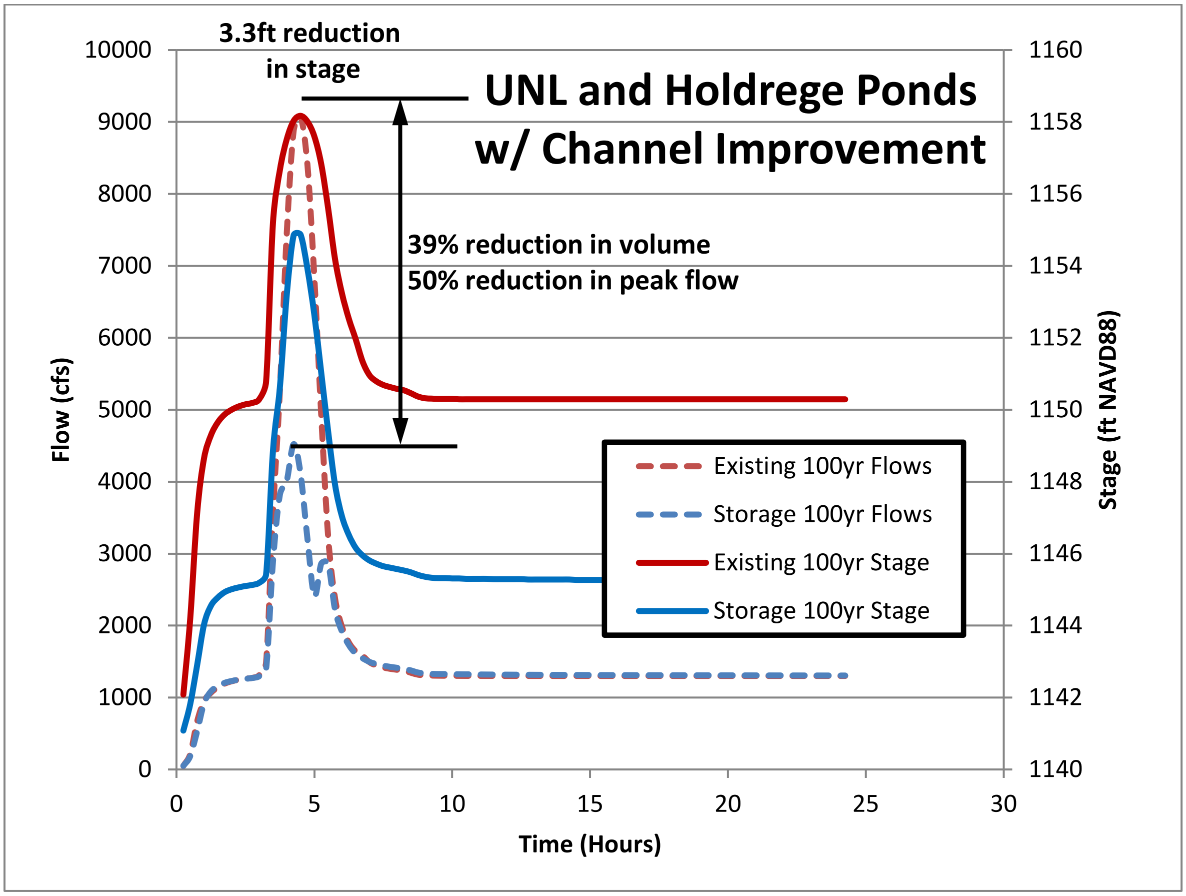


Figure 31. Reduction in Stage and Flow downstream of UNL ponds due to Storage at UNL and Holdrege w/ Channel Improvements

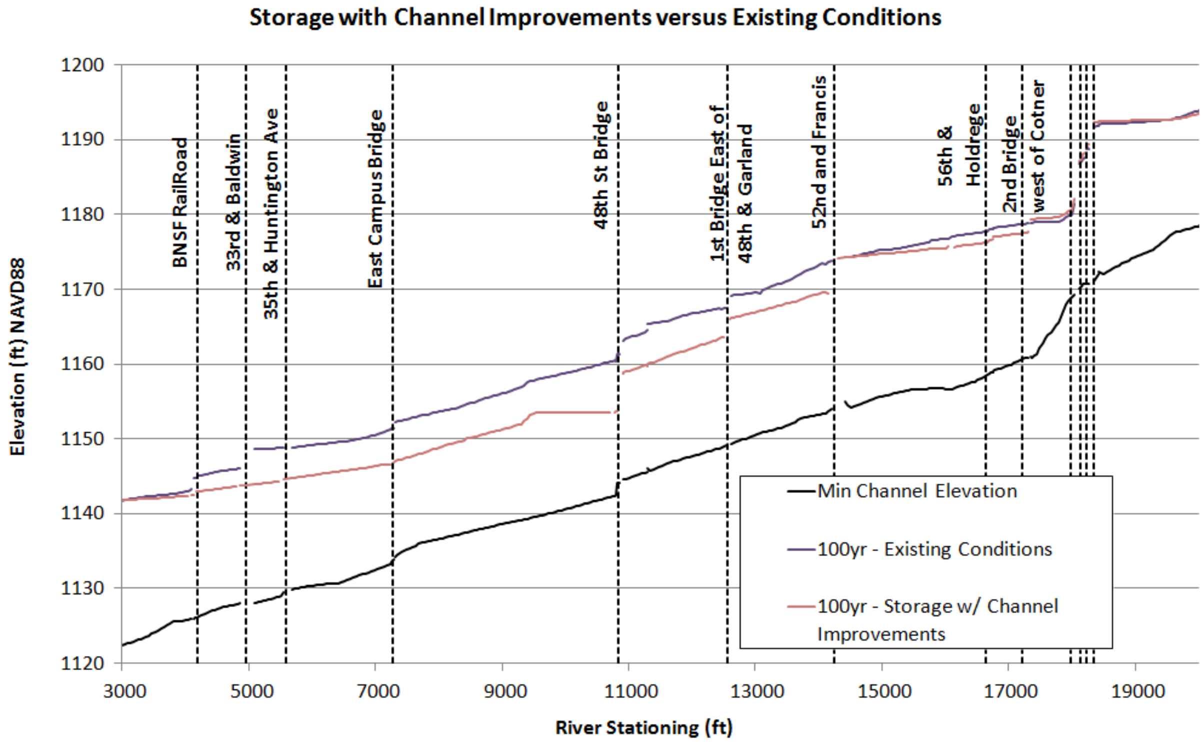


Figure 32. Stage Reduction Due to Storage and Channel Improvement

Quantities
The UNL and Holdrege storage retention ponds would require approximately 575,000 CY (Reach 2) and 165,000 CY (Reach 3) of excavation, respectively.

2.3.5.2 Storage with Channel Improvements (with UNL ponds only)

As can be seen in Figure 34, the UNL ponds can reduce flooding downstream at the 33rd St and 36th St Bridges even without the addition of the Ponds remove approximately 1,000 cfs off the peak discharge. The benefit of the Holdrege ponds can be analyzed by removing them, and evaluating the effect of the UNL ponds only. The Holdrege ponds and may be a viable option. Although the Holdrege ponds do not decrease flooding near Holdrege St or 52nd St and Francis St, stages are reduced between 52nd St and Francis St and 48th St (see Figure 35). Without Holdrege ponds peak flows at the index location 1000ft downstream of the 48th Street Bridge are reduced by 39% and the stage is reduced by 2.27ft (see Figure 33). The storage options appear to be effective at reducing stages, but their cost outweigh their benefits. The 48th St Bridge would likely still require modifications or replacement. It is likely the excavation required to build the storage areas would have a unit cost of $11 per CY. When including the replacement of several bridges, this alternative is too expensive to be further developed in this analysis. However, this analysis has shown that storage may be a viable structural measure to be pursued later by the city.

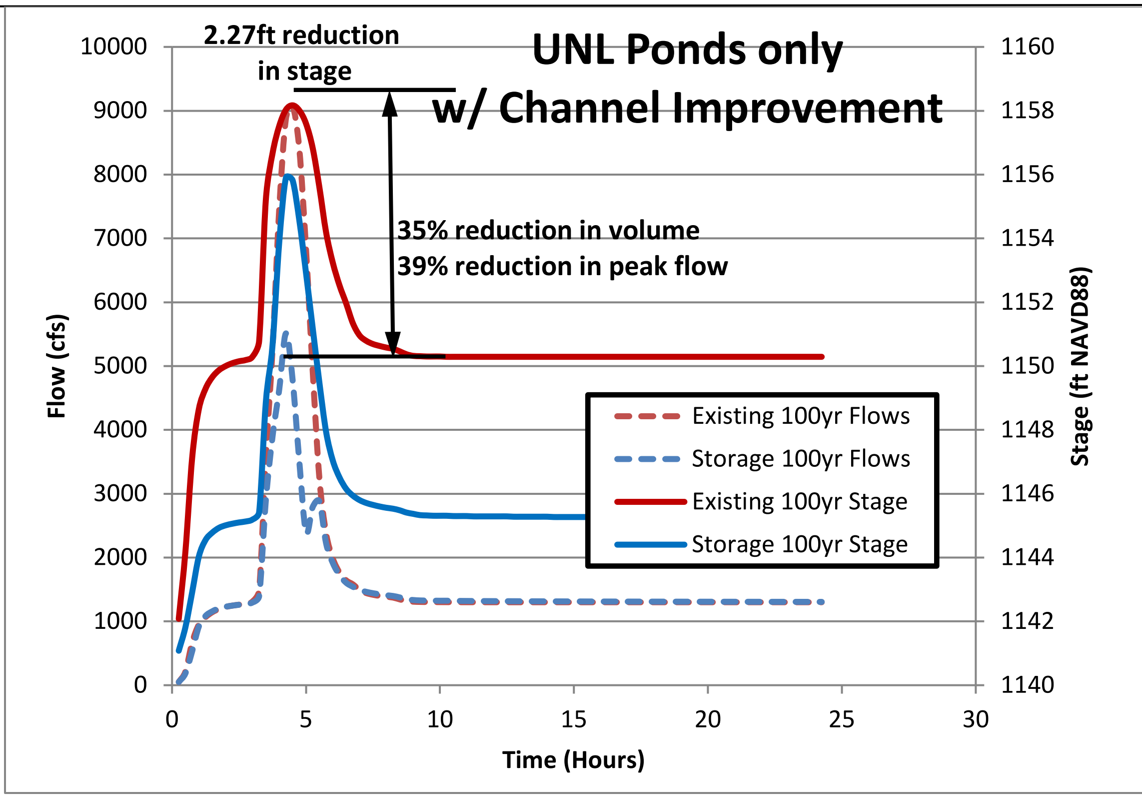


Figure 33. Hydrograph taken 1000ft downstream of 48th St Bridge that shows result of UNL Ponds and Channel Improvements

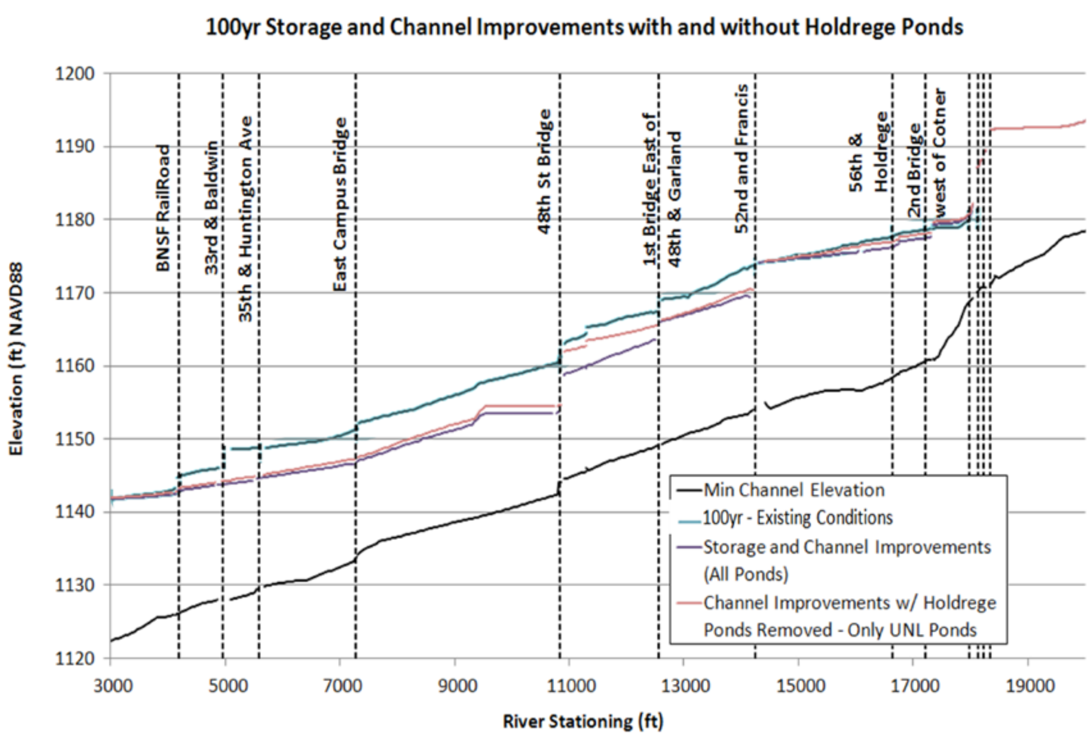


Figure 34. Storage and Channel Improvements with and without Holdrege Ponds

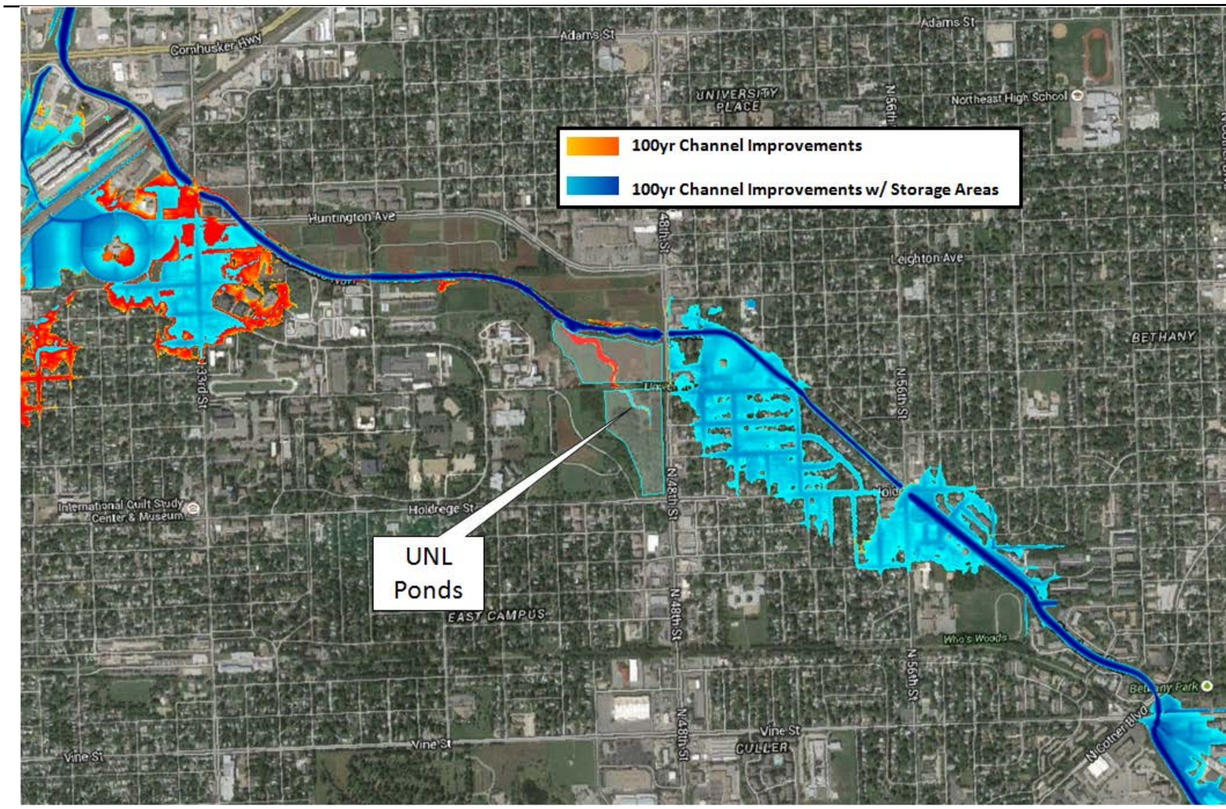


Figure 35. Flooding reduced at 33rd and 36th St bridges downstream of UNL ponds (w/ channel improvements and w/o Holdrege ponds).

Quantities

The UNL and Holdrege storage retention ponds would require approximately 575,000 CY (Reach 2) and 165,000 CY (Reach 3) of excavation, respectively. Because of the amount of excavation required to achieve a benefit, and the incapability of both channel improvements with storage, this alternative was rejected.

3. Uncertainty Analysis

In accordance with current USACE guidelines, (see Reference 6) an uncertainty analysis was completed to better define existing conditions, future without project conditions, and with project flood damages. The Hydrologic Engineering Center's Flood Damage Reduction Analysis (HEC-FDA) version 1.2.4 dated June 2005 was used in the analysis. The HEC-FDA model runs were executed by the USACE economist. However, input from the hydrologic and hydraulic sections of the USACE was used in model setup.

3.1 Hydraulic Uncertainty Analysis

The stage-discharge function for each reach is based on the water surface profiles computed with the HEC-RAS model at the index station. HEC-FDA input requires the description of stage uncertainty of the computed water surface profiles. Uncertainty in computed stage profiles reflects modeling assumptions, numerical errors, and parameter estimation. Uncertainty was estimated for the entire study reach by performing a sensitivity analysis with the HEC-RAS model. Determination of the standard deviation is described in detail in Reference 6 and summarized below in Table 5.

Table 7. Standard Deviation for Uncertainty

Estimating Standard Deviation of Error in Stage			
Method	Parameter	Standard Deviation	Computation
HEC-RAS Sensitivity (max. and min. profiles)	3.0 max. difference, use 100-year elevation for constant	0.75	$S_{model} = E_{mean} / 4$ (EM 1110-2-1619, eq. 5-7)
Minimum Standard Deviation of Error	Poor reliability due to no data for model adjustment/validation. And cross-sections based on Aerial Spot Elevations	1.3	EM 1110-2-1619, Table 5-2

3.2 Natural Uncertainty Analysis

Natural uncertainty for the two reaches was estimated using Figure 5-3 and Equation 5- 5 from Reference 6. Figure 5-3 (Ref. 6) gives an upper bound of standard deviation of uncertainty based solely on the channel slope. Based on a slope of 0.0009 for the Deadmans Run, the upper bound is approximately 1.7 ft.

Equation 5-5 (Ref. 6) was then used to estimate the natural uncertainty:

$$S_{natural} = [0.07208 + 04936 I_{bed} - 2.2626X10^{-7} A_{basin} + 0.02164 H_{range} + 1.41941X10^{-5} Q100]^2$$

Where: $S_{natural}$=standard deviation of uncertainty in meters
I_{bed}=steam bed identifier for the bed material which controls flow
A_{basin}=basin area in square kilometers
H_{range}=the maximum expected or observed stage range in meters
Q_{100}=100-year estimated discharge in m^3/s

The following values were used in the equation for the Deadmans Run:
I_{bed}=4 (Based on Table 5-1 of EM 1110-2-1619 for sand material.)
A_{basin}=9.6 $miles^2 \approx 150{,}000\ km^2$
H_{range}=4 meters
Q_{100}=200-300 m^3/s (7,000-10,000 cfs)

The resulting $S_{natural}$ for the Platte River is 0.13 meters or ≈ 0.5 ft. A value of 0.5 ft will be used in computation of the total uncertainty. The standard deviation of the total uncertainty is determined from:

$$S_t = \sqrt{S^2_{natural} + S^2_{model}}$$ (EM 1110-2-1619, eq. 5-6)

Using the estimated values of 0.5ft for $S_{natural}$ and 1.3ft for S_{model} (overrides 0.75ft determined from sensitivity analysis) with the above equation, the total standard deviation S_t is 1.4ft. Within the FDA model the total standard deviation of 1.4ft at the 100-year event was employed at all locations. Between the channel invert and the 100-year stage, standard deviation values are interpolated while the value of 1.3ft is used for all stages above the 100-year event.

4. Channel Stability

The channel stability analysis was done by converting the unsteady HEC-RAS model into a steady model. Converting the model into a steady flow is a more simplistic approach that lead to quick velocity estimates. To convert to a steady model, the 2D area was removed and a flow file was created based on the Deadmans Run Hydrologic Analysis Report at approximate model locations that corresponded to the report.

The model was modified to generate a maximum velocity condition by using reduced roughness and a critical depth downstream boundary condition. To assess probable velocities, the Manning's n values in the base condition were lowered by 1 standard deviation (as per Figure 5-4 in EM 1110-2-1619). The downstream boundary condition for the reach was set to critical depth to reflect minimum flow in Salt Creek. These conditions should result in conservatively high velocity values for use in evaluating stability measures. A spreadsheet was created that digitized the curve in EM 1110-2-1619 Figure 5-4 so a standard deviation could be determined for every possible Manning's n found in the model. A standard deviation of -1 (see Figure 36) was applied to the Manning's n value throughout the model to obtain higher velocities.

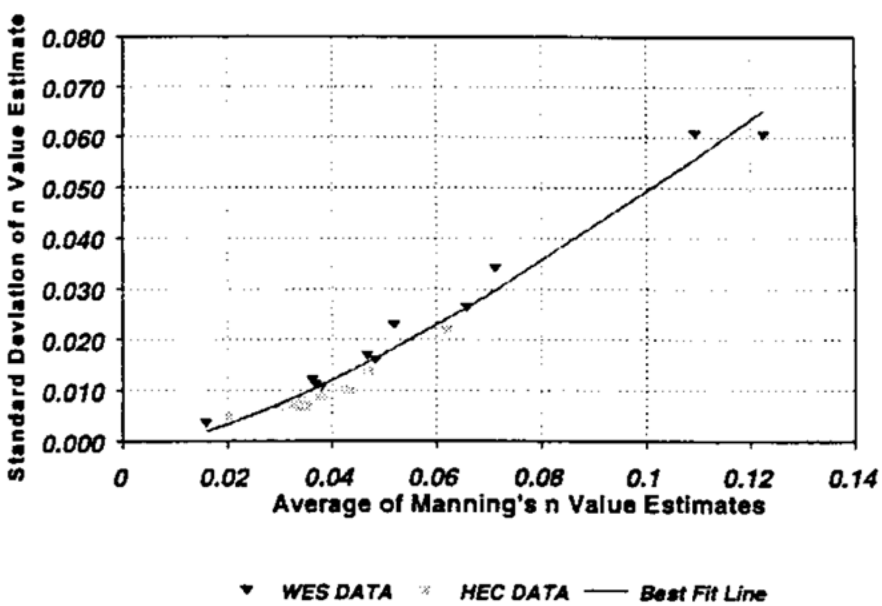


Figure 36. (Figure 5-4 from EM 1110-2-1619) Uncertainty of Manning's n value estimates based on estimated mean values

Contraction/expansion coefficients at bridges were not changed.

A series of profiles from the 2% ACE to the 20% ACE were simulated with the RAS model. The velocity outputs from the RAS model for each given profile were ranked from highest to lowest and then assigned a probability. These were then plotted in a Velocity vs. Probability graph so velocity frequency could be analyzed. The base 'n' values could then be compared to the lowered 'n' values.

Riprap Design:
USACE criteria (CHANLPRO 2.0) was used and checked against the Isbash method. CHANLPRO is a riprap sizing program created by the USACE Costal and Hydraulics Laboratory (CHL) and the Engineering Research and Development Center (ERDC). Both CHANLPRO and the Isbash method were done assuming a specific stone weight of 165lb/ft3. A channel velocity profile for the project reach can be seen in Figure

38. Approximately 80% of the channel has velocities below 8ft/s. And 20% of the channel has flows between 8 and 12ft/s. In addition to the Isbash spreadsheet, the 1994 USACE Eq. 1 in EM 1110-2-1601 was used to confirm the size of the riprap D50 and layer thickness. The equation and its corresponding variables can be seen in Figure 37. The selected values for each variable are discussed below and their resulting D50 and layer thickness can be seen in Table 8:

- The recommended minimum for the factor of safety (Sf) is 1.1, but for a conservative estimate, this was increased to 1.2.
- Correction for velocity profile in bend is 1.283-0.2log(R/W) = 1.14 if R = 865 and W = 160.
- The stability coefficient (Cs) can range between 0.3 for angular rock to 0.375 for round rock. It is expected that angular rock will be used for the riprap, so a 0.3 was used.
- The thickness coefficient (Ct) only applies of D85/D15>5.2. A D85/D15 of 3.2 is expected to be used in design.
- The average depth of flow (d) is 15ft for the 50yr event.
- The average channel velocity does not exceed 8ft/s through the majority of the channel downstream of station 9000. Upstream of station 9000, velocities are as high as 10-12ft/s. Approximately 20% of the channel velocities are between 8-12ft/s. The other 80% of the velocities are below 8ft/s. These two distinct regions (above station 9000 and below station 9000) will have differently sized gradations.
- The sideslope correction factor (K1) was calculated to be 0.99.

Basic Equations

Riprap design equations

From USACE (1994), the equation for stone size is

$$D_{30} = S_f C_S C_v C_T d \left[\left(\frac{\gamma_w}{\gamma_s - \gamma_w} \right)^{1/2} \frac{VL}{\sqrt{K_1 g d}} \right]^{2.5} \quad (1)$$

where

D_{30} = characteristic riprap size of which 30 percent is finer by weight. D_{30}(min) of available riprap gradation must be greater than or equal to D_{30}.

S_f = safety factor, minimum = 1.1

C_s = stability coefficient for incipient failure, thickness = $1D_{100}$(max) or $1.5D_{50}$(max), whichever is greater, valid for gradation uniformity coefficient D_{85}/D_{15} = 1.7 to 5.2. C_s is not an input in CHANLPRO and is fixed at 0.30 for angular rock.
= 0.30 for angular rock
= 0.375 for rounded rock

C_V = velocity distribution coefficient
= 1.0 for straight channels
= 1.0 for inside of bends
= 1.283-.2log(R/W) for outside of bends for R/W < 26
= 1 for R/W > 26 (see Figure 4)
= 1.25 downstream of concrete channels
= 1.25 at end of dikes

R = centerline radius of bend, main channel flow only

W = water surface width at upstream end of bend, main channel flow only

C_T = blanket thickness coefficient (see Figure 4)

d = local depth, use depth at 20 percent upslope from toe for side slopes

γ_s = unit stone weight

γ_w = unit weight of water

VL = local depth-averaged velocity, which is the characteristic velocity used in this procedure. For side-slope riprap, the depth-averaged velocity at 20 percent upslope from the toe V_{ss} is used for VL. To emphasize this point, V_{ss} is only used for side-slope riprap and is always the depth-averaged velocity 20 percent upslope from the toe.

K_1 = side-slope correction factor, see Figure 5.

Figure 37. Isbash Variables used 1994 USACE Eq. 1 in EM 1110-2-1601

Table 8. CHANLPRO Calculations for varying channel velocities.

CHANLPRO OUTPUT (ETL GRADATION)	Variable	Average Channel Velocity (V) ft/s		
		12	**10**	**8**
Factor of Safety	Sf	1.2	1.2	1.2
Stability Coef.	Cs	0.3	0.3	0.3
Vertical Velocity Distribution Coef.	Cv	1.14	1.14	1.14
Thickness Coef.	Ct	1	1	1
Average Depth of flow (ft)	d	15	15	15
Computed Local Depth Avg Velocity (ft/s)	VL	16.31	13.59	10.87
Side slope correction factor	K1	0.99	0.99	0.99
D50 (inches)		32	20	12
Layer Thickness (inches)		48	30	18

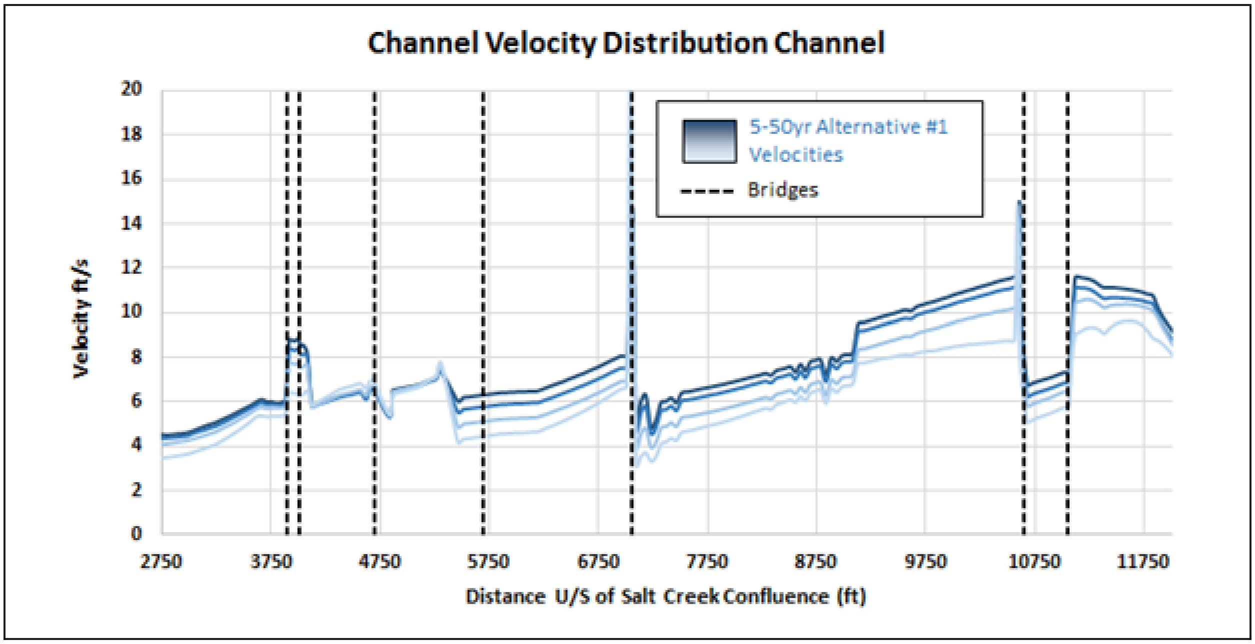


Figure 38. Velocity Distribution for Deadmans Run Channel Improvements

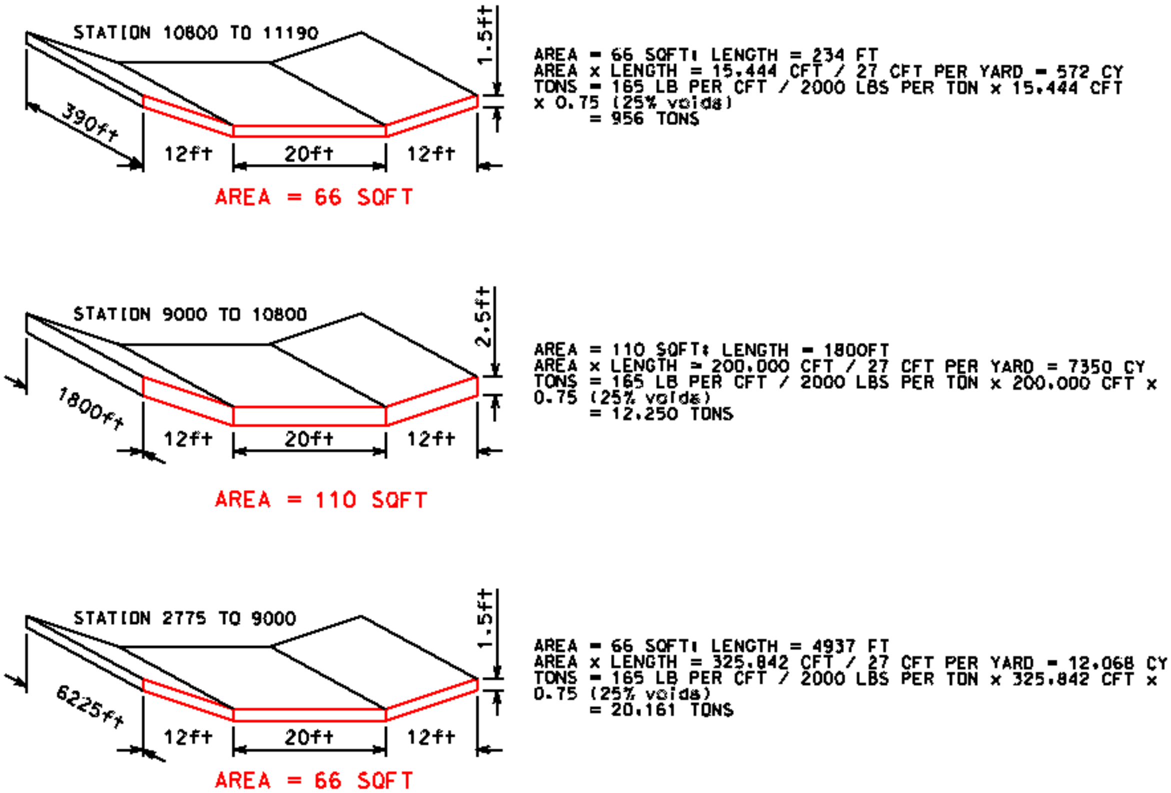


Figure 39. Quantity calculations for Deadmans Run Riprap

Figure 40 summarizes the final quantities determined in the above analysis.

RIPRAP ALTERNATIVE					
234	**390ft Upstream of 48th from station 10800 to 11190**				
Riprap (CY)	Riprap (tons 165 lb/ft3)	Riprap Thickness (inches)	Turf Reinforced Mat (SF)	Native Seed (SF)	Clearing and Grubbing (SF)
572	956	18	24570	5850	17550
1800	**1800ft Downstream of 48th from station 9000 to 10800**				
Riprap (CY)	Riprap (tons 165 lb/ft3)	Riprap Thickness (inches)	Turf Reinforced Mat (SF)	Native Seed (SF)	Clearing and Grubbing (SF)
7333	12251	30	189000	45000	135000
4937	**East Campus Bridge to Cornhusker from station 2775 to 9000**				
Riprap (CY)	Riprap (tons 165 lb/ft3)	Riprap Thickness (inches)	Turf Reinforced Mat (SF)	Native Seed (SF)	Clearing and Grubbing (SF)
16091	20161	18	518385	123425	370275
TOTALS:					
Riprap (CY)	Riprap (tons 165 lb/ft3)	N/A	Turf Reinforced Mat (SF)	Native Seed (SF)	Clearing and Grubbing (SF)
23996	33368		731955	174275	522825
Notes:					
- Assuming 25% voids in riprap					
- Gabions may provide 9600 CY of Riprap					

Figure 40. Final quantities for Riprap and Reinforced Turf Matting

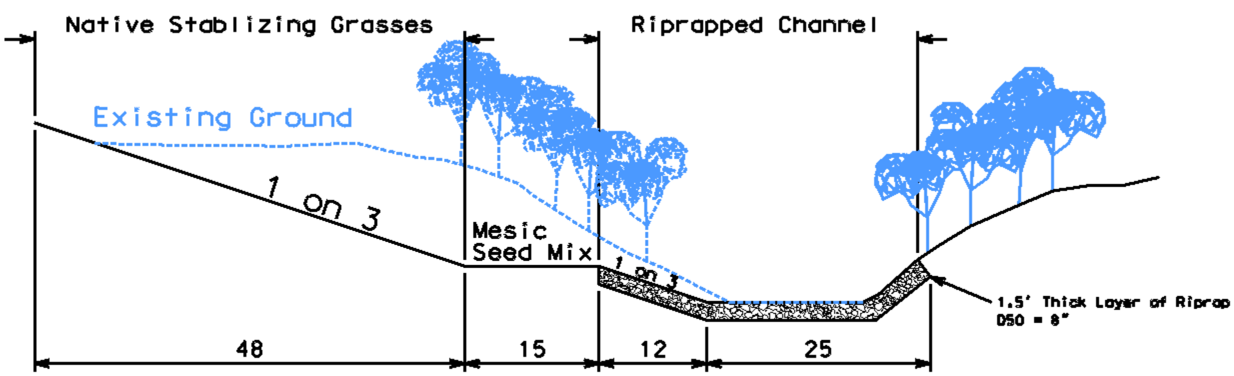
5. Optimization

Alternative #1 was brought forward to be evaluated in the Optimization Phase. The current design of Alternative #1 accommodates the 100-year flood. The objective of Optimization is to find the optimal channel size that balances cost and prevented damages. In order to do this, a cost vs damages curve can be created by developing at least 3 points. This is done by first sizing the channel for three different flood frequencies. Because the existing channel begins to cause damages around the 25 year flood, the 50yr was chosen as the higher frequency. The 100yr was chosen as a point because it is already developed. And the 120yr flood was calculated as the lower frequency because it wasn't possible to accommodate a low frequency flood without removing the railroad bridge. The 120yr was back calculated by first expanding the channel where possible while also not creating higher stages downstream, and not having to expand bridges.

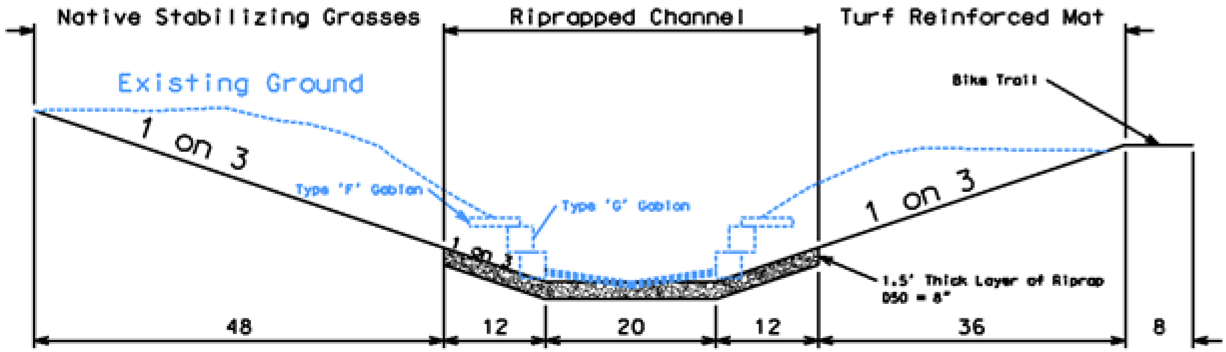
5.1 50 Year (2% ACE) Optimization Plan

The 50yr optimization was chosen because the channel begins to overflow and cause damages in the high damage area during anything greater than a 25yr event. The only changes that deviate from Alternative #1 are as follows:

- The channel between 38th and 48th St had the Native Seed bench shortened from 25ft to 15ft wide (XS 7270.68 to 10837.90).
- The channel between 38th St and Cornhusker had the 25ft Native Seed bench completely removed (XS 2709 to 7270.68).
- The height of the berm that allows water to weir into the storage area was reduced from elevation 1145ft NAVD88 to 1143ft NAVD88.

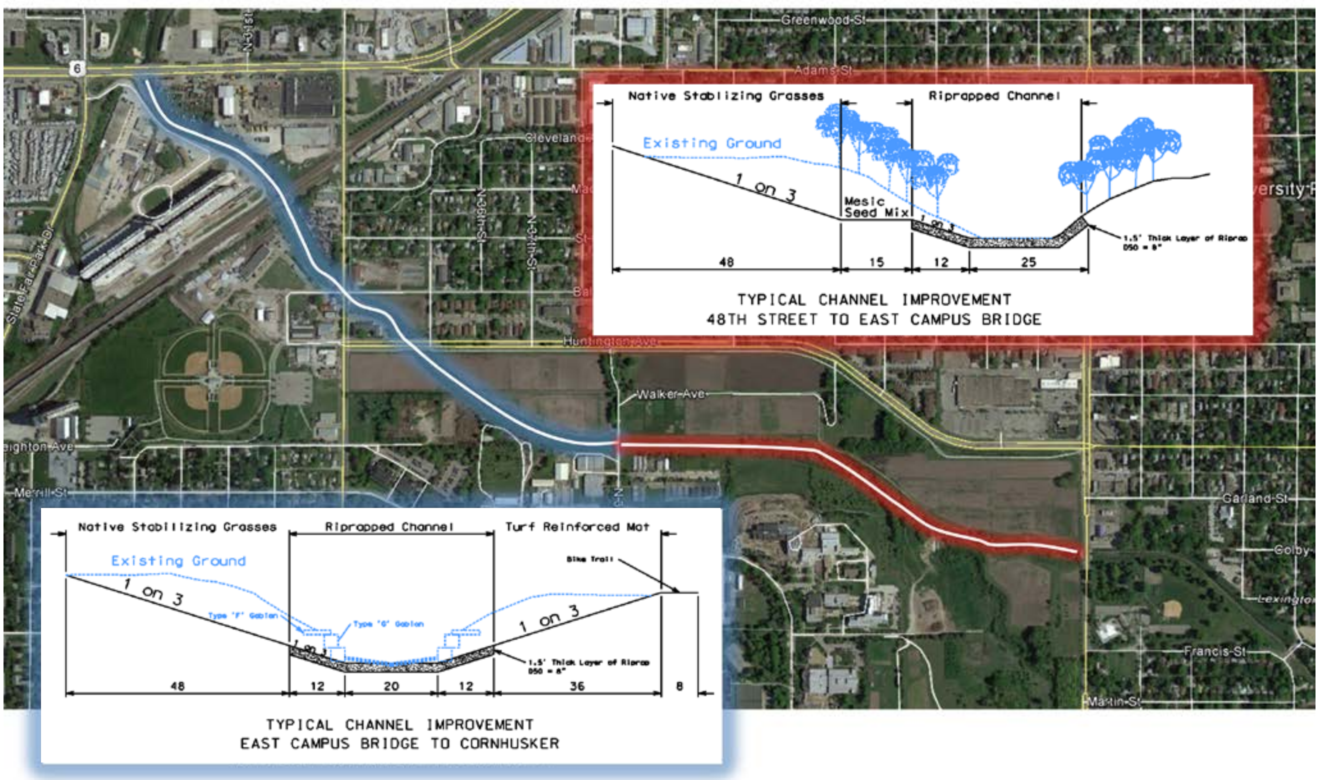


TYPICAL CHANNEL IMPROVEMENT
48TH STREET TO EAST CAMPUS BRIDGE



TYPICAL CHANNEL IMPROVEMENT
EAST CAMPUS BRIDGE TO CORNHUSKER

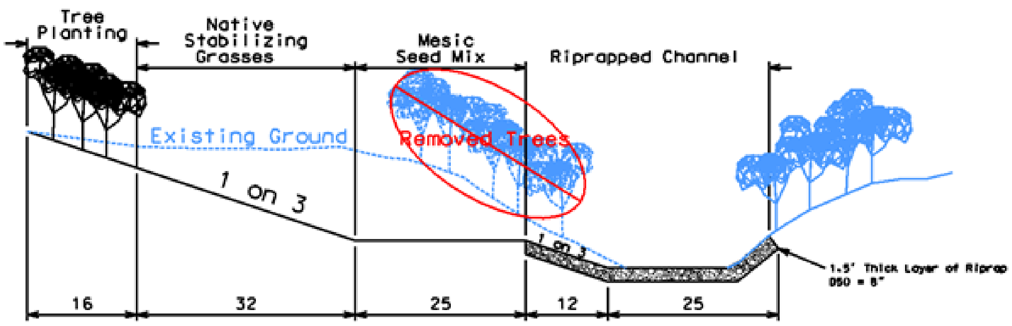
50 year Optimization



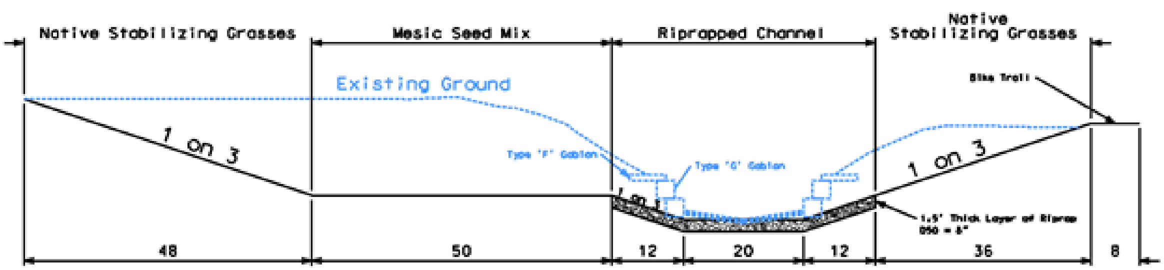
5.2 120 Year (0.83% ACE) Optimization Plan

The 120yr was back calculated after making the below changes to the hydraulic model:

- The channel between 38th St and Cornhusker had the 25ft Native Seed bench expanded to a 50ft wide bench (XS 2709 to 7270.68).
- The low chord of the 48th St Bridge may need to be raised 0.5ft in order to accommodate the slightly higher flow rates.

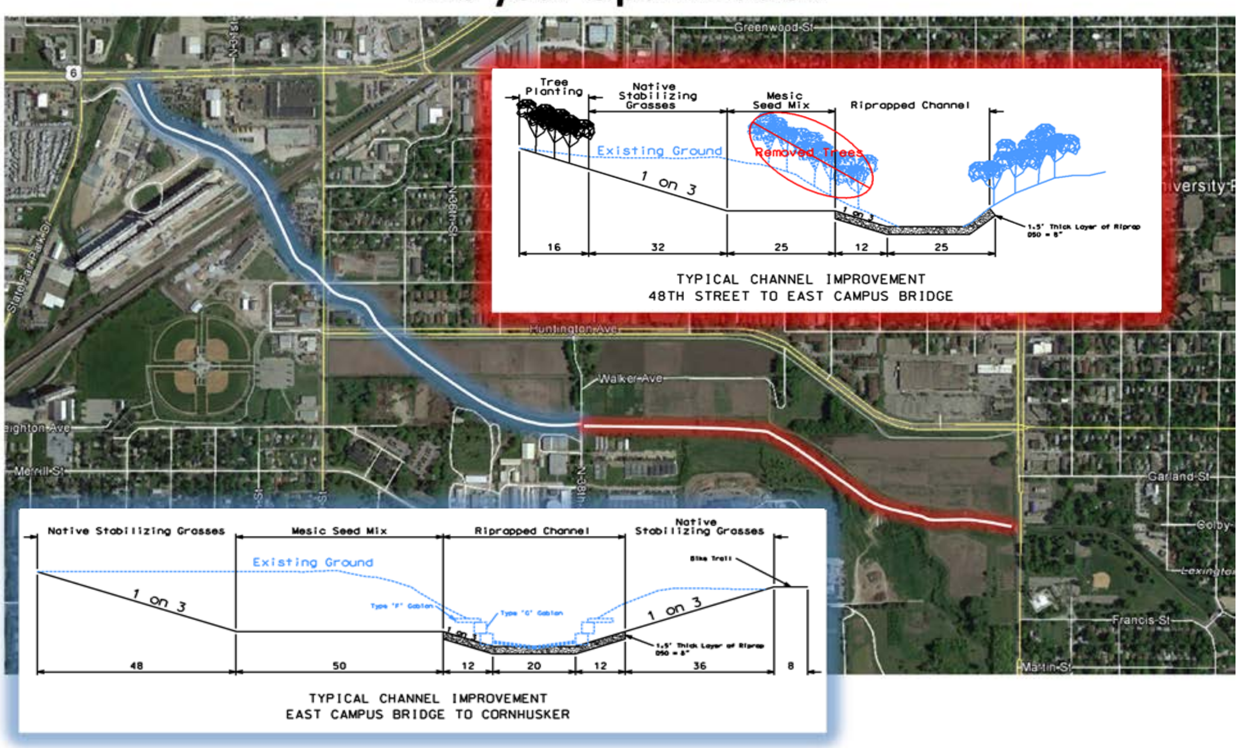


TYPICAL CHANNEL IMPROVEMENT
48TH STREET TO EAST CAMPUS BRIDGE



TYPICAL CHANNEL IMPROVEMENT
EAST CAMPUS BRIDGE TO CORNHUSKER

120 year Optimization



6. Conclusion

After modeling the effects of bridge modifications, storage, channel improvements and levees, it is evident that a combination of these will be needed in order to remove an appreciable amount of damages from either of Reaches 2 and 3.

Reach 2 has several options (storage, channel improvements, and bridge modifications). It is possible to divide Reach 2 into the left and right bank. A channel improvement project alone would remove the right bank from the 100yr floodplain. The right bank of Reach 2 is the highest damage area within the watershed's current effective 100yr floodplain (including over 500 residential structures).

Reach 3 has limited options. A channel improvement option with the replacements of Holdrege St Bridge and a wider abutment at the pedestrian bridge would resolve the 100yr floodplain along Reach 3. Reach 3 has tighter real estate constraints than Reach 2 (see Figure 2), leaving less room for channel improvement. With less room, a more expensive terraced retaining wall channel section would be required. As seen in Section 2.3.5.1, storage potential in Reach 3 is possible, but the benefits do not arise until after the 52nd St Bridge. The Holdrege ponds do provide reduction in stage during the 100yr event, however, to completely remove Reach 3 from the floodplain either Holdrege St Bridge would need to be replaced, or non-structural measures would need to be taken upstream of the bridge.

The two preferred alternatives evident from this hydraulic analysis both include structural measures in Reach 1, 2, and 3; which mostly benefits the damage areas on the right bank of Reach 2. These structural measures consist of channel improvements, bridge modifications (being addressed by City of Lincoln), and either a flume under the railroad, or a levee upstream of the railroad. The tentatively selected plan (Alternative #1), brought forward the railroad flume instead of a levee. The flood reduction benefits mainly impact Reach 2 for these reasons:

- There is more real estate potential for channel improvement and storage in Reach 2 than in Reaches 1, 3, or 4. The real estate majority of real estate purchased would need to be from UNL campus, instead of multiple land owners.
- Channel improvements would remove nearly half of the woody vegetation within the channel that currently is input in the HEC-RAS model. The woody vegetation and trees create higher water surface elevations around the 48th St Bridge.
- Implementing a channel improvement project alone may remove the right bank high damage area. Modifying several bridges will further assure that the 100yr floodplain will not affect the right bank.

REFERENCES

1. *CDM, Deadmans Run Water Shed Master Plan, City of Lincoln, NE Study Report, December 2007*

2. *URS, Deadmans Run Hydrologic Analysis Report, Contract W9128F-14-D-003, USACE, April 2015*

3. *National Flood Insurance Program (NFIP) Regulations, Title 44 Emergency Management and Assistance, 44 CFS Part 65*

4. *EM-1110-2-1601, Hydraulic Design of Food Control Channels, USACE, 1 July 1991/30 June 1994*

5. *MPC-53 Channel Control Structure Big Papillion Channel Improvements, USACE Omaha, Nebraska, March 1991*

6. *U.S. Army Corps of Engineers. EM 1110-2-1619 "Risk-based Analysis for Flood Damage Reduction Studies." 1 August 1996.*

7. *Stability Thresholds for Stream Restoration Materials, Craig Fischenich, May 2011*

8. *Engineer and Design Risk-Based Analysis for Flood Damage Reduction Studies, EM 1110-2-1619, August 1996*

APPENDIX A

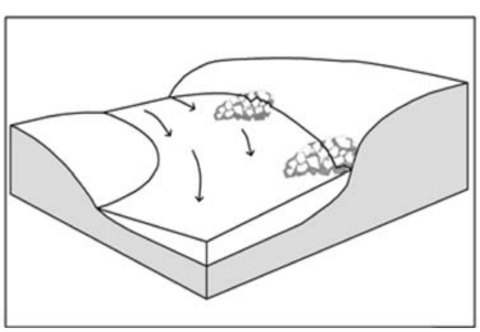
DESCRIPTIVE LIST OF CHANNEL- AND BANK-PROTECTION TECHNIQUES

The following techniques are described below:

- River training
  - Spur dikes
  - Vanes
  - Bendway weirs
  - Large woody debris structures
  - Stone weirs
  - Longitudinal stone toe
  - Longitudinal stone toe with spurs
  - Coconut fiber rolls
  - Vegetated gabion basket
  - Live cribwalls
  - Vegetated mechanically stabilized earth
  - Live siltation
  - Live brushlayering
  - Vegetated floodways
  - Meander restoration
- Bank armor and protection
  - Vegetation alone
  - Live staking
  - Willow posts and poles
  - Live fascines
  - Turf reinforcement mats
  - Erosion control blankets
  - Geocellular containment systems
  - Rootwad revetments
  - Live brush mattress
  - Vegetated articulated concrete blocks
  - Vegetated riprap
  - Soil and grass covered riprap
  - Vegetated gabion mattress
  - Cobble or gravel armors
  - Trench fill revetment
- Riparian buffer and stream opportunities
  - Live gully repair
  - Vanes with J-hooks
  - Cross vanes
  - Boulder clusters
  - Newbury rock riffles
- Slope stabilization
  - Diversion dike
  - Slope drain
  - Live pole drain
  - Chimney drain
  - Trench drain
  - Drop inlet
  - Fascines with subsurface drains
  - Slope flattening
  - Stone-fill trenches

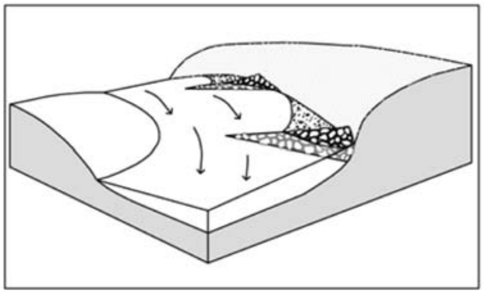
RIVER TRAINING

SPUR DIKES



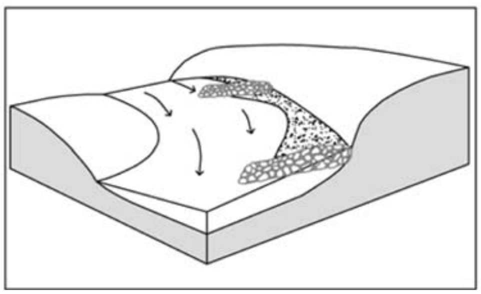
Spur dikes, deflectors, or groins are transverse structures that extend into the stream from the bank and reduce erosion by deflecting flows away from the bank. Transverse river training structures often provide pool habitat and physical diversity. Two to five structures are typically placed in series along straight or convex bank lines where flow lines are roughly parallel to the bank. Spurs, groins, and deflectors have no specific design criteria regarding crest height, crest slope, or upstream angle and therefore differ from vanes and bendway weirs. Earthen core spur dikes are groins constructed with a soil core armored by a layer of stone. Deflectors can also be constructed from natural materials, such as Large Woody Debris (LWD), or LWD embedded with rock, and designed to provide biologic benefits and habitat restoration. Stone spurs capped with a prism of earth reinforced with live fascines are referred to as “live booms.”

VANES



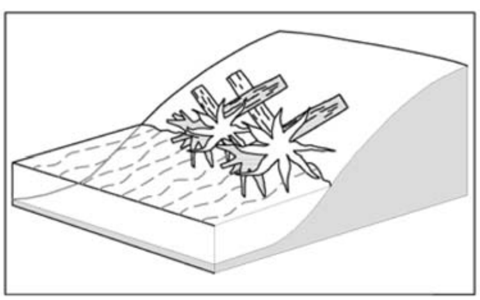
Rock vanes are discontinuous, redirective structures angled upstream 20 to 30 degrees. Generally, two or three vanes are constructed along the outer bank of a bend in order to redirect flows near the bank to the center of the channel. Typically, vanes project 1/3 of the stream width. The riverward tips are at channel grade, and the crests slope upward to reach bankfull stage elevation at the key. Rock vanes can preclude the need for rock armor and increase vegetative techniques as the high flows are redirected away from the bank. Vanes can increase cover, backwater area, edge or shoreline length, and the diversity of depth, velocity, and substrate. Variations include cross vanes and rock vanes with J-hooks.

BENDWAY WEIRS



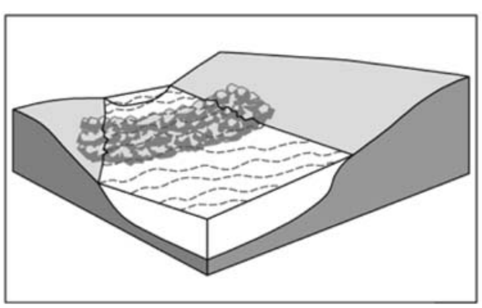
Bendway weirs are discontinuous, redirective structures usually constructed of rock, designed to capture and then safely direct the flow through a meander bend. A minimum of five structures are typically placed in series (the series are known as "weir fields") along straight or convex bank lines. Bendway weirs differ from spurs and vanes in that they form a control system that captures and directs the streamflow through the weir field, usually all the way through the bend (hence the name bendway weirs). Bendway weirs are generally longer (1/3 to 1/2 stream width) and lower than barbs or spurs, flat crested, and designed to be continuously submerged or at least overtopped by the design flows. Transverse river training structures often provide pool habitat and physical diversity.

LARGE WOODY DEBRIS STRUCTURES



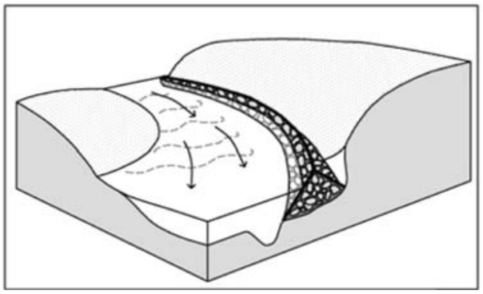
Large woody debris (LWD) structures (also known as engineered log jams) made from felled trees may be used to deflect erosive flows and promote sediment deposition at the base of eroding banks. Root wads, consisting of a short section of trunk and attached root bole, can also be used or incorporated into the structures. Using the classical spur design criteria and methods, the placement of LWD structures can be designed to achieve optimum benefit for both aquatic habitat and bank protection.

STONE WEIRS



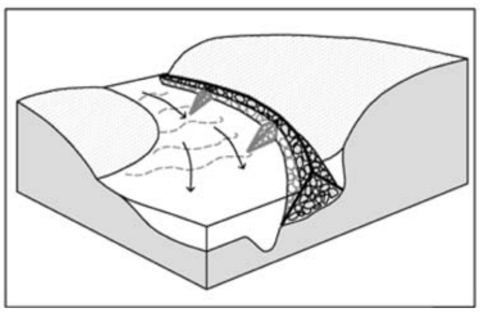
Stone weirs are structures that span the stream and produce a drop in the water surface elevation. These structures are frequently made of angular quarried stone, but logs, sheet piling, concrete, boulders and masonry are also quite common. Well-constructed stone weirs can prevent or retard channel bed erosion and upstream progression of knickpoints and headcuts, as well as provide pool habitats for aquatic biota. Stone weirs or similar grade control structures are often intended to raise or elevate the bottom of incised channels, with the ultimate goal of elevating a dropping water table. Variations on stone weirs that have additional habitat benefits are newbury rock riffles and cross vanes.

LONGITUDINAL STONE TOE



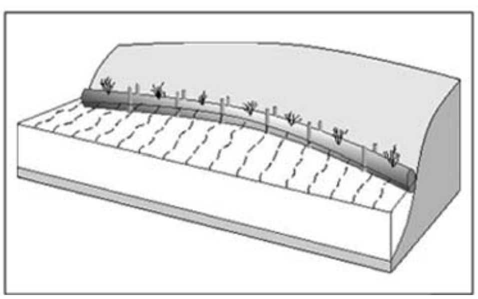
A longitudinal stone toe (also known as longitudinal peaked stone toe protection [LPSTP]) is continuous bank protection consisting of a stone dike placed longitudinally at, or slightly streamward of, the toe of an eroding bank. The cross section of the stone toe is usually triangular in shape. The success of this method depends upon the ability of stone to self-adjust or "launch" into scour holes formed on the stream side of the revetment. The stone toe does not need to follow the bank toe exactly, but should be designed and placed to form an improved or "smoothed" alignment through the stream bend. Longitudinal stone toes usually require much less bank disturbance and the bank landward of the toe may be revegetated by planting or natural succession. Brushlayering and willow post and poles are excellent candidates for use with this technique.

LONGITUDINAL STONE TOE WITH SPURS



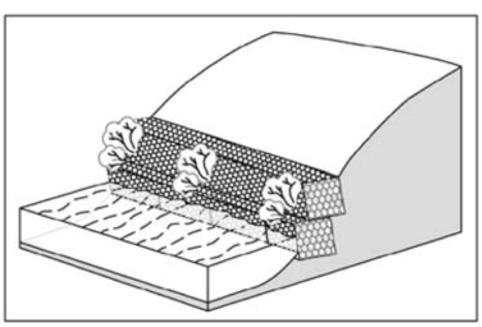
A longitudinal stone toe (also known as longitudinal peaked stone toe protection) has proven cost-effective in protecting lower banks and creating conditions leading to stabilization and revegetation of steep, caving banks. A large body of evidence indicates, however, that intermittent structures such as spurs tend to provide aquatic habitats superior to those adjacent to continuous structures like a stone toe. This technique represents an effort to achieve erosion control benefits available from a continuous stone toe and habitat benefits associated with spurs.

COCONUT FIBER ROLLS



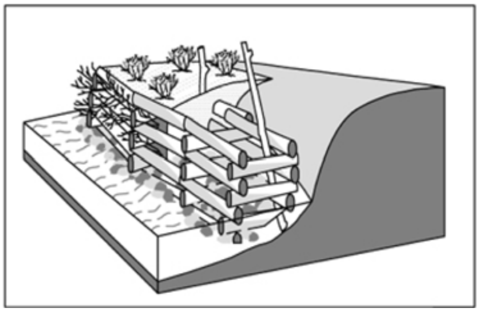
Coconut fiber rolls are manufactured, elongated cylindrical structures that are placed at the bottom of streambanks to help prevent scour and erosion. The coconut husk fibers (coir) are bound together with geotextile netting with 35 cm or 40 cm (12 in. or 18 in.) diameters and lengths of 6 m (20 ft). Coir is fairly long-lasting, typically 5 to 7 years, but must be designed with riparian revegetation to attain permanent solutions. Proper anchoring is critical and generally coir rolls are not recommended for areas with high velocities and shear. Brushlayering and live stakes are good candidates for combining with coconut fiber rolls.

VEGETATED GABION BASKET



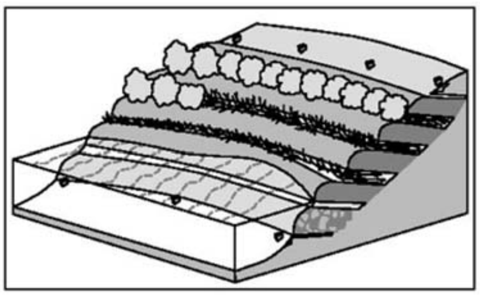
Gabions are rectangular baskets made of twisted or welded-wire mesh that are filled with rock. These flexible and pervious structures can be used individually or stacked like building blocks to reinforce steep banks. Used alone, rock-filled gabions provide insufficient habitat benefit. However, woody vegetation, such as brushlayering or post and poles, can be incorporated by inserting the cuttings all the way through the basket during filling and penetrating the native subsoil. The woody vegetation can provide additional reinforcement and longevity to the structure while helping to mitigate loss of habitat.

LIVE CRIBWALLS



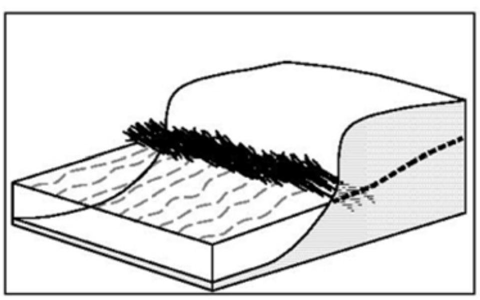
A cribwall is a gravity retaining structure consisting of a hollow, box-like interlocking arrangement of structural beams (for example, logs). The interior of the cribwall is filled with rock or soil. In conventional cribwalls, the structural members are fabricated from concrete, wood logs, and dimensioned timbers (usually treated wood). In live cribwalls, the structural members are usually untreated log or timber members. The structure is filled with a suitable backfill material, and live branch cuttings are inserted through openings between logs at the front of the structure and imbedded in the crib fill. These cuttings eventually root inside the fill and the growing roots gradually permeate and reinforce the fill within the structure.

VEGETATED MECHANICALLY STABILIZED EARTH



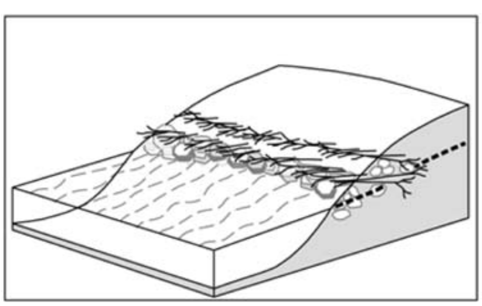
This technique consists of live cut branches (live brushlayering) interspersed between lifts of soil wrapped in natural fabric, for example, coir, synthetic geotextiles (turf reinforcement mats [TRMs] or erosion control blankets [ECBs]), or geogrids. The fabric, branches and optional geogrids provide the primary geotechnical reinforcement, similar to that of conventional mechanically stabilized earth, allowing relatively steep, stable slopes. The fabric wrap over the face of the soil lift prevents erosion until vegetation takes over. The live, cut branches eventually root and leaf out, providing vegetative cover and secondary reinforcement as well. This technique is recommended for use above the annual high water stage.

LIVE SILTATION



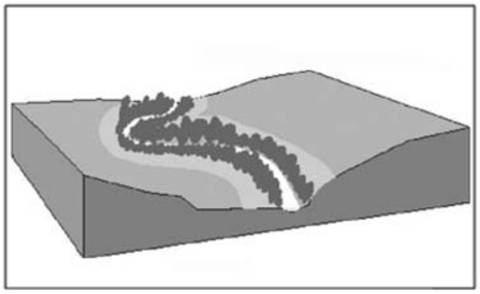
Live siltation is a bioengineering technique involving the installation of a living or a nonliving brushy system at the water's edge. Willow cuttings are the most common materials used. Live siltation construction is intended to increase roughness at the stream edge thereby encouraging deposition and reducing bank erosion. The embedded branches and roots also reinforce the bank and reduce geotechnical failure, while the branches and leaves provide cover, aquatic food sources, and organic matter.

LIVE BRUSHLAYERING



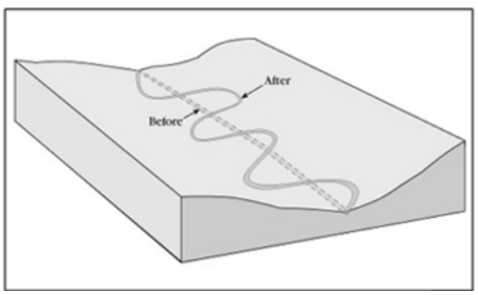
Live brushlayers are rows of live woody cuttings that are layered, alternating with successive lifts of soil fill, to construct a reinforced slope or embankment. Vertical spacing depends on slope gradient and soil conditions. Live brushlayering provides enhanced geotechnical stability, improved soil drainage, and superior erosion control. It is one of the most effective ways to establish vegetation from live cuttings. Live brushlayering is an excellent candidate for combining with other streambank stabilization measures.

VEGETATED FLOODWAYS



Confining floodwaters to a broad floodway bordered by levees or topographic highs is attractive because the portion of the floodway not normally inundated can support vegetation and thus provide wildlife habitat or recreational opportunities. Floodways may be created by constructing levees or floodwalls or by excavation. Excavation consists of creating terraces or benches along an existing channel or a completely new flood channel (bypass). Roadway embankments sometimes serve a dual purpose by defining a floodway.

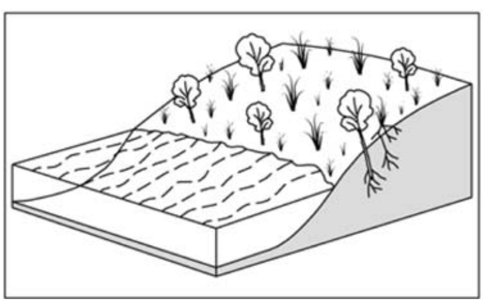
MEANDER RESTORATION



Meanders are broad, looping (sinuous) bends in a stream channel. Meandering is a form of slope adjustment with more sinuous channel paths leading to decreased reach gradient. Fluvial and ecological functions are integrally related to the highly diverse spatial and temporal patterns of depth, velocity, bed material and cover found in meanders. Generally speaking, streams with natural meander bends do not require grade control measures. Meander restoration consists of reconstructing meandering channels that have been straightened or altered by humans.

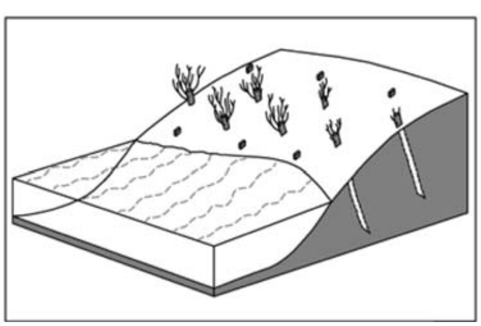
BANK ARMOR AND PROTECTION

VEGETATION ALONE



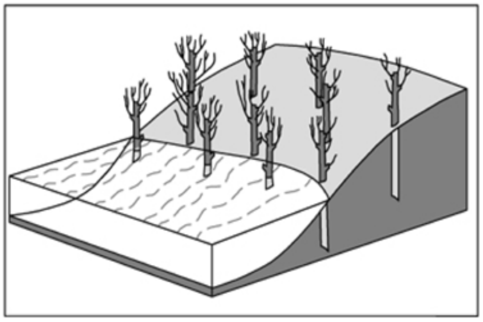
Vegetation can be viewed as a living, organic groundcover consisting of grasses, legumes, forbs, or woody plants. Vegetation is established on bare soils in order to help prevent surficial erosion, minimize shallow seated mass movement, provide habitat, and enhance aesthetics or visual appearance. Vegetation can be used alone under special circumstances, but it also lends itself well to conjunctive use with other erosion control techniques in a mutually beneficial manner. Living plants can be used in conjunction with nearly every type of groundcover.

LIVE STAKING



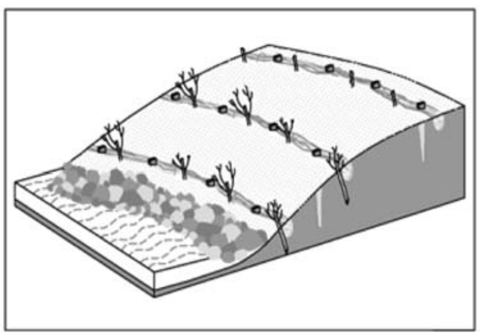
Live stakes are very useful as a revegetation technique, a soil reinforcement technique, and as a way to anchor erosion control materials. They are usually cut from the stem or branches of willow species, and the stakes are typically 0.5 to 1.0 m (1.5 to 3.3 ft) long. The portion of the stem in the soil will grow roots and the exposed portion will develop into a bushy riparian plant. This technique is referred to as Joint Planting when the stakes are inserted into or through riprap. Live staking is an excellent candidate for combination with other techniques.

WILLOW POSTS AND POLES



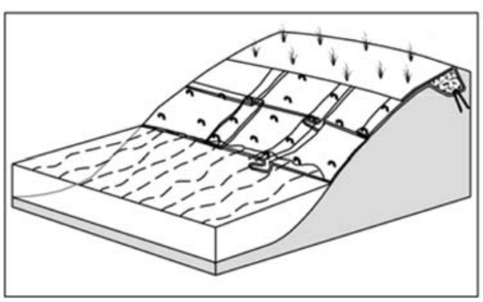
Post and pole plantings are intended to provide mechanical bank protection. Willow and cottonwood species are recommended for their ability to root and grow, particularly if they are planted deep into the streambanks. Larger and longer than live stakes, posts and poles can provide better mechanical bank protection during the period of plant establishment. Dense arrays of posts or poles can reduce velocities near the bank or bed surface, and long posts or poles reinforce banks against shallow mass failures or bank slumps. Posts and poles are also excellent candidates for combination with other structural methods, for example, LWD structures, vegetated gabion baskets, live cribwall, and cross vanes.

LIVE FASCINES



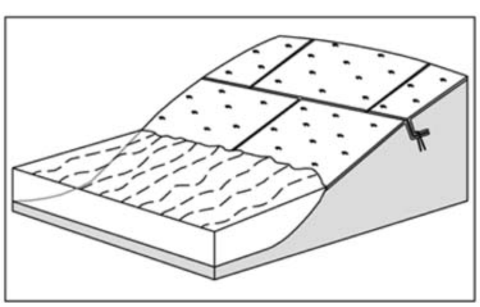
Live fascines are bundles of live (and nonliving) branch cuttings placed in long rows in shallow trenches across the slope on contour or at an angle. Fascines are intended to grow vegetatively while the terraces formed will trap sediment and detritus, promoting vegetative establishment. Fascines can be utilized as a resistive measure at the stream edge and for erosion control on long bank slopes above annual high water. Fascines are also an effective way to anchor ECBs and TRMs.

TURF REINFORCEMENT MATS



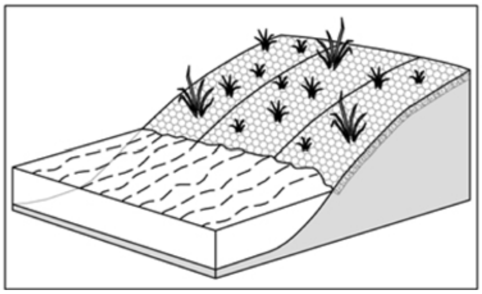
Turf reinforcement mats (TRMs) are similar to erosion control blankets, but they are more permanent, designed to resist shear and tractive forces; they are usually specified for banks subjected to flowing water. The mats are composed of ultraviolet (UV) stabilized polymeric fibers, filaments, or nettings, integrated together to form a three-dimensional matrix 5 to 20 mm (0.2 to 0.79 in.) thick. TRMs are a biotechnical practice intended to work with vegetation (roots and shoots) in mutually reinforcing manner. As such, vegetated TRMs can resist higher tractive forces than either vegetation or TRMs can alone.

EROSION CONTROL BLANKETS



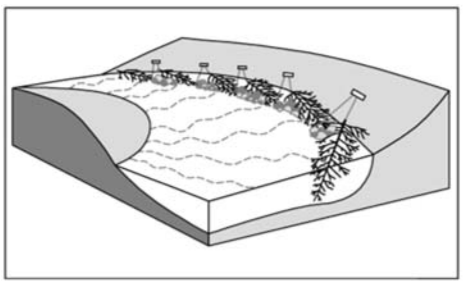
Erosion control blankets (ECBs) are a temporary rolled erosion control product consisting of flexible nets or mats that can be brought to a site, rolled out, and fastened down on a slope. ECBs are typically manufactured of fibers such as straw, wood, excelsior, coconut, or a combination of these, and then stitched to or between geosynthetic or woven natural fiber netting. Various grades of biodegradable fibers and netting can be specified depending on required durability and environmental sensitivity.

GEOCELLULAR CONTAINMENT SYSTEMS



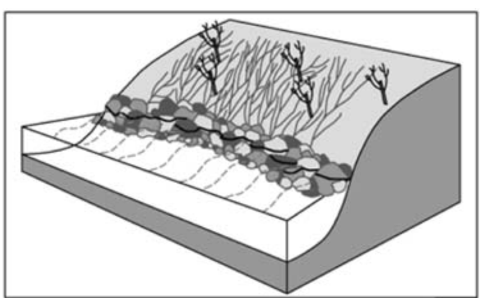
Geocellular containment systems (GCS) are flexible, three-dimensional, high density polyethylene (HDPE), honeycomb-shaped, earth-retaining structures that can be expanded and backfilled with a variety of materials to mechanically stabilize surfaces. They can be used flat, as channel or slope lining, or stacked to form a retaining wall. GCS provide very little habitat enhancements alone, therefore these systems must be combined with vegetation to be considered environmentally sensitive. Live staking and joint planting are excellent choices for combining techniques.

ROOTWAD REVETMENTS



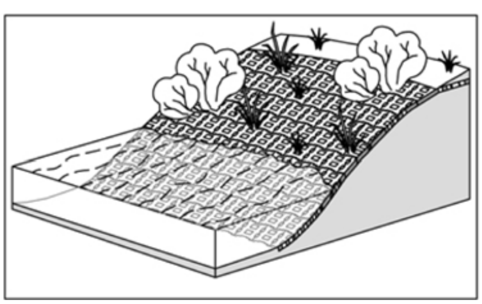
Rootwad revetments and tree revetments are structures constructed from interlocking tree materials. These structures are continuous and resistive, distinguishable from discontinuous and redirective techniques, such as LWD structures or rootwad deflectors. Rootwad revetments and tree revetments are primarily intended to resist erosive flows and are usually used on the outer bank of a meander bend when habitat diversity is desirable and tree materials are available and naturally occurring.

LIVE BRUSH MATTRESS



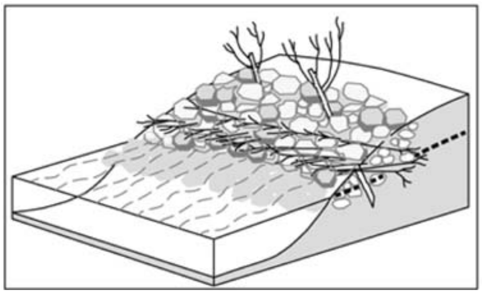
A live brush mattress is a thick blanket (15 to 30 cm [6 to 12 in.]) of live brushy cuttings and soil fill. The mattresses are usually constructed from live willow branches or other species that easily root from cuttings. Brush mattresses are used to simultaneously revegetate and armor the bank. The dense layer of brush increases roughness, reducing velocities at the bank face, and protecting it from scour, while trapping sediment and providing habitat directly along the water's edge. Brush mattresses are an excellent candidate for combining with structural techniques such as rock toe protection.

VEGETATED ARTICULATED CONCRETE BLOCKS



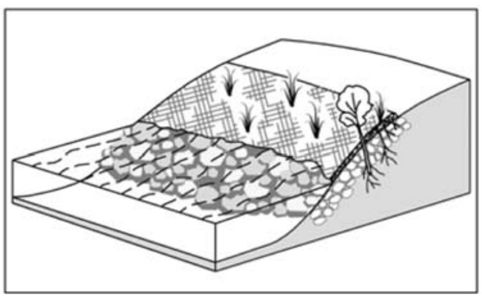
An articulated concrete block (ACB) system consists of durable concrete blocks that are placed together to form a matrix overlay or armor layer. Articulated block systems are flexible and can conform to slight irregularities in slope topography caused by settlement. The blocks are placed on a filter course (typically a geofabric) to prevent washout of fines through the blocks. ACBs provide very little habitat enhancements alone, therefore these systems must be combined with vegetation to be considered environmentally sensitive. Vegetation in the form of live cuttings or grass plugs is inserted through openings in the blocks into the native soil beneath the blocks.

VEGETATED RIPRAP



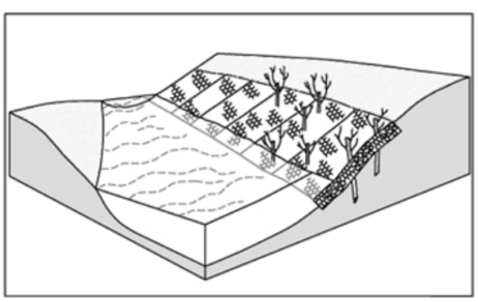
A vegitative riprap is a layer of stone and/or boulder armoring that is vegetated, optimally during construction, using pole planting, brushlayering, and live-staking techniques. The goal of this method is to increase the stability of the bank, while simultaneously establishing riparian growth within the rock and overhanging the water to provide shade, water quality benefits, and fish and wildlife habitat. Vegetative riprap combines the widely accepted, resistive, and continuous rock revetment techniques with deeply planted biotechnical techniques.

SOIL AND GRASS COVERED RIPRAP



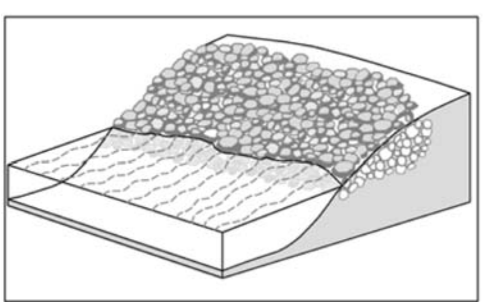
Two configurations have been used: (1) an ordinary riprap blanket is covered with a layer of soil 30 to 60 cm (1 to 2 ft) thick from the top of the revetment down to base flow elevation or (2) a crown cap of soil and plant material is placed over a riprap toe running along the base of a steep bank, effectively reducing the bank angle. Soils used for fill should not be highly erosive. A variety of methods may be used to establish plant materials, including hydroseeding, seeding and mulching, sodding, and incorporation of willow cuttings or root stock in the fill materials.

VEGETATED GABION MATTRESS



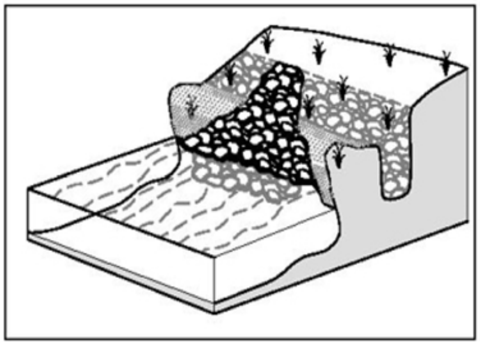
Gabion mattresses differ from gabion baskets as they are shallow (0.5 to 1.5 m [20 to 60 in.] deep), rectangular containers made of welded wire mesh and filled with rock. Gabion mattresses are not stacked but placed directly and continuously on the prepared banks. They are intended to protect the bed or lower banks of a stream against erosion. A gabion mattress can be used as either a revetment to stabilize a streambank or, when used in a channel, to decrease the effects of scour. Live cuttings are introduced through the rock filled mattress and inserted into native soil beneath.

COBBLE OR GRAVEL ARMORS



Cobble or gravel armor is a resistive technique, similar to riprap revetment, that uses naturally occurring rock. Cobbles are natural stones larger than 6.5 cm (2.5 in.) in diameter that have been rounded by the abrasive action of flowing water, while gravel is material smaller than cobble, but larger than sand (larger than about 5 mm [0.2 in.]). Rounded river cobble or gravel blanket presents a more natural appearance and can be as effective as riprap revetment for areas with relatively lower tractive forces and velocities.

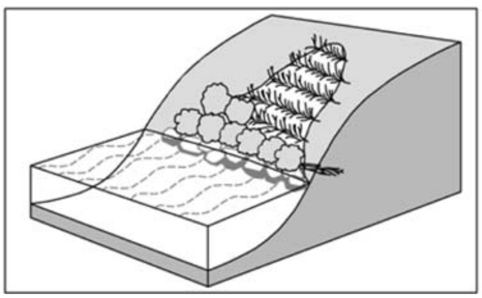
TRENCH FILL REVETMENT



Trench fill revetments are constructed by excavating a trench along the top of the bank and placing stone riprap in the trench. As the bank erodes, the stone is undercut and "launches" down the bank line, resulting in a more gradual, protected slope. Earth removed for excavation of the trench may be used to cover the riprap, thus completely concealing it until it is launched. This technique might be chosen if access to the stream reach is restricted due to legal or environmental issues.

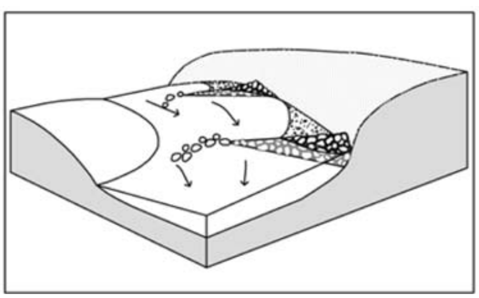
RIPARIAN BUFFER AND STREAM OPPORTUNITIES

LIVE GULLY REPAIR



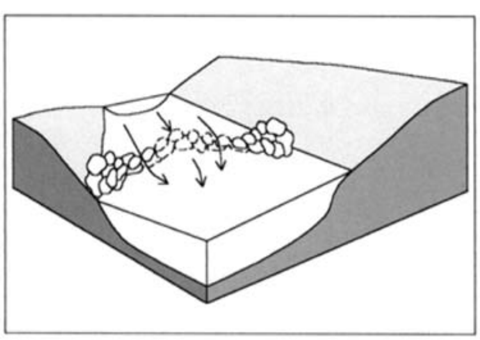
Live gully fill repair consists of alternating layers of live branch cuttings and compacted soil. This reinforced fill can be used to repair small gullies. The method is similar to branch packing (a method for filling small holes and depressions in a slope), but is more suitable for filling and repairing elongated voids in a slope, such as gullies. Gully treatment must include correcting or eliminating the initial cause of the gully as well as the gully itself. Gullies are likely to have tributary gullies that also require treatment.

VANES WITH J-HOOKS



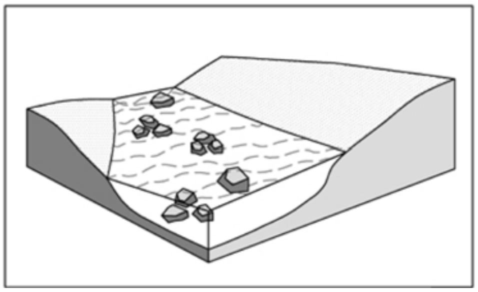
Vanes with J-hooks are actually rock vanes modified to enhance the instream habitat benefits. They are redirective, upstream-pointing deflection structures whose tip is placed in a "J" configuration and partially embedded in the streambed so that it is submerged even during low flows. The rock vanes have demonstrated effectiveness in reducing near-bank velocities by redirecting the thalweg toward the center of the channel. The "J" structures are intended to create scour pools and thereby improve substrate complexity. The scour usually results in a "tail out" deposition of gravel (riffle) which may provide spawning habitat.

CROSS VANES



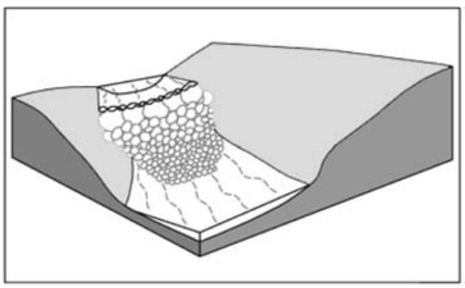
Cross vanes (also known as vortex weirs) are "V" shaped, upstream-pointing, rock structures stretching across the width of the stream. Cross vanes redirect water away from the streambanks and into the center of the channel. This serves to decrease shear stress on unstable banks, as well as create aquatic habitat in the scour pools formed by the redirected flow. Cross vanes are designed to be overtopped at all flows. The lowest part of the structure is the vortex of the "V," which is at the point farthest upstream. The crests are sloped 3% to 5% with the ends of the vanes keyed into the streambanks at an elevation approximate to annual high water or bankfull stage. This shape forms a scour pool inside the "V." Cross vanes are particularly useful for modifying flow patterns, enhancing in-stream habitat and substrate complexity, and providing in-grade control. Double cross vanes (W weirs) are a variation suitable for wider channels.

BOULDER CLUSTERS



Large boulders may be placed in various patterned clusters within the base flow channel of a perennial stream. Natural streams with beds coarser than gravel often feature large roughness elements like boulders that provide hiding cover and velocity shelters for fish and other aquatic organisms. If a constructed or modified channel lacks such features, adding boulder clusters may be an effective and simple way to improve aquatic habitat.

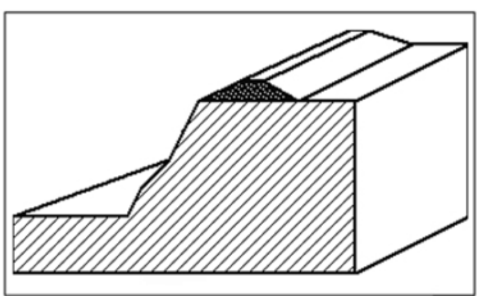
NEWBURY ROCK RIFFLES



Newbury rock riffles are ramps or low weirs with long aprons made from riprap or small boulders that are constructed at intervals along a channel approaching natural riffle spacing (5 to 7 channel widths). The structures are built by placing rock fill within an existing channel. The upstream slope of the rock fill is typically much steeper than the downstream slope, which creates a longitudinal profile quite similar to natural riffles. These structures provide limited grade control, pool and riffle habitat, and visual diversity in otherwise uniform channels.

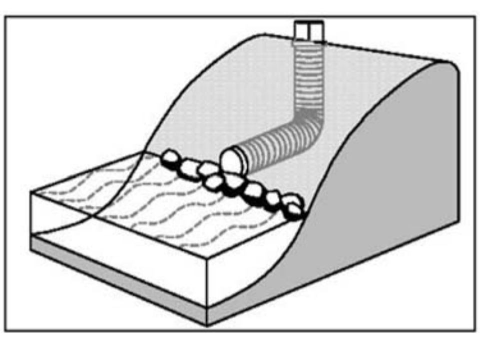
SLOPE STABILIZATION

DIVERSION DIKE



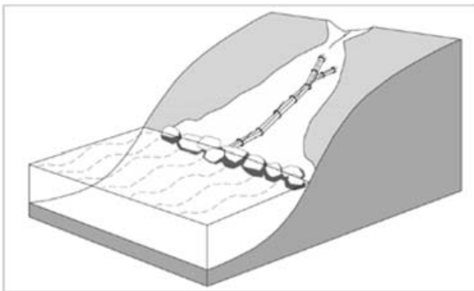
A diversion dike is a low berm (or ditch and berm combination) that is constructed along the crest or top of a streambank. The purpose of a diversion is to intercept and divert concentrated runoff away from the face of a steep slope or streambank. Diversion dikes are constructed from compacted earthen fill and should be used on drainage areas of 2 ha (5 ac) or less. In addition to protecting the face of a streambank from overbank runoff, diversions may also improve general slope stability by preventing runoff from infiltrating into and saturating the bank.

SLOPE DRAIN



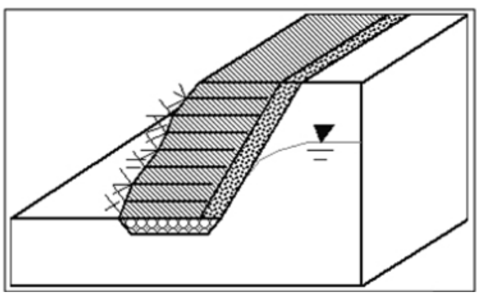
A slope drain is a drainage system used to collect and transport storm runoff down the face of a slope. This system usually consists of a berm at the top of the slope or streambank and a flexible pipe with end sections and outlet protection. A pipe slope drain is constructed with corrugated pipes (polymeric or metallic) and can be temporary or permanent. Slope drains are commonly used to: (1) temporarily convey runoff down the face of a steep slope until permanent protection or cover can be established, (2) prevent further cutting of a gully, and (3) serve as a permanent drainage-way down a steep slope where visual appearance is not a factor.

LIVE POLE DRAINS



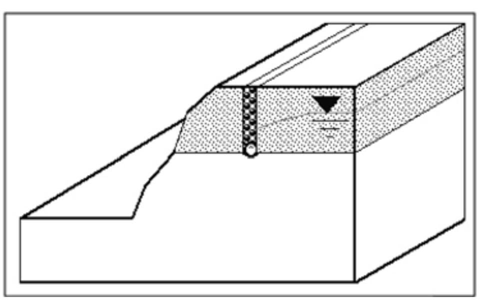
Live pole drains are live, growing, and often long-lived drainage systems composed of bundles (fascines) of live branches (commonly willow). Live pole drains are placed in areas where excess soil moisture results in soil instability. They are also used to treat small drainage gullies. Live pole drains collect subsurface drainage and concentrated surface flow and channel them to the base of the bank. Once established, their drainage function is increased, as the plants absorb much of the water that is conducted along their stems. Because they are long and fibrous, the bundles act like a conduit. As the fascines begin to root and sprout, the root system acts like a filter medium, stabilizing fine particles and reducing piping and sapping. Live pole drains provide drainage and stabilization immediately after installation and, once established, produce roots that further stabilize bank and levee slopes.

CHIMNEY DRAIN



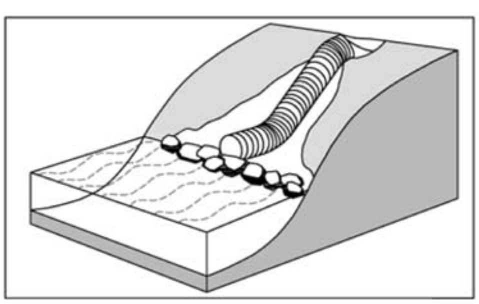
A chimney drain is a subsurface drainage course placed between a natural slope or streambank and an earthen buttress fill or other retaining structure (for example, log crib wall). A drainage blanket, sloped sheet drain, and strip drain are types of subsurface drainage courses. Typically, a chimney drain is a near-vertical drain that feeds into a collection system at its base, whereas a sloped sheet drain is inclined back at an angle. A subsurface drain may be continuous across the slope, or it may consist of discontinuous drainage strips that are placed against the natural slope at periodic intervals.

TRENCH DRAIN



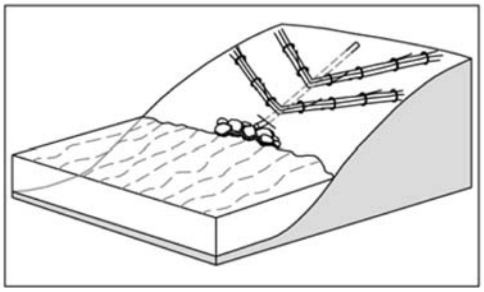
A trench drain is a drainage trench excavated parallel to and just behind the crest of a streambank. Ideally, the bottom of the trench should be keyed into an impermeable layer in the slope. The trench should be backfilled with a coarse graded aggregate that meets filtration criteria; that is, it should allow unimpeded flow of groundwater while excluding fines. Alternatively, the trench can first be lined with a filter fabric that meets the filtration requirements and then be backfilled with a coarse aggregate. The purpose of the trench is to intercept and divert shallow seepage away from the face of the streambank.

DROP INLET



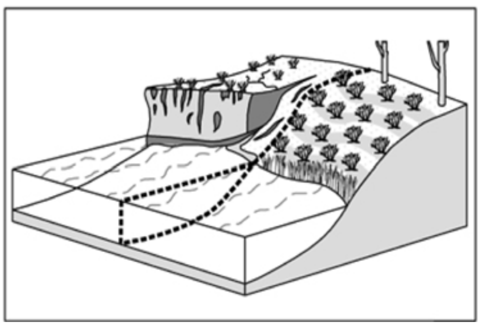
Concentrated overbank runoff can be a major cause of erosion, especially along deeply incised channels. Runoff passing over the top of banks frequently triggers gully development and expansion. Water that is ponded at the top of high, steep banks and infiltrates or seeps into the ground behind the slope face is often a major factor in erosion by piping or slope failure. Gully erosion and downcutting can be addressed using a drop inlet, which is a water control structure that consists of an L-shaped corrugated pipe passing through an earthen embankment placed at the downstream end of the gully.

FASCINES WITH SUBSURFACE INTERCEPTOR DRAIN



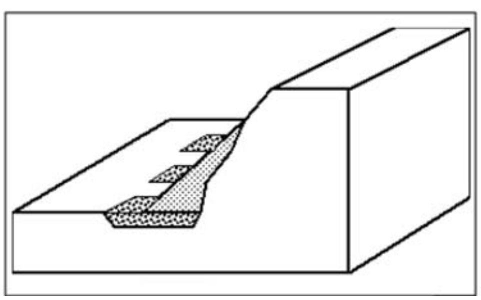
Rows of drainage fascines (also known as live pole drains) are installed off contour along a slope. Drainage fascines are widely used to help dewater landslides or small gullies and on very wet sites where there is evidence of substantial subsurface seepage that is causing piping and slope instability. As the seepage and drainage become concentrated, the fascines can be connected to a subsurface drain, consisting of a perforated pipe wrapped in a geocomposite drainage medium, and placed at the bottom of a trench. The trench is backfilled with clean, coarse aggregate or gravel that is oriented downslope. There is significant evidence that live drainage fascines, usually constructed from willow cuttings, are long lived once established.

SLOPE FLATTENING



Flattening or bank reshaping stabilizes an eroding streambank by reducing its slope angle or gradient. Slope flattening is usually done in conjunction with other bank-protection treatments—including installation of toe protection, placement of bank armor, revegetation, and erosion control—or installation of drainage measures. Flattening or gradient reduction can be accomplished in several ways: (1) by removal of material near the crest, (2) by adding soil or fill at the bottom, or (3) by placing a toe structure at the bottom and adding a sloping fill behind it. Right-of-way constraints may limit or preclude the first two alternatives because both entail either moving the crest back or extending the toe forward.

STONE-FILL TRENCHES



Stone-fill trenches are rock-filled trenches placed at the base of a streambank, usually within a failed section of the toe. A series of trenches are excavated at or within the toe of the slope in a direction perpendicular to the stream. The trenches are backfilled with crushed rock or stone. The toe of the slope is then reconstructed by placing and compacting earthen fill within and atop the stone-fill trenches. A small, longitudinal riverside plug or stone dike should be used between the stone trenches to help contain and protect the toe of the earthen fill placed between and atop the stone trenches.

US Army Corps
of Engineers®

Deadmans Run
Lincoln, Nebraska

Section 205
Flood Risk Management

Feasibility Report and Environmental Assessment with Finding of No Significant Impact

APPENDIX G

FLOOD RISK AND FLOODPLAIN MANAGEMENT

AUGUST 2018

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1 INTRODUCTION

1.1 Purpose of Appendix G

The purpose of this appendix is to present the flood risk and floodplain management studies, analyses and evaluations conducted for the Feasibility Study, Deadmans Run at Lincoln, Nebraska. Some of these studies identify nonstructural measures that can modify buildings to reduce future flood damages without the construction of extensive structural measures such as levees, dams or channels. All Feasibility Study alternatives were evaluated for compliance with flood risk and floodplain management criteria including Executive Order 11988 (EO11988).

1.2 Flood Risk and Floodplain Management Studies

As described in the Project Management Plan for the Feasibility Study, the floodplain management studies include the investigation of nonstructural measure alternatives and the preparation and submittal of a Letter of Map Revision (LOMR) for changes in the Deadmans Run floodplain resulting from the construction of any structural alternatives that would modify the floodplain. Other potential activities include a preparation of a Floodplain Management Plan (FPMP) for the selected alternative. The floodplain management studies were conducted by the Flood Risk and Floodplain Management Section, Hydrologic Engineering Branch, Omaha District, U.S. Army Corps of Engineers.

The flood risk and floodplain management studies also include identifying the federal, state and local floodplain regulations that may affect the Feasibility Study plan formulation. Any selected plan in the Feasibility Study included provisions for coordinating with all relevant federal, state and local floodplain regulations and policies. Nonstructural measures are prescribed along with structural measures to be used in reducing community flood risks as noted in the Planning Bulletin 2016-01. The Planning Bulletin 2016-01 also discusses utilizing a combination of nonstructural and structural measures to formulate a complete plan.

In the following sections the nonstructural measures and floodplain regulations currently in effect are discussed. Additional sections will discuss the likely nonstructural measures and floodplain regulations in effect for future without project conditions.

2 EXISTING CONDITIONS

2.1 Floodplain Regulations

Floodplain regulations and management are effective tools in reducing flood risks and flood damage. Regulation of floodplains is the responsibility of local, state, and tribal entities. Some federal programs require communities to enact floodplain regulations that meet certain standards to participate. The National Flood Insurance Program (NFIP) administrated by the Federal Emergency Management Agency (FEMA) is one example of a federal program.

2.1.1 Local Floodplain Regulations

The City of Lincoln participates in the NFIP. The NFIP makes flood insurance available to all property owners in participating communities. In return, participating communities must enact floodplain management regulations that meet the minimum standards of the NFIP. Standards that exceed the minimum required by NFIP may be enacted by the state and communities. A higher standard can provide greater flood risk management.

As required by the NFIP, the City of Lincoln has enacted local floodplain management regulations that meet the minimum standards of the NFIP. The standards are outlined in Lincoln Municipal Code Section 27.52 and 27.53. The City also participates in the Community Rating System (CRS). The CRS program encourages floodplain management activities within the community. Participating in CRS activities can lower the flood insurance premium rates for the community as a whole. In the designated Special Flood Hazard Area (SFHA), also known as the 1-percent-annual-chance or 1-percent-annual-chance floodplain, floodplain development permits are required for new building construction or other significant development, which has to meet certain requirements, such as elevation of the lowest floor above the base (1-percent-annual-chance) flood. In the part of the SFHA designated as the regulatory floodway, new development is severely restricted and must not cause adverse impacts by increasing the base flood elevations.

2.1.2 State Floodplain Regulations

The State of Nebraska has enacted "Minimum Standards for Floodplain Management Programs" (Nebraska Administrative Code, Title 455, Chapter 1). These regulations are administered by the Nebraska Department of Natural Resources. Some Nebraska floodplain regulations are stricter than the minimum floodplain regulations required by the NFIP, such as requiring new construction within the 1-percent-annual-chance floodplain to be elevated or floodproofed one foot above the 1-percent-annual-chance flood elevation. Nebraska does not allow new residential construction in the regulatory floodway even if such construction would not impact base flood elevations. The floodplain regulations enacted by the City of Lincoln and Lancaster County must, at a minimum, meet the Nebraska floodplain regulations.

2.1.3 Executive Order 11988; Floodplain Management

This Executive Order (EO11988) was issued by President Carter on 24 May 1977. In issuing the Executive Order the President stated "in order to avoid to the extent possible the long and short term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative, it is hereby ordered that each agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains in carrying out its responsibilities…". This nonstructural assessment was conducted in compliance with the Executive Order, meaning that any nonstructural measures that are incorporated into alternatives recommended for implementation supports this Executive Order.

Executive Order 11988 is applicable to all planning, design, and construction civil works projects program (ER 1165-2-26). The proposed project construction on the flood risk reduction project is to reduce the risk of flooding for the community, increase the protection of life safety, and will be developed with recognition of the state and local floodplain regulations. The study area includes just upstream of the 48th Street Bridge (upstream) to the channel's confluence with Salt Creek (downstream). Corps of Engineers ER 1165-2-26, Implementation of Executive Order 11988 provides guidance on compliance with EO11988. The following comments are provided in reference to ER 1165-2-26 Section 8 General Procedures.

The project is located in Lancaster County within Lincoln, Nebraska. The proposed project is located in or adjacent to the NFIP floodway and/or the regulatory floodplain (Panel 31109C0310F effective 18 February 2011) and is identified as within the 100 year floodplain in project analysis. As a flood risk reduction project, the proposed project's construction purpose is to reduce the flood risk and increase the protection of life safety, as such the project is functionally dependent on its location. The proposed project will increase conveyance within the study area. Creating beneficial impacts on the hydraulic condition. The project will result in updated NFIP mapping, reducing the extent of the Special Flood Hazard Area. This will promote development in the areas with reduced risk. The project is being developed in accordance with local permitting criteria and communicated to the public through standard procedures.

2.2 Floodplain Mapping

FEMA publishes official floodplain maps for communities participating in the NFIP to be used for flood insurance purposes and for floodplain management. The current effective FEMA floodplain maps for the City of Lincoln along Deadmans Run were published on February 18, 2011.

The current effective floodplain mapping for the City of Lincoln along Deadmans Run is a detailed study. The study provides the 1-percent-annual-chance flood profiles and a floodway. The effective FEMA floodplain modeling and mapping was used as a baseline and USACE updated the models for this study. The refined modeling was used as the existing conditions model.

3 Future Without Project CONDITIONS

3.1 Floodplain Mapping and Regulations

The City of Lincoln and Lancaster County will continue to participate in the NFIP and continue to administer floodplain regulations. With or without a project, continued enforcement of the floodplain regulations and the fact that the area along Deadmans Run is essentially developed will limit future significant growth from occurring in the designated Special Flood Hazard Areas (SFHA) along Deadmans Run.

3.2 Without-Project Conditions Nonstructural Measures

Nonstructural flood risk management can be categorized as a set of physical or nonphysical measures utilized for mitigating loss of life as well as future flood damages. The physical measures determined to be most commonly implemented are those which adapt to the natural characteristics of the floodplain without adversely affecting or changing those natural flood characteristics. Nonstructural measures can be applied to individual buildings or to several adjacent buildings. Nonstructural measures include dry floodproofing, wet floodproofing, elevation on fill, elevation on posts, columns or extended foundation walls, filling of the basement, and relocation of the building from the floodplain.

There are not large areas of undeveloped land remaining in the SFHA of Deadmans Run. Any new residential buildings will need to be elevated to at least one foot above the 1-percent-annual-chance flood elevation, either on raised foundations or on fill. Commercial buildings may be floodproofed to the elevation requirement.

Floods will occur on Deadmans Run in the future that will cause damage to existing buildings, particularly those that have not been elevated or floodproofed. Floodplain regulations require buildings that are substantially damaged, with estimated repair costs greater than 50 percent of pre-flood market value, be brought into compliance with current floodplain standards during repairs.

For residential buildings constructed before Lincoln enacted floodplain management regulations, this would require the lowest floor of residential buildings be elevated at least one foot above the base flood elevation or the buildings be bought out or relocated from the SFHA zone.

4 EVALUATION OF STRUCTURAL FLOOD DAMAGE REDUCTION ALTERNATIVES

4.1 Alternatives Reducing the Water Surface Elevation for 1-Percent-Annual-Chance Flood Protection

The City desires that the project alternatives along the Deadmans Run reduce the SFHA as must as possible, which would require that any proposed channel project be large enough to convey the 1-percent annual-chance flood event. In the event that levees are needed to supplement this conveyance, the levees would need to be certified as meeting the NFIP requirements for levees providing protection from the base flood. The requirements for levees to be accredited by FEMA as providing protection from the base flood are given in the Code of Federal Regulations, Title 44, Section 65.10 and/or EC 1110-2-6067. The levee alternatives under consideration were all designed to meet the FEMA and Corps of Engineers requirements for levees providing protection from the 1-percent-annual-chance flood.

4.2 Mitigation of Impacts from Structural Project Alternatives on Base Flood Elevations

In areas where levees are constructed, the flows that previously spread out across the entire floodplain are restricted by the levees into a smaller flow area and the flood elevation profiles and flow velocities for various flood events may increase. These higher project induced flood stages may result in greater flood damages to buildings not protected by the project. Based on the hydraulic analysis of the alternatives for Deadmans Run, the maximum increase in the elevations of the 1-percent-annual-chance flood from the selected alternatives would be less than 1.0 feet and would only affect buildings already subject to flood depths much greater than the potential increase in flood depths.

The rules of the NFIP and the State of Nebraska allow induced stages of less than 1 foot for the base flood as the result of development in the SFHA outside of the regulatory floodway or where there is no regulatory floodway. If there is construction within the regulatory floodway, there must be no increase in the base flood elevations. If there is an increase in the regulatory floodway, there may be the need to apply for prior approval from FEMA or mitigate potential impacts. The selected levee alternatives for flood risk reduction from Deadmans Run need to be constructed in compliance with the regulations of the NFIP, the State of Nebraska and the City of Lincoln.

5 NONSTRUCTURAL FLOOD DAMAGE REDUCTION ALTERNATIVE

Nonstructural alternatives were developed for the 1-percent -annual-chance events (100 year) flood event plus one foot, which was selected as the design flood event (DFE) for Deadmans Run. There are 569 structures identified for nonstructural alternative. 542 structures are residential structures and 27 structures are commercial structures. Structure inventory data was available that identified the type of building, square footage, first floor elevation, whether the building had a basement, and other building information.

The process of conducting a nonstructural assessment starts with collecting structure surveys and hydrologic and hydraulic data. The Flood Damage Reduction Analysis (HEC-FDA) program uses this data to calculate expected damages from flood events of various recurrence intervals. Once structure damages have been calculated, the appropriate nonstructural measure is identified, the estimated cost for that measure are developed and any residual damages are calculated. The results of the study include pre- and post-project damages, mitigation costs, recommended nonstructural measures, and benefit-to-cost ratios.

5.1 Nonstructural Evaluation Plan Alternatives

Since nonstructural measures can be implemented for individual buildings, these measures were evaluated across the entire study area. The design flood elevation used for this alternative was the water surface elevation of the 1-percent annual chance flood event plus one foot, which was determined at each building location. Each building will have a different DFE depending on the depth of flooding at the structure during the 100 year flood event and depending on the structure type. Cost estimates were completed at each structure for the nonstructural measure recommended for the design flood event. The following sections outline how the costs were determined for each measure.

5.1.1 Residential Elevation on Extended Foundation

This measure involves elevating the entire building from its original foundation to the design flood event elevation. This technique was used on residential buildings, with and without basements. To calculate the vertical distance of rise for each building, the elevation of the DFE was used (1-percent ACE flood elevation plus one foot). The one foot freeboard was added in accordance with Nebraska Statutory requirements. The elevation of the first floor was subtracted from the design flood event to determine the floodproofing height required. Since flood depths did not exceed 12 feet, all residential buildings with significant flood damages for flood events less than the 0.2-percent ACE flood event were evaluated.

Figure 1 illustrates an example of a residential building without a basement before and after incorporation of this nonstructural technique.

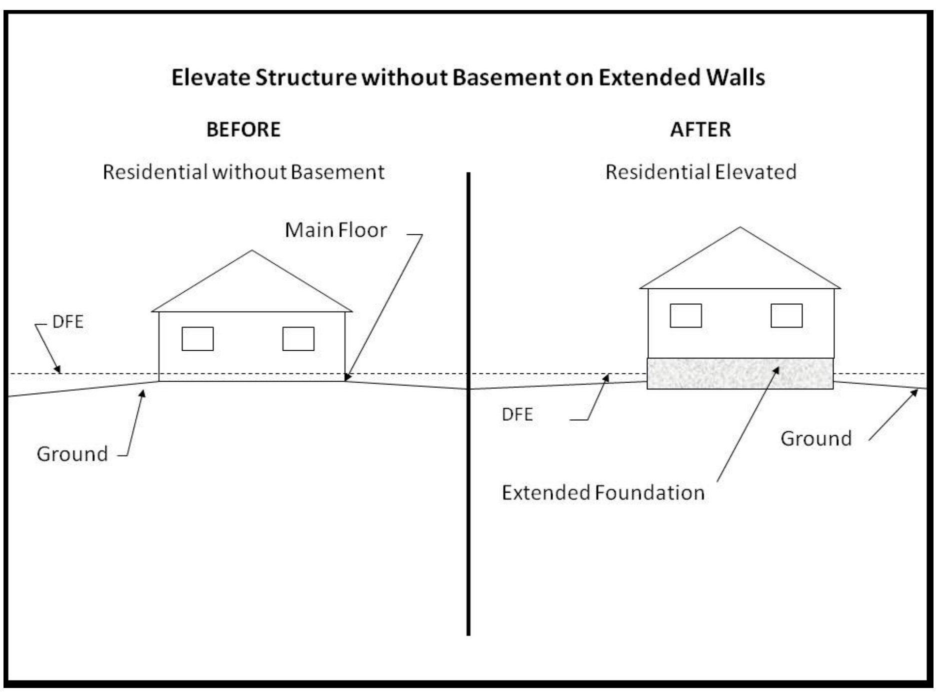

Figure 1: Schematic of Elevated Building without Basement on Extended Foundation

The cost to elevate residential buildings was estimated by utilizing equations based upon building square footage, floodproofing height, and foundation type. The equation for computing residential elevation costs was developed by the Omaha District Cost Engineering Office from a cost estimate procedure developed for FEMA's Hazard Mitigation Grant Program (HMGP) (Elevation Cost Guide, 2013).

The Omaha District Cost Engineering formula for determining costs based on the HMGP cost estimate procedure of a residential building for flood risk management is:

Elevation Cost = (**HCF** + **AUC** + **SRC**) x **ACF** x **SF**

Where: **HCF =** FEMA HMGP cost per square foot, based on foundation type and height of raise, see Table 1

AUC = Additional utility cost per square foot = 1.50

SRC = Site restoration cost per square foot = 3.50

ACF = Area cost factor = 0.99

SF = Footprint of residence to be raised, square feet

Table 1. Residential Elevation Cost Factors (cost per square foot)

Foundation Type			
Raise, Feet	**Open Foundation**	**Slab Separation**	**Slab Raise**
1.50-2.49	$50.53	$60.53	$70.53
2.50-3.49	$51.58	$61.58	$71.58
3.50-4.49	$52.63	$62.63	$72.63
4.50-5.49	$55.63	$65.63	$75.63
5.50-6.49	$58.63	$68.63	$78.63
6.50-7.49	$61.63	$71.63	$81.63
7.50-8.49	$64.63	$74.63	$84.63

Open foundation elevation costs are applicable to buildings on basements walls or on foundation walls with a crawl space. Slab separation is a technique for raising a non-reinforced slab-on-grade residence by separating the building superstructure from the foundation slab. A slab raise involves raising the foundation slab and the superstructure as one unit.

5.1.2 Basement Fill and Main Floor Utility Addition

Filling in the basement for nonstructural measure is required when elevating residential buildings. The filled basement resists damage to the building foundation from hydrostatic forces and raises the threshold of flood damages to the main floor elevation, whether existing or elevated. Residential buildings which are subject to flood damages with a main floor elevation above the DFE only need the basement to be filled to reduce flood risk. If the modification is considered a substantial improvement, the main floor may need to be elevated one foot above the DFE according to floodplain management regulations. The basement would be filled with clean sand or other suitable material and the top of the fill is covered with a vapor barrier. To compensate for a portion of the lost basement area and provide a location for relocation of the utilities (furnace, water heater, water softener, washer and dryer) which may reside in the basement, an above ground addition was assumed to be constructed onto the building at the DFE. For purposes of this analysis, an addition size of 50 square feet was used.

A small, unfinished area of the basement may be able to be left unfilled to be used as a storm shelter, however, this may only be allowable if the building is not a substantial improvement and does not use federal grant funds. If federal grant funds are used, then the FEMA guidance likely would not allow a shelter to remain below the BFE. Figure 2 illustrates a simplified example of removing a basement by adding fill material and constructing an addition to the residence to house utilities.

Relocation of the furnace and water heater to a higher elevation provides the property owner an opportunity at his/her expense to replace these items with new units that are more efficient. In that situation, the estimated cost of relocating the existing furnace and water heater would be applied to the cost of installing the replacement units.

Cost estimates for the fill is summarized in Table 2. Cost estimates for the addition is summarized in Table 3.

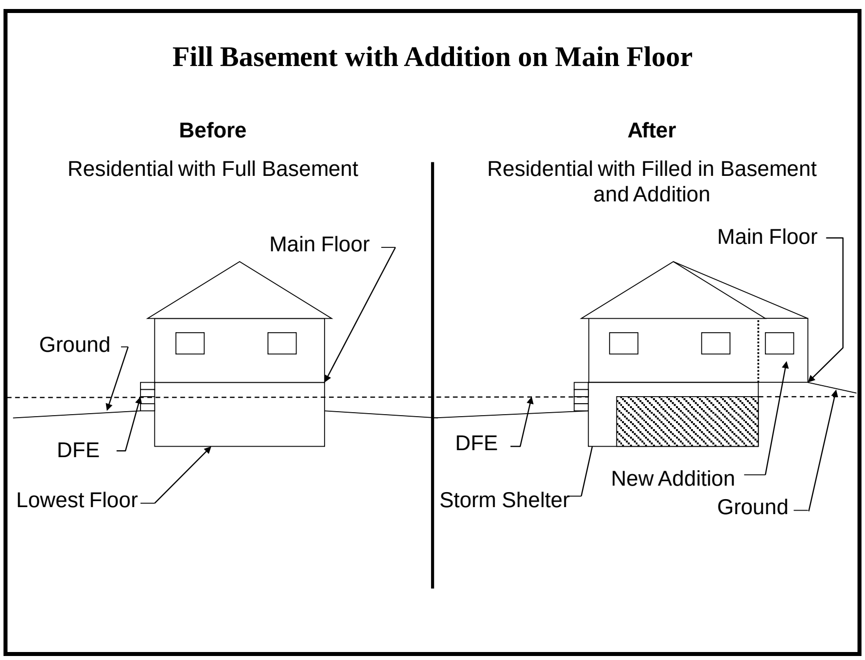

Figure 2: Schematic of Filled Basement with Main Floor Addition

Table 2. Cost Parameter for Filling Basement

Item	Cost/Units	Quantity Calculation
Sand Fill	$1.40/cubic foot	Basement Area x 6 feet

Table 3. Cost for Addition to Residential Buildings

Size	Cost
50 Square Feet	$6,250

5.1.3 Dry Floodproofing for Commercial Buildings

Dry floodproofing of commercial and other non-residential buildings involves applying a water resistant sealant around the building to prevent flood water from entering. The sealant layer is then protected with a brick veneer or similar material. Closure panels are used at building openings and a backflow prevention valve is installed on the sanitary sewer line into the building to prevent floodwaters from backing up through the sewer. A sump pump or skimmer pump (portable pumps may be used) to remove floodwater that leaks into the building. A schematic of the dry floodproofing technique is shown in Figure 3.

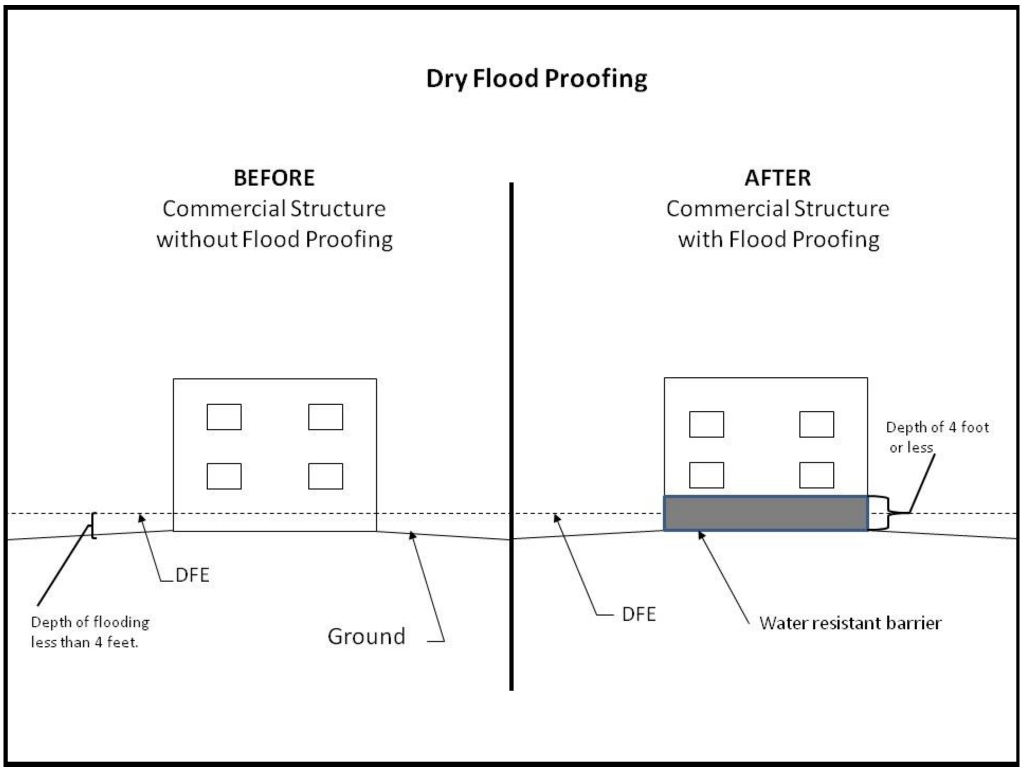

Figure 3: Schematic of Commercial Dry Floodproofing

Testing sponsored by the National Flood Proofing Committee at USACE ERDC indicated that a masonry or concrete commercial buildings can generally be dry floodproofed up to a design depth of 4 feet. The floodplain building inventory of the study area found a number of non-residential buildings with walls of prefabricated steel panels. Since these panels may not be of sufficient strength to resist the hydrostatic load and may leak through the joints between the steel panels, an alternate method of dry floodproofing was proposed for metal buildings.

To provide sufficient wall strength, new short walls of concrete masonry units (CMU) with interiors of the masonry blocks filled with waterproof grout and with steel reinforcements would be built on a new foundation footing immediately outside of the existing steel walls. The waterproof sealant and brick veneer is applied to the CMU wall. Closures for openings into the building are also built into the CMU wall.

Buildings could be evaluated for nonstructural measures that are designed to be partially dry floodproofed and partially wet floodproofed. In this situation, the interior walls of the dry floodproofed area need to be waterproofed as well as the exterior walls. In this analysis, structures were only assessed for one measure or the other. A more detailed interior structure analysis would be required to if multiple measures to one structure are to be assessed.

Cost estimates for dry floodproofing were developed for commercial buildings with design flood depths up to 3-4 feet with a structural analysis. A structural engineer will be required to thoroughly review the adequacy of the building to withstand hydrostatic and possibly dynamic floodwater loading onto the walls of the building prior to implementation.

The various costs used in the dry floodproofing estimate are summarized in Table 4. The perimeter of the dry floodproofing for evaluated buildings was determined by estimating building dimensions from available data, such as building plans in the county assessors' records or if unavailable the perimeter was estimated by taking the square root of the area and then multiplying by four. The number and size of closure panels were estimated from photos taken during the structure inventory or from the Google Earth Street View map application. The floodproofing height was calculated by subtracting the first floor elevation from the design flood elevation. Residential buildings cannot be removed from insurance or floodplain management requirements by dry floodproofing. An individual homeowner may choose to floodproof their home, but the lowest floor will not change for insurance or permitting.

Table 4. Cost Parameters for Dry Floodproofing

Item	Unit of Measure	Unit Cost (Dollars)
Waterproofing	SF	0.93
Masonry Veneer	SF	13.30
Closure Panels	SF	185.20
CMU Wall	SF	14.83
Wall Foundation	LF	109.00
Pumps	GPH	0.24
Sewer Backflow Valve	LS	9,590.00

5.1.4 Wet Floodproofing Commercial Buildings

As a standalone measure, wet floodproofing requires all construction materials and finishing materials located below the DFE to be water resistant. Flood vents are installed in the walls to allow floodwaters into the building and equalize the hydrostatic forces. It is required that one square inch of flood vent area be provided for each square foot of the wet floodproofing area (NFIP Regulations, 44 CFR Section 60.3(c)(5)). All utilities, such as heating, lighting, electrical panels and outlets must be elevated above the DFE or be located inside flood resistant closures.

Since wet floodproofing allows floodwaters into a building, it is only recommended for crawlspaces in finished residential buildings. Wet floodproofing may be applicable to commercial and industrial buildings when combined with a flood warning, preparedness and response plan. While it may be used as a retrofitting technique, wet floodproofing may not be able to be used to achieve compliance of the building for minimum state and federal floodplain management standards. A wet floodproofing proposal should be discussed with the local floodplain manager prior to implementation. Wet floodproofing was recommended for buildings that were constructed of concrete, masonry, or metal and did not have furnished interiors, such as warehouses and garages. To protect the contents during flooding, damageable items would be elevated permanently or temporarily above the DFE.

The various costs used in the wet floodproofing estimate are summarized in Table 5. The total structure square footage was used along with the unit cost information to determine cost. These costs could vary significantly from structure to structure and depend on the structure's functional purpose. For estimating purposes the structure perimeter was used to estimate the length of electrical utilities that would need to be relocated. The floodproofing height was calculated by subtracting the first floor elevation from the design flood elevation.

Table 5. Cost Parameters for Wet Floodproofing

Item	Unit of Measure	Unit Cost (Dollars)
Demo interior wall	SF	1.05
Insulation and wains coat	SF	8.47
Raise electric utilities	LF	12.88
Flood vents	SF	51.34
Sewer backflow valve	LS	9,590.00

6 Nonstructural Economic Feasibility

For the purposes of determining the federal interest in nonstructural measures for this assessment, the economic feasibility of nonstructural flood mitigation measures was determined on a building by building basis. In any nonstructural analysis to determine economic feasibility, some buildings may not be economically feasible within the entire nonstructural plan. Whether or not it is determined that there is a Federal interest in nonstructural measures for a particular building, any of the nonstructural measures described may be implemented independently by the property owner to reduce their future flood damages.

7 Nonstructural Standalone Alternative Results

Nonstructural measures can be implemented for individual buildings and these measures were evaluated across the entire study area. The measures considered in Deadmans Run floodplain were elevation on extended foundation, filling the basement, wet floodproofing, and dry floodproofing. The structure inventory includes all structures within the 0.2 percent ACE floodplain as well as structures lying just outside the floodplain to ensure a complete inventory was included for the nonstructural assessment. The study area contains two types of buildings: residential and commercial buildings. A nonstructural analysis requires that each building be examined based on building type, where the building is located within the floodplain, foundation type, and previous flooding characteristics of the area for purposes of determining the nonstructural measure is most the appropriate. Ground elevations were not collected at the structures, as a result LiDAR was used to identify the ground elevation at each structure.

As discussed in the Economics Appendix, the economic analysis conducted in this study utilized the Hydrologic Engineering Center Flood Damage Analysis (HEC-FDA) software. The model was used to calculate expected flood damages on a structure by structure basis at various flood events. A modified with-project conditions HEC-FDA input file was created for the project area which did not compute flood damages for buildings with nonstructural measures until the DFE was exceeded. Each building had the design flood elevation (DFE) set to the 1 percent flood elevation plus the one foot of freeboard required by local floodplain regulations. The input data was modeled in HEC-FDA to determine damages for the with-project conditions. The difference between the without-project and with-project damages was then designated as the project benefits. The annual benefits and annual costs developed for each building analyzed were used to compute the net benefits and benefit-cost ratio (BCR) for each building. To be considered economically feasible, benefits of a flood risk management measure (mainly flood damages prevented) must exceed the costs of the measure. This is also expressed in terms of a benefit-cost ratio (BCR) greater than 1.00.

Table 6 shows the annualized project benefits, costs, overall net benefits and benefit-cost ratio (BCR) for each reach in Deadmans Run study area. An interest rate of 2.875% over 50 years was used to annualize the total project costs.

Table 6. Deadmans Run Nonstructural Alternative

Reach	Structures in Plan	Average Annual Benefits	Average Annual Cost	Total Estimated Project Cost	BCR	Total Net Benefits
Reach 1Lb	3	$ 400	$ 2,670	$ 71,130	0.15	$ - 2,300
Reach 1Rb	7	$ 8,400	$ 10,420	$ 274,510	0.81	$ - 2,020
Reach 2L	0	$ -	$ -	$ -	-	$ -
Reach 2R	351	$ 1,070,320	$ 1,258,530	$ 33,164,390	0.85	$ - 188,210
Reach 3L	13	$ 20,700	$ 26,670	$ 702,760	0.78	$ - 5,970
Reach 3R	66	$ 162,410	$ 226,490	$ 5,968,500	0.72	$ - 64,080
Reach 4L	27	$ 57,700	$ 64,620	$ 1,702,980	0.89	$ - 6,920
Reach 4R	38	$ 108,680	$ 111,970	$ 2,950,550	0.97	$ - 3,290
Reach 5L	0	$ -	$ -	$ -	-	$ -
Reach 5R	0	$ -	$ -	$ -	-	$ -
Reach 6L	0	$ -	$ -	$ -	-	$ -
Reach 6R	0	$ -	$ -	$ -	-	$ -
All Reaches	569	$ 1,428,610	$ 1,701,400	$ 44,834,830	0.84	$ -272,786

*** The above BCRs and net benefits are based on the composite of selected structures. Further optimization and/or implementation could result in prioritization or voluntary participation of higher risk properties within the plan. This could result in higher BCRs and net benefits.**

For the DFE, 1-percent ACE flood elevation plus one foot, 569 structures were assessed. These were structures that incurred flood damages for the 0.01 annual chance exceedance flood event. The total nonstructural mitigation cost of the nonstructural measures for all of the structures was $44,834,833. The annualized cost is equal to $1,701,396. The benefits were $1,428,610 resulting in net benefits of $ -272,786 and with a BCR of 0.84. There no individual reaches that had a positive BCR. The annual costs shown in the table include additional costs above the direct construction costs such as engineering and design (6 percent) and supervision and administration (9 percent). The computation of the annual benefits and costs is described in detail in the Economics Appendix.

Further optimization and/or implementation could result in prioritization or voluntary participation of higher risk properties within the plan. This could result in higher BCRs and net benefits. Figure 4 displays the location of the structures in the analysis with the recommended nonstructural measure.

The results of this analysis did not produce a BCR over 1.0, however the analysis does indicate that there are numerous structures in the community at notable flood risk. The data used for the nonstructural assessment can be used to assist in developing a community's nonstructural plan including public warning systems and evacuation planning, communicate risk, evaluate individual nonstructural implementation, and/or assist in making other flood risk informed decisions.

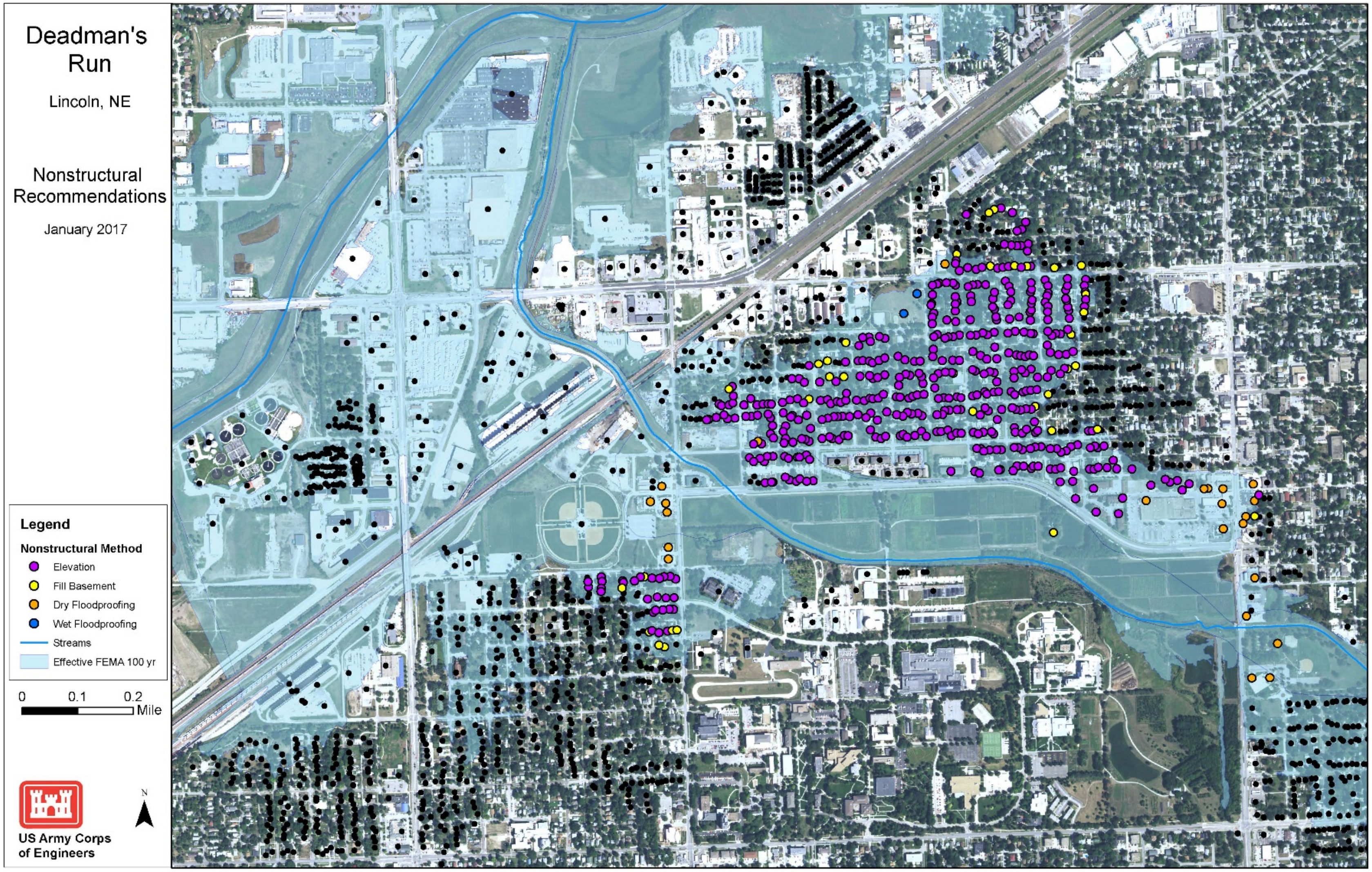

Figure 4: Recommended Nonstructural Measures for Deadmans Run

8 Additional Preliminary Analysis and Study Limits

The initial structure inventory included structures upstream and downstream of the study area. This inventory was used to identify risk broadly for purposes of setting the study limits. Preliminary analysis downstream on West Tributary indicates structures to be economically unfeasible because of West Tributary's vicinity to the Salt Creek. Further analysis of Salt Creek would be required to fully evaluate the at-risk structures in that area.

Preliminary analysis upstream of the study area limit indicates initial positive results for nonstructural measures to be economically feasible for a sample of the structures in the structure inventory for purposes of setting the study limits. The study limits were established based on expected project costs, risk prioritization, and community input. No alternatives or optimization analysis was completed.

The sample inventory included 50 residential structures and 6 commercial structures. The residential and commercial sample structures both indicate positive net benefits shown in Tables 7 and 8 below.

Table 7. Preliminary Deadmans Run Nonstructural Alternative Residential Structures

Reach	Structures in Plan	Average Annual Benefits	Average Annual Cost	Total Estimated Project Cost	BCR	Total Net Benefits
Upstream A	32	$ 66,960	$ 68,426	$ 1,803,138	0.98	$ - 1,466
Upstream B	18	$ 49,610	$ 44,449	$ 1,171,314	1.12	$ 5,161
All Reaches	50	$ 116,570	$ 112,875	$ 2,974,452	1.03	$ 3,695

Table 8. Preliminary Deadmans Run Nonstructural Alternative Commercial Structures

Reach	Structures in Plan	Average Annual Benefits	Average Annual Cost	Total Estimated Project Cost	BCR	Total Net Benefits
Upstream B	1	$ 7,430	$ 4,135	$ 108,961	1.80	$ 3,295
Upstream C	1	$ 1,900	$ 2,034	$ 53,600	0.93	$ - 134
Upstream D	3	$ 14,680	$ 9,333	$ 245,953	1.57	$ 5,347
Upstream E	1	$ 2,170	$ 1,432	$ 37,726	1.52	$ 738
All Reaches	6	$ 26,180	$ 16,934	$ 446,240	1.55	$ 9,246

9 Floodplain Management Plan (FPMP)

Section 202 of the Water Resources Development Act of 1996 (WRDA 1996), requires the development of a Floodplain Management Plan (FPMP) for federally constructed flood damage reduction projects. This plan is to be developed and in-place within one year after signing the project cooperation agreement (PCA). The FPMP is a document developed by the non-Federal sponsor, with input and guidance from the Federal agency.

The FPMP assures that the integrity of the Federal project will not be diminished during the life of the project and that impacts of future flood events in the project area have been reduced. The FPMP will address potential measures, practices, and policies to reduce loss of life, injuries, damages to property and facilities, public expenditures, and other adverse impacts associated with flooding and to preserve and enhance natural floodplain values. The FPMP is required for either a structural or nonstructural project. An FPMP for a feasible, selected alternative would be developed once a flood reduction project is approved.

10 REFERENCES

Code of Federal Regulations, Emergency Management and Assistance, Title 44, 2011.

Federal Emergency Management Agency; Floodproofing Non-Residential Buildings; FEMA P-936; June 2013.

Federal Emergency Management Agency, Office of Community Development, Disaster Recovery Unity, Hazard Mitigation Program; Procedure Number 1, Revision Number 11; “Elevation Cost Guide”, January 15, 2013.

U.S. Army Corps of Engineers, National Nonstructural Flood Proofing Committee; Flood Proofing Tests, Tests of Materials and Systems for Flood Proofing Structures; August, 1988.

U.S. Army Corps of Engineers, Engineering Regulation (ER) 1100-2-100, Planning Guidance Notebook. U.S. Army Corps of Engineers, 10 October 2003.

U.S. Army Corps of Engineers, National Nonstructural Flood Proofing Committee; Raising and Moving the Slab on Grade House With the Slab Attached; 1990.

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Omaha District

DEADMANS RUN
LINCOLN, NEBRASKA

SECTION 205 – FLOOD RISK MANAGEMENT

FEASIBILITY REPORT

APPENDICES VOLUME III:
APPENDICES H – K
REVIEW DOCUMENTATION
& LETTERS OF SUPPORT

AUGUST 2018

US Army Corps of Engineers ®
Omaha District

DEADMANS RUN
LINCOLN, NEBRASKA

SECTION 205 – FLOOD RISK MANAGEMENT

FEASIBILITY REPORT

APPENDIX H
REAL ESTATE PLAN

AUGUST 2018

REAL ESTATE PLAN

DEADMANS RUN

SECTION 205

AT

LINCOLN, NEBRASKA

Prepared for

US Army Corps of Engineers

Northwestern Division

Omaha District

Revised as of

January 18, 2018

Prepared by

Sean M. Keating

Civil Branch

REAL ESTATE PLAN

DEADMANS RUN

SECTION 205

AT

LINCOLN, NEBRASKA

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Exhibit A Project Location/Site Map
Exhibit B Acquisition Capability Checklist

REAL ESTATE PLAN

FOR

DEADMANS RUN

SECTION 205

AT

LINCOLN, NEBRASKA

1. PROJECT PURPOSE: The purpose of this Real Estate Plan is to support the Integrated Feasibility Study. It will identify and describe all lands, easements, relocations, rights-of way, and Disposals (LERRDs) for the construction, operation, and maintenance of Section 205 Channel Improvement Project for "Deadmans Run", a right-bank tributary of Salt Creek in eastern Lincoln, Nebraska. The Real Estate Plan is tentative in nature; it is for planning purposes only and both the final real property acquisition lines and the real estate cost estimates provided are subject to change even after approval of the Feasibility Report. The project will serve multiple purposes, primarily to reduce flood risks in the area, protect some areas, but also help restore the degraded ecosystem, and provide improved recreation and other enhancements in the Deadmans Run watershed.

The local Non-Federal Sponsor (NFS) for this project is the Lower Platte South Natural Resources District (LPSNRD). A Feasibility Cost Share Agreement was signed on August 21, 2014 between the LPSNRD and the United State Army Corps of Engineers (USACE). Upon approval of the proposed Integrated Feasibility Report, a Project Partnership Agreement (PPA) between the LPSNRD and USACE will be signed. The project will require the acquisition of a small fee tract, including the relocation of a business, various easement estates, and several facility replacements, all further described below.

A map depicting the location and project footprint is attached as **Exhibit "A".** A preliminary determination of the tracts with the acreage for each fee and easement acquisition required for the project is shown on the exhibit. A final project map will be completed during the Design and Implementation Phase.

AUTHORITY: An Integrated Feasibility Study has been conducted under the authority of Section 205 of the Flood Control Act of 1948, (P.L. 80-858), as amended. Under Section 205, the Corps is authorized to study and construct projects (structural and/or nonstructural) to reduce the risks of flooding, loss of life, and property damage in partnership with state and local governments. Projects implemented under Section 205 authority are formulated for flood risk management in accordance with current policies and procedures governing projects of the same type that are specifically authorized by Congress.

PREVIOUS STUDIES: An unpublished Section 205 Reconnaissance Study was completed in 1993. The study was terminated following a nation-wide defunding of Section 205 studies. In August of 2003, a Section 22 Planning and Assistance to States Study of the flooding problems associated with Deadmans Run, Beal Slough, and Salt Creek in Lincoln, NE was prepared for the City of Lincoln and the LPSNRD. The study specifically discussed floodplain analysis and economic investigation.

2. PROJECT DESCRIPTION AND REQUIRED LERRD: Deadmans Run is a tributary to Salt Creek in Lincoln, Nebraska. The flow is northwesterly across the north part of Lincoln. The specific segment of the channel involved in the project runs from about 52nd Street and Francis Street, westerly under 48th Street, meandering west by northwesterly across the UNL East Campus to about 35th and Huntington Avenue, meandering northwesterly and crossing under 33rd Street and Baldwin Avenue, crossing under the BNSF Railroad, continuing a meander northwesterly to Highway 6 aka Cornhusker Highway, this being the end of the project segment of channel.

The Deadmans Run watershed is entirely within city limits, completely urbanized, and contains residential and commercial areas, including the University of Nebraska at Lincoln's East Campus. In 2007, the City of Lincoln and the LSPNRD sponsored a Deadmans Run Master Plan that identified $50 million in flood damage reduction that would remove approximately 800 structures from the 100-year floodplain and produce water quality and ecosystem improvements. Flash floods have claimed lives and remain a safety threat of this stream. The proposed project is a channel improvement project that will make the existing channel deeper and wider, and allow for reduced flow obstruction. No mitigation lands will be required for this project as all mitigation objectives can be achieved within the existing channel footprint.

The Project Footprint comprises the Deadmans Run channel, beginning at a point east of 48th Street, running north-northwesterly along the channel and ending at a point just north of Cornhusker Highway.

The Tentatively Selective Plan (TSP) Alternative is outlined below in items (a) through (h) below.

1. Structural Alternative #1 – Channel Widening and Channel Conveyance Improvement
    a. Channel Widening, Cornhusker Highway to Huntington Ave.
    b. Install smooth flume under BNSF Bridge and rail spur to improve conveyance.
    c. End Baldwin Avenue on either side of the Channel and build turn-arounds.
    d. Widen DMR channel, Huntington to 48th Street, within LPSNRD easement.
    e. Improve DMR channel to limits of economically justifiable ROW, 48th to 52nd St.
    f. Site-Specific nonstructural measures where needed to supplement structural measures.
    g. Remove existing interior road, replace tributary culvert with new channel
    h. Move access point on State Fair Park Drive south on State Fair Park Drive and build new interior road/drive.

The LER required for the project include:

Fee estate is required for approximately 0.33 acres affecting one land owner, which will also require a business relocation due to the loss of the commercial structure (2100 N 48th Street).

Permanent Channel Improvement Easements are required for approximately 31.96 acres.

Permanent Road Easement is required for approximately 1.23 acres.

Temporary Construction Easements are required for approximately 8.00 acres.

RECOMMENDED ESTATES: The following standard estates will be used to acquire the real property for the project:

FEE TITLE

The fee simple title to the land described in Schedule A (Tract Nos. ___, and ___) subject, however, to existing easements for public roads and highways, public utilities, railroads, and pipelines.

CHANNEL IMPROVEMENT EASEMENT

A perpetual and assignable right and easement to construct, operate, and maintain channel improvement works on, over and across Tracts Nos.____, ____ and ____ for the purposes as authorized by the Act of Congress approved_____________, including the right to clear, cut, fell, remove and dispose of any and all timber, trees, underbrush, buildings, improvements and/or other obstructions there from; to excavate, dredge, cut away, and remove any or all of said land and to place thereon dredge or spoil material; and for such other purposes as may be required in connection with said work of improvement; reserving, however, to the owners, their heirs and assigns, all such rights and privileges as may be used without interfering with or abridging the rights and easement hereby acquired; subject, however, to existing easements for public roads and highways, public utilities, railroads and pipelines.

PERMANENT EASEMENT FOR ROAD

A perpetual, non-exclusive and assignable easement and right-of-way in, on, over and across (the land, described in Schedule A) (Tracts Nos.____, ____, and ____) for the location, construction, operation, maintenance, alteration replacement of (a) road(s) and appurtenances thereto; together with the right to trim, cut, fell and remove therefrom all trees, underbrush, obstructions and other vegetation, structures, or obstacles within the limits of the right-of-way; (reserving, however, to the owners, their heirs and assigns, the right to cross over or under the right-of-way as access to their adjoining land at the locations indicated in Schedule B; subject, however, to existing easements for public roads and highways, public utilities, railroads and pipelines.

TEMPORARY WORK AREA EASEMENT

A temporary easement and right-of-way in, on, over and across (Tracts No's. ____, ____ and ____, for a period not to exceed 1 year, beginning with date possession of the land is granted to the United States, for use by the United States, its representatives, agents, and contractors as a (borrow area) (work area), including the right to (borrow and/or deposit fill, spoil and waste material thereon) (move, store and remove equipment and supplies, and erect and remove temporary structures on the land and to perform any other work necessary and incident to the construction of the ___________________ Project, together with the right to trim, cut, fell and remove therefrom all trees, underbrush, obstructions, and any other vegetation, structures, or obstacles within the limits of the right-of-way; reserving, however, to the landowners, their heirs and assigns, all such rights and privileges as may be used without interfering with or abridging the rights and easement hereby acquired; subject, however, to existing easements for public roads and highways, public utilities, railroads and pipelines.

3. SPONSOR OWNED LANDS: The NFS owns land at the upstream and downstream ends of the project area. The majority of the remaining area is owned by the Board of Regents of the University of Nebraska, though it is anticipated that the LPSNRD has easements covering and/or surrounding Deadmans Run. The exact acreage and extent of these easements will be established through title evidence in Design phase of the project.

4. NON-STANDARD ESTATES: Non-standard estates will not be necessary for the project.

5. EXISTING FEDERAL PROJECTS: No Federal projects are known to exist within the project footprint.

6. FEDERALLY OWNED LANDS: No portion of the project lies within federally owned lands.

7. NAVIGATION SERVITUDE: Navigation Servitude is not applicable and will not be exercised for this project. All lands required for the project are located above ordinary mean high water mark.

8. PROJECT LOCATION: The project site is located in the SW1/4 Section 7 T10N R7E, the NW ¼ and E ½ Section 18 T10N, R7E, 6th P.M. and the NW ¼, SW ¼, and SE ¼ of Section 17 T10N R7E 6th P.M. in Lancaster County. A map of the project site is attached at Exhibit "A".

9. INDUCED FLOODING: The Flood Risk Management (FRM) features will be designed to minimize or prevent induced stages. No induced flooding impacts outside of the Federal project boundary have been identified. Therefore, no additional LER is identified at this time as a necessary acquisition for completion of the project as a result of induced flooding. There is no known impact to flood frequency at the feasibility study level.

10. BASELINE COST ESTIMATE: The baseline cost estimate for the project was prepared with figures from a Cost Estimate prepared by Joel Walker, Staff Review Appraiser, with an effective date of January 5, 2018. The estimated cost for the LER are as follows:

Fee	$ 350,000
Channel Improvement Easements	986,401
Road Easements	110,251
Temporary Work Easements	53,192
Business Relocation Costs	80,000
Estimated Value LER w/o Incidental Cost	$1,579,844

An incremental cost of $55,295 was added to the estimated LER values. This amounts to 3.5% of the estimated value. This cost accounts for the following uncertainties: unknowns caused by a lack of study definition at this preliminary stage; potential cost and value increases from potential development pressures and/or zoning changes; negotiation of purchase price above estimated market value; and potential for excessive condemnation costs and awards.

The estimated total cost for LER, with incidental costs is $1,650,000.

11. **PUBLIC LAW 91-646:** The Sponsor must comply with Public Law 91-646 as they acquire the necessary properties for the project. Fee estate is required for approximately 0.33 acres affecting one land owner. It is anticipated that a business relocation will be required due to the loss of the commercial structure (2100 N 48th Street). A formal relocation plan and survey have not been conducted, but will need to be coordinated and completed by the NFS prior to the initiation of acquisition.

12. MINERALS: There are no known existing third party mineral rights or interest including oil, gas, timber or any other outstanding rights that may need to be resolved for the construction, operation, and maintenance of the project.

13. ASSESSMENT OF LOCAL SPONSOR: Assistant District Counsel Melissa Head prepared an Assessment of the NFS Real Estate Acquisition Capability (attached as **Exhibit "B").** She determined that the NFS has the legal authority and is capable of acquiring the property required for the project.

14. PLANNING AND ZONING: The NFS will be required to acquire all properties necessary to implement the approved FRM plan. This includes lands needed for construction and future O&M activity of the project. No application or enactment of zoning ordinances will be utilized for the proposed Project.

15. ACQUISITION SCHEDULE: The Project Manager will develop a schedule upon the approval of the Real Estate Plan and the Feasibility Study. The NFS must acquire the appropriate lands for the project. No construction will take place until documentation of the acquisitions have been provided, reviewed, and confirmed, as stated in the PPA. The NFS must provide copies of all deeds on tracts of lands required by the project footprint. Further, they must provide the certification by their attorney that they have met the requirements including compliance with P. L. 91-646 through those acquisitions prior to advertisement of the construction contract. The PDT anticipates that a phased construction schedule will be recommended during the Design phase which will allow for a phased acquisition schedule.

The anticipated real estate project activities duration, beginning with the approval of the Feasibility Report is:

Feasibility Report Approval (NWO)	*0 month*
NFS and COE execute PPA	*Within 30-60 days **
Final Project Map drawings to NFS with NTP	Within 10 days after PPA Execution
NFS initiates acquisition responsibilities	Within 10 days of receipt of final ROW
Complete acquisition	8 months
Certify Real Estate	Within 10 days if NFS certification
Construction Contract Award	After RE certification
Begin Construction Phase	Anticipate 12 months minimum time required Between Feasibility Report approval and start of construction

***** number of days required dependent upon NFS's date for coordination/board meeting(s) after the execution of the PPA.

16. FACILITY/UTILITY RELOCATION: No application or enactment of zoning ordinances will be utilized for the proposed Project. At this phase of the project, we are not anticipating any facility or utility relocations will be required.

"ANY CONCLUSION OR CATEGORIZATION CONTAINED IN THIS REAL ESTATE PLAN, OR ELSEWHERE IN THIS PROJECT REPORT, THAT AN ITEM IS A UTILITY OR FACILITY RELOCATION TO BE PERFORMED BY THE NON-FEDERAL SPONSOR AS PART OF ITS LERRD RESPONSIBILITIES IS PRELIMINARY ONLY. THE GOVERNMENT WILL MAKE A FINAL DETERMINATION OF THE RELOCATIONS NECESSARY FOR THE CONSTRUCTION, OPERATION, OR MAINTENANCE OF THE PROJECT AFTER FURTHER

ANALYSIS AND COMPLETION AND APPROVAL OF FINAL ATTORNEY'S OPINIONS OF COMPENSABILITY FOR EACH OF THE IMPACTED UTILITIES AND FACILITIES."

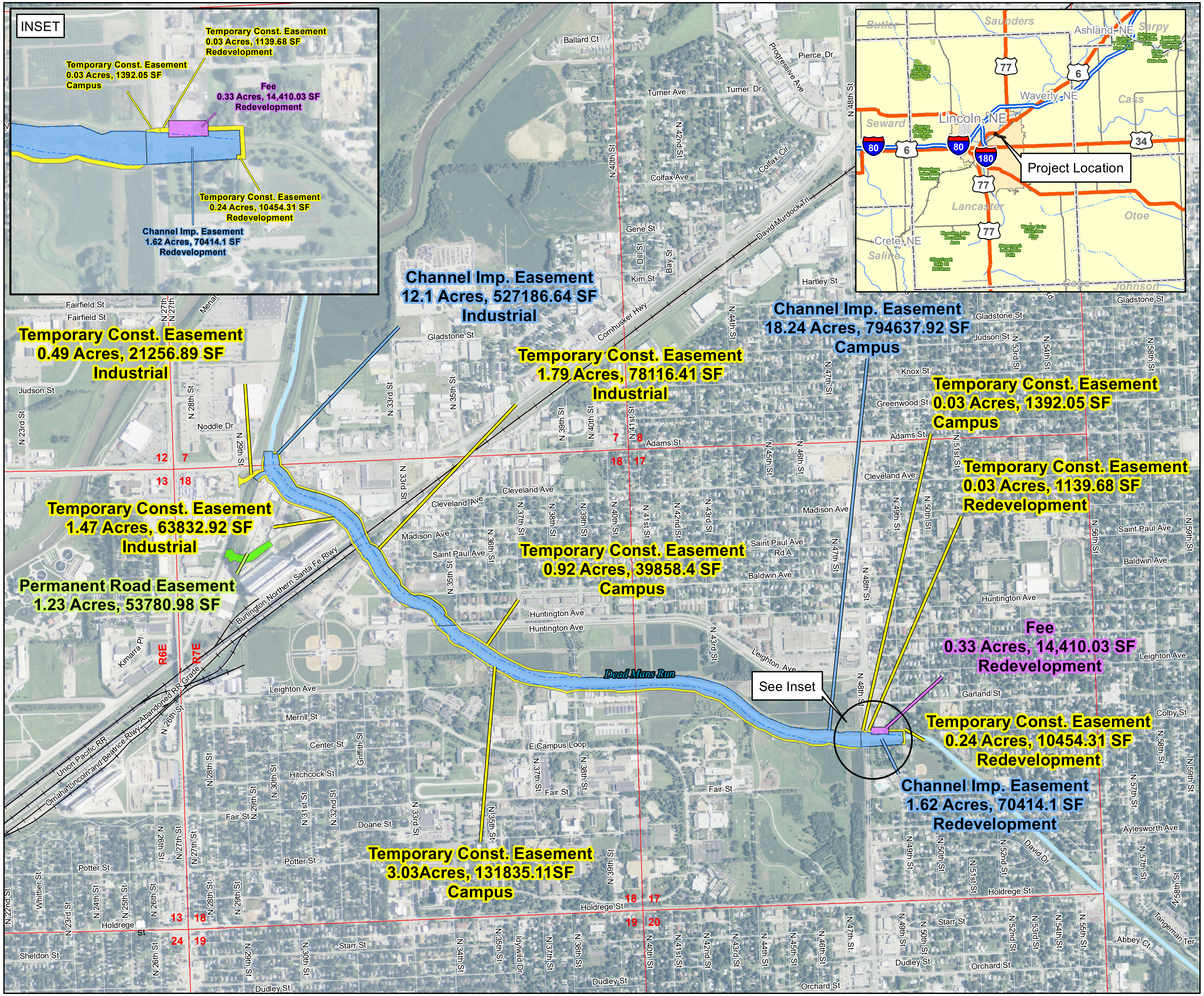
17. HTRW: There are no known or potential HTRW identified within the project area. Environmental engineering shall perform HTRW investigation in design phase. An Environmental Condition of Property Phase 1 evaluation was performed for the Deadmans Run floodplain, with site reconnaissance taking place in February 2015. Several properties of potential were identified, some adjacent to Deadmans Run, which required consideration when evaluating flood risk reduction measures. The primary focus for this project is in the lower reach of the basin downstream of 56th Street. It is noteworthy that there is a high concentration of properties, having the potential for pollutants to be found, located downstream from 33rd Street. Some of the identified sites between 33rd Street and Cornhusker Highway are located close to the Deadmans Run channel. It has been determined that the level of precision provided at the feasibility phase will not allow for the team to confidently determine whether or not any identified sites will be disturbed, and to what level those site would be disturbed. Therefore, it is recommended that this effort be performed during design of any potential project, and the Phase II investigation, if necessary, also be performed at that time.

18. OPPOSITION/SUPPORT OF PROJECT BY LOCAL LANDOWNERS: Public meetings were held in 2015, 2016 and 2017 in Lincoln, Nebraska to discuss the proposed project. All meetings were well attended and the attendees were extremely supportive of the preferred alternative.

19. ACQUISITION PRIOR TO PPA EXECUTION: The NFS has been notified in writing about the risks associated with acquiring land before the execution of the PPA and the Government's formal notice to proceed with acquisition.

20. RECOMMENDATIONS/COMMENTS: Omaha District's Real Estate Division and the project non-Federal Sponsor, the Lower Platte South Natural Resources District, recommends this project for approval.

Prepared by: Sean Keating, Real Estate Division
Date: January 18, 2018



Dead Mans Run

Lancaster County, NE

N
W E
S

T10N
6th P.M.

Legend

- Existing Channel
- Creeks and Streams
- Railroads
- Streets
- Sections
- Fee
- Channel Improvement Easement
- Permanent Road Easement
- Temporary Construction Easement

Disclaimer: The Government furnishes this data and the recipient accepts and uses it with the express understanding that the United States Government makes no warranties, expressed or implied, concerning the accuracy, completeness, reliability, usability, or suitability for any particular purpose of the information and data furnished. The United States shall be under no liability whatsoever to any person by reason of any use made thereof. Data displayed on this map are approximations derived from GIS layers and should NOT be used in place of survey data or legal land descriptions.

0 600 1,200 2,400 Feet

Real Estate
RE-S

Produced By:
Jesse Otterson

Production Date:
January 16, 2018

Revised By:
Jesse Otterson

Revision Date:
March 12, 2018

US Army Corps of Engineers ®
Omaha District

File Location:
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SECTION 205 PROJECT
DEADMANS RUN
LINCOLN, NE
ASSESSMENT OF NON-FEDERAL SPONSOR'S
REAL ESTATE ACQUISITION CAPABILITY

I. Legal Authority:

a. Does the sponsor have legal authority to acquire and hold title to real property for project purposes?
Yes

b. Does the sponsor have the power of eminent domain for this project?
Yes

c. Does the sponsor have "quick-take" authority for this project?
Unknown

d. Are any of the lands/interests in land required for the project located outside the sponsor's political boundary?
No

e. Are any of the lands/interests in land required for the project owned by an entity whose property the sponsor cannot condemn?
No

II. Human Resource Requirements:

a. Will the sponsor's in-house staff require training to become familiar with the real estate requirements of Federal projects including P.L. 91-646, as amended?
No

b. If the answer to II a. is "yes," has a reasonable plan been developed to provide such training?

c. Does the sponsor's in-house staff have sufficient real estate acquisition experience to meet its responsibilities for the project?
Yes

d. Is the sponsor's projected in-house staffing level sufficient considering its other work load, if any, and the project schedule?
Yes

e. Can the sponsor obtain contractor support, if required in a timely fashion?
Yes

f. Will the sponsor likely request USACE assistance in acquiring real estate?
No

III. Other Project Variables:

a. Will the sponsor's staff be located within reasonable proximity to the project site?
Yes

b. Has the sponsor approved the project/real estate schedule/milestones?
Yes

EXHIBIT "B"

IV. Overall Assessment:

a. Has the sponsor performed satisfactorily on other USACE projects?

Yes

b. With regard to this project, the sponsor is anticipated to be:

Fully capable

V. Coordination:

a. Has this assessment been coordinated with the sponsor?

Yes

b. Does the sponsor concur with this assessment?

Yes coordinated with Paul Zillig: General Manager Lower Platte South NRD 402-476-2729

Prepared by:

Melissa M Head

Melissa M Head
Assistant District Counsel

Reviewed and approved by:

Susan Goding

Susan L. Goding
Chief, Real Estate Division

US Army Corps of Engineers ®
Omaha District

DEADMANS RUN
LINCOLN, NEBRASKA

SECTION 205 – FLOOD RISK MANAGEMENT

FEASIBILITY REPORT

APPENDIX I
COST ENGINEERING

AUGUST 2018

COST ENGINEERING APPENDIX

I. OVERVIEW OF APPENDIX

This cost appendix provides a summary explanation of the project assumptions and other cost related aspects of the project. Greater detail on many project topics can be found in the other technical appendices.

II. CONTRACT AQUISITION

Typical construction methods are assumed for this project. The cost estimate is based on a single contract being awarded to a prime contractor who performs major earthmoving such as the stream widening. Other aspects of the job, such as flume construction are assumed to be performed by sub-contractors.

III. COST METHODOLOGY

A. General

The costs in this Fully Funded Estimate (FFE) are considered to be fair and reasonable to a well-equipped and capable contractor and include overhead and profit. The preparation of this estimate was created in accordance with "ER 1110-1-1300 – Cost Engineering Policy and General Requirements, (26 March 1993)" and "ER 1110-2-1302 – Civil Works Cost Engineering, (15 September 2008)". The Fully Funded Estimate (FFE) was completed in accordance with "EM 1110-2-1304 – Civil Works Construction Cost Index System (CWCCIS), (revised 30 Semptember 2017)".

The estimate was developed using Micro Computer Aided Cost Estimate System (MCACES) MII v4.3 cost estimating software. Material prices were developed using the MII Cost Book, R.S. Means references, and quotes obtained from suppliers.

B. Direct Cost

Direct costs are based on the anticipated material, equipment, and labor needed to construct the project based on the current scope of work. Direct costs were calculated independent of the contractor assigned to perform the work. Contractor assignments were determined after the formulation of the direct costs.

1. **Labor-Rate Determination**
   Labor Rates are based on 2018 Lincoln Labor Rates, from R.S. Means.

2. **Equipment Rates**
   All equipment costs are from MII Equipment Region 5, 2016 and MII English Cost Book 2016 adjusted with inflation factors to 2018Q1 cost levels.

3. **Sales Tax**
   Local taxes are applied to the project.

4. **Productivity**
   An average productivity factor for the estimate was used to account for work and access limitations.

C. Indirect Costs
The following indirect costs were applied in the formulation of this cost estimate.

1. **Prime Contractor**

   a. **Job Office Overhead (JOOH)**

   b. **Home Office Overhead (HOOH)**

   c. **Profit**

   d. **Bond and Liability Insurance**

   e. **Sub-Contractor**
      1) Job Office Overhead (JOOH)
      2) Home Office Overhead (HOOH)
      3) Profit

D. Other Assumptions

1. **Government Furnished Materials**
   The estimate is based on no government furnished materials.

2. **Weather Inefficiency**
   At this phase of design, there are no weather inefficiency markups/delays expected due projected weather delay impacts.

3. **Site Access**
   No cost is included in the estimates for the maintenance and repair of local or county roads.

4. **Waste Disposal**
   Waste will be hauled off-site to the landfill within 5 miles of the project area.

5. **Riprap and Rock**
   Costs for rip rap and spalls are in line with the unit prices for riprap for previous bids at Little Papio in the Lincoln, NE area.

7. **Material Factors**
   The following material factors were applied to various materials in this estimate.

   Random Fill:
   LCY= 1.25 BCY
   BCY = 0.9 ECY

   Clay Swell:
   LCY= 1.4 BCY

   Gravel Swell:
   LCY= 1.1BCY

Concrete and Asphalt:
LCY= 1.4 CY

IV. PROJECT MARKUPS

The following project markups are added to the construction costs to determine the magnitude of the total project cost from start of design to completed project.

A. Escalation
Escalation rates were calculated using the Total Project Cost Summary spreadsheet.

B. Contingencies
An abbreviated Cost and Schedule Risk Analysis has been performed to generate risk based contingency rates for total weighted construction, PED, and construction management.

C. (WBS 30) Planning, Engineering, and Design (PED)
The work covered under this account includes the project management, engineering, and design costs spent to date as well as the remaining estimated costs that will be associated with the engineering and design for this project.

D. (WBS 31) Construction Management
The work covered under this account includes the expected costs for contract supervision, contract and construction administration, technical management activities, district office supervision, and administration costs.

V. TOTAL PROJECT COST SUMMARY (TPCS)

The TPCS was prepared using the latest TPCS excel spreadsheet provided by the USACE, Walla Walla District. The TPCS incorporates the construction cost developed in the MII, the project markups, and the functional costs.

**** TOTAL PROJECT COST SUMMARY ****

PROJECT: **Deadmans Run** DISTRICT: **Omaha** PREPARED: **3/23/2018**
PROJECT NO: **393779**
LOCATION: **Lincoln, NE** POC: **Steven Kemp**

This Estimate reflects the scope and schedule in report; Deadmans Run, Lincoln, NE Sec 205

Civil Works Work Breakdown Structure		**ESTIMATED COST**				**PROJECT FIRST COST (Constant Dollar Basis)**						**TOTAL PROJECT COST (FULLY FUNDED)**			
						Program Year (Budget EC): 2018									
						Effective Price Level Date: 1-Oct- 17									
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	REMAINING COST ($K)	Spent Thru: 1-Mar-18 ($K)	**TOTAL FIRST COST ($K)**	ESC (%)	COST ($K)	CNTG ($K)	FULL ($K)
02	RELOCATIONS	$577	$133	23%	$710		$577	$133	$710		$710	6.7%	$616	$142	$758
09	CHANNELS AND CANALS	$3,872	$891	23%	$4,762		$3,872	$891	$4,762		$4,762	8.3%	$4,193	$964	$5,158
15	FLOODWAY CONTROL AND DIVERSIO	$1,687	$388	23%	$2,075		$1,687	$388	$2,075		$2,075	6.7%	$1,801	$414	$2,215
16	BANK STABILIZATION	$2,122	$488	23%	$2,610		$2,122	$488	$2,610		$2,610	5.9%	$2,247	$517	$2,764
	CONSTRUCTION ESTIMATE TOTALS:	$8,258	$1,899		$10,158		$8,258	$1,899	$10,158		$10,158	7.2%	$8,857	$2,037	$10,894
01	LANDS AND DAMAGES	$1,580	$70	4%	$1,650		$1,580	$70	$1,650		$1,650	5.7%	$1,669	$74	$1,743
30	PLANNING, ENGINEERING & DESIGN	$705	$162	23%	$867		$705	$162	$867		$867	7.8%	$760	$175	$935
31	CONSTRUCTION MANAGEMENT	$496	$114	23%	$610		$496	$114	$610		$610	17.3%	$582	$134	$715
	PROJECT COST TOTALS:	$11,039	$2,246	20%	$13,285		$11,039	$2,246	$13,285		**$13,285**	7.5%	$11,868	$2,420	$14,288

______________________ Steven Kemp

______________________ Jeff Bohlken

______________________ Sue Goding

______________________ CHIEF, PLANNING, XXX

______________________ CHIEF, ENGINEERING, XXX

______________________ CHIEF, OPERATIONS, XXX

______________________ CHIEF, CONSTRUCTION, XXX

______________________ CHIEF, CONTRACTING, XXX

______________________ CHIEF, PM-PB, xxxx

______________________ CHIEF, DPM, XXX

ESTIMATED TOTAL PROJECT COST:		**$14,288**
ESTIMATED FEDERAL COST:	65%	$9,287
ESTIMATED NON-FEDERAL COST:	35%	$5,001
22 - FEASIBILITY STUDY (CAP studies):		**$1,300**
ESTIMATED FEDERAL COST:	54%	$700
ESTIMATED NON-FEDERAL COST:	46%	$600
ESTIMATED FEDERAL COST OF PROJECT		**$9,987**

**** TOTAL PROJECT COST SUMMARY ****

**** CONTRACT COST SUMMARY ****

PROJECT: Deadmans Run
LOCATION: Lincoln, NE
This Estimate reflects the scope and schedule in report; Deadmans Run, Lincoln, NE Sec 205

DISTRICT: Omaha
POC: Steven Kemp

PREPARED: 3/23/2018

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: 23-Mar-18				Program Year (Budget EC): 2018								
		Estimate Price Level: 1-Oct-17				Effective Price Level Date: 1 -Oct-17								
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	RISK BASED CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	ESC (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*	*P*	*L*	*M*	*N*	*O*
	PHASE 1 or CONTRACT 1													
02	RELOCATIONS	$577	$133	23.0%	$710		$577	$133	$710	2021Q2	6.7%	$616	$142	$758
09	CHANNELS AND CANALS	$3,872	$891	23.0%	$4,762		$3,872	$891	$4,762	2022Q1	8.3%	$4,193	$964	$5,158
15	FLOODWAY CONTROL AND DIVERSIO	$1,687	$388	23.0%	$2,075		$1,687	$388	$2,075	2021Q2	6.7%	$1,801	$414	$2,215
16	BANK STABILIZATION	$2,122	$488	23.0%	$2,610		$2,122	$488	$2,610	2022Q1	5.9%	$2,247	$517	$2,764
	CONSTRUCTION ESTIMATE TOTALS:	$8,258	$1,899	23.0%	$10,158		$8,258	$1,899	$10,158			$8,857	$2,037	$10,894
01	LANDS AND DAMAGES	$1,580	$70	4.4%	$1,650		$1,580	$70	$1,650	2020Q4	5.7%	$1,669	$74	$1,743
30	PLANNING, ENGINEERING & DESIGN													
1.0%	Project Management	$83	$19	23.0%	$102		$83	$19	$102	2019Q2	4.9%	$87	$20	$107
1.0%	Planning & Environmental Compliance	$83	$19	23.0%	$102		$83	$19	$102	2019Q2	4.9%	$87	$20	$107
1.5%	Engineering & Design	$124	$29	23.0%	$153		$124	$29	$153	2019Q2	4.9%	$130	$30	$160
1.0%	Engineering Tech Review ITR & VE	$83	$19	23.0%	$102		$83	$19	$102	2019Q2	4.9%	$87	$20	$107
1.0%	Contracting & Reprographics	$83	$19	23.0%	$102		$83	$19	$102	2019Q2	4.9%	$87	$20	$107
1.0%	Engineering During Construction	$83	$19	23.0%	$102		$83	$19	$102	2022Q1	17.3%	$97	$22	$120
1.0%	Planning During Construction	$83	$19	23.0%	$102		$83	$19	$102	2022Q1	17.3%	$97	$22	$120
1.0%	Project Operations	$83	$19	23.0%	$102		$83	$19	$102	2019Q2	4.9%	$87	$20	$107
	Pre-Construction Monitoring													
	Post Construction Monitoring													
31	CONSTRUCTION MANAGEMENT													
3.0%	Construction Management	$248	$57	23.0%	$305		$248	$57	$305	2022Q1	17.3%	$291	$67	$358
2.0%	Project Operation:	$165	$38	23.0%	$203		$165	$38	$203	2022Q1	17.3%	$194	$45	$238
1.0%	Project Management	$83	$19	23.0%	$102		$83	$19	$102	2022Q1	17.3%	$97	$22	$120
	CONTRACT COST TOTALS:	$11,039	$2,246		$13,285		$11,039	$2,246	**$13,285**			$11,868	$2,420	**$14,288**

CI17133 DMR Sec 205
Concrete and Asphalt Swell %= 40%
Random Fill Swell % = 25%
Clay Swell % = 40%
Gravel Swell % = 10%

UPDATED Selected Plan

Estimated by	CENWO-ED-C
Designed by	
Prepared by	Elizabeth Lien
Preparation Date	3/23/2018
Effective Date of Pricing	3/23/2018
Estimated Construction Time	Days

Currency in US dollars

Description	ContractCost	ProjectCost
WBS	**11,108,825**	**13,284,355**
DEADMANS RUN PROJECT	**11,108,825**	**13,284,355**
CONSTRUCTION COSTS	**8,258,442**	**10,157,884**
02 RELOCATIONS	**577,264**	**710,035**
09 CHANNELS AND CANALS	**3,871,904**	**4,762,442**
15 FLOODWAY CONTROL AND DIVERSION STRUCTURES	**1,687,390**	**2,075,490**
16 BANK STABILIZATION	**2,121,883**	**2,609,917**
PROJECT COSTS	**2,850,383**	**3,126,471**
30 PLANNING, ENGINEERING, AND DESIGN	**704,876**	**866,998**
31 CONSTRUCTION MANAGEMENT	**495,507**	**609,473**
REAL ESTATE COST	**1,650,000**	**1,650,000**

Labor ID: EQ ID: EP16R05 Currency in US dollars TRACES MII Version 4.3

CI16902 Deadman's Run

Selected Plan prior to the removal of vehicle bridges and detention basin

Estimated by	CENWO-ED-C
Designed by	
Prepared by	Elizabeth Lien
Preparation Date	6/23/2017
Effective Date of Pricing	4/1/2017
Estimated Construction Time	Days

Description	ContractCost	ProjectCost
WBS Summary	**21,334,952**	**25,591,160**
Deadmans Run (Final)	**21,334,952**	**25,591,160**
CONSTRUCTION COSTS	**15,874,132**	**19,525,183**
02 RELOCATIONS	**5,380,802**	**6,618,386**
09 CHANNELS AND CANALS	**4,264,350**	**5,245,151**
15 FLOODWAY CONTROL AND DIVERSION STRUCTURES	**3,691,405**	**4,540,428**
16 BANK STABILIZATION	**2,537,575**	**3,121,217**
PROJECT COSTS	**5,460,820**	**6,065,977**
30 PLANNING, ENGINEERING, AND DESIGN	**1,678,672**	**2,064,766**
31 CONSTRUCTION MANAGEMENT	**952,448**	**1,171,511**
REAL ESTATE COST	**2,829,700**	**2,829,700**

Labor ID: EQ ID: EP14R05 Currency in US dollars TRACES MII Version 4.3

CI16723 Deadmans Run Optimization

Estimated by CENWO-ED-C
Designed by
Prepared by Elizabeth Lien

Preparation Date 1/4/2017
Effective Date of Pricing 1/4/2017
Estimated Construction Time Days

Description	ContractCost	ProjectCost
WBS Summary	**93,962,923**	**107,758,254**
100 Year Optimization (TSP)	**21,667,723**	**24,788,657**
CONSTRUCTION COSTS	**15,006,511**	**17,707,683**
02 RELOCATIONS	**5,500,574**	**6,490,678**
09 CHANNELS AND CANALS	**3,833,686**	**4,523,749**
15 FLOODWAY CONTROL AND DIVERSION STRUCTURES	**3,139,030**	**3,704,055**
16 BANK STABILIZATION	**2,533,221**	**2,989,201**
PROJECT COSTS	**6,661,212**	**7,080,974**
30 PLANNING, ENGINEERING, AND DESIGN	**1,350,586**	**1,593,691**
31 CONSTRUCTION MANAGEMENT	**981,426**	**1,158,082**
Real Estate Costs	**4,329,200**	**4,329,200**
50 Year Optimization	**21,378,234**	**24,462,252**
CONSTRUCTION COSTS	**14,829,006**	**17,498,227**
02 RELOCATIONS	**5,500,574**	**6,490,678**
09 CHANNELS AND CANALS	**3,662,060**	**4,321,230**
15 FLOODWAY CONTROL AND DIVERSION STRUCTURES	**3,139,030**	**3,704,055**
16 BANK STABILIZATION	**2,527,342**	**2,982,264**
PROJECT COSTS	**6,549,228**	**6,964,025**
30 PLANNING, ENGINEERING, AND DESIGN	**1,334,611**	**1,574,840**
31 CONSTRUCTION MANAGEMENT	**969,817**	**1,144,384**
Real Estate Costs	**4,244,800**	**4,244,800**
120 Year Optimization	**24,722,105**	**28,384,746**
CONSTRUCTION COSTS	**17,611,222**	**20,781,242**
02 RELOCATIONS	**7,942,339**	**9,371,960**
09 CHANNELS AND CANALS	**3,991,727**	**4,710,238**
15 FLOODWAY CONTROL AND DIVERSION STRUCTURES	**3,139,030**	**3,704,055**
16 BANK STABILIZATION	**2,538,126**	**2,994,988**
PROJECT COSTS	**7,110,884**	**7,603,505**
30 PLANNING, ENGINEERING, AND DESIGN	**1,585,010**	**1,870,312**
31 CONSTRUCTION MANAGEMENT	**1,151,774**	**1,359,093**

Labor ID: EQ ID: EP14R05 Currency in US dollars TRACES MII Version 4.3

Description	ContractCost	ProjectCost
Real Estate Costs	4,374,100	4,374,100
120+ Year Optimization	26,194,861	30,122,598
CONSTRUCTION COSTS	18,885,894	22,285,354
02 RELOCATIONS	10,355,505	12,219,496
09 CHANNELS AND CANALS	3,991,727	4,710,238
15 FLOODWAY CONTROL AND DIVERSION STRUCTURES	2,000,536	2,360,633
16 BANK STABILIZATION	2,538,126	2,994,988
PROJECT COSTS	7,308,968	7,837,244
30 PLANNING, ENGINEERING, AND DESIGN	1,699,730	2,005,682
31 CONSTRUCTION MANAGEMENT	1,235,137	1,457,462
Real Estate Costs	4,374,100	4,374,100

Currency in US dollars

CI16723 Deadmans Run Alternative Formulation

Estimated by	CENWO-ED-C
Designed by	
Prepared by	Elizabeth Lien
Preparation Date	1/4/2017
Effective Date of Pricing	1/4/2017
Estimated Construction Time	Days

Description	ContractCost	ProjectCost
WBS Summary	**41,671,133**	**46,615,603**
Alternative #1	**21,249,011**	**23,870,113**
CONSTRUCTION COSTS	**15,123,776**	**17,392,343**
02 RELOCATIONS	**4,483,918**	**5,156,506**
09 CHANNELS AND CANALS	**4,607,075**	**5,298,136**
14 RECREATION FACILITIES	**75,223**	**86,506**
15 FLOODWAY CONTROL AND DIVERSION STRUCTURES	**3,139,030**	**3,609,885**
16 BANK STABILIZATION	**2,818,530**	**3,241,309**
PROJECT COSTS	**6,125,235**	**6,477,770**
30 PLANNING, ENGINEERING, AND DESIGN	**1,361,140**	**1,565,311**
31 CONSTRUCTION MANAGEMENT	**989,095**	**1,137,459**
REAL ESTATE COST	**3,775,000**	**3,775,000**
Alternative #2	**20,422,122**	**22,745,490**
CONSTRUCTION COSTS	**13,405,853**	**15,416,731**
02 RELOCATIONS	**3,180,282**	**3,657,325**
09 CHANNELS AND CANALS	**4,607,075**	**5,298,136**
11 LEVEES AND FLOODWALLS	**724,206**	**832,837**
14 RECREATION FACILITIES	**75,223**	**86,506**
15 FLOODWAY CONTROL AND DIVERSION STRUCTURES	**2,000,536**	**2,300,617**
16 BANK STABILIZATION	**2,818,530**	**3,241,309**
PROJECT COSTS	**7,016,269**	**7,328,760**
30 PLANNING, ENGINEERING, AND DESIGN	**1,206,527**	**1,387,506**
31 CONSTRUCTION MANAGEMENT	**876,743**	**1,008,254**
REAL ESTATE COST	**4,933,000**	**4,933,000**

Labor ID: EQ ID: EP14R05 Currency in US dollars TRACES MII Version 4.3

US Army Corps of Engineers ®
Omaha District

DEADMANS RUN
LINCOLN, NEBRASKA

SECTION 205 – FLOOD RISK MANAGEMENT

FEASIBILITY REPORT

APPENDIX K
CULTURAL RESOURCES

AUGUST 2018

Cultural Resources

Background

The following cultural history summary is taken from Simons, et. al. (2012). Archaeologists generally divide the pre-contact cultural sequence of the Great Plains into two pre-ceramic and three ceramic stages. The earliest pre-ceramic stage is often designated the Paleoindian Period and dated from more than 10000 to about 4500 BC. Following the first pre-ceramic stage is the Archaic Period, which dates from 4500 BC to AD 1. The first ceramic stage, the Plains Woodland Period, dates from AD 1 to 950. The next ceramic stage, termed the Plains Village Period, dates from AD 950 to 1500. The final pre-contact stage in the Great Plains, known as the Late Prehistoric, Proto-historic, or Post-Classic stage, dates from AD 1500 to 1800.

Following the pre-contact stages in the Great Plains is the historic period, which generally dates from AD 1800 to the present. During the final pre-contact stage, considerable overlap with the historic period occurs because of the introduction of European cultural influence and technology. It was also the beginning of the written accounts of events. The stages of cultural development in the Plains are defined by changes in technology, settlement, and subsistence. None of the cultural stages is considered confined to their particular range of dates and can fluctuate across regions within the Great Plains.

During the last 2,000 years, the Great Plains witnessed considerable changes in the distributions of native peoples. A variety of peoples have moved in (and out) of the Plains. A primary attraction was bison hunting, often coupled with increasing reliance upon horticulture, especially in the eastern portion of the Plains. This changing cultural landscape is reflected in the region's prehistoric archaeological record, outlined above. Among the groups coming into the vicinity of the present project area were speakers of Caddoan languages, prominent among which were the Pawnee, who probably entered the region around 1,000 years ago from the south.

Several hundred years later, speakers of the Chiwere group of Siouan languages split off from the Winnebago living in the vicinity of the western Great Lakes region. Their southwestward movements are represented archaeologically by the Oneota Tradition . This group split into three tribes; the Iowa, Missouri, and Otoe, who largely settled west of the Mississippi River and east/south from the Missouri River. By approximately 300-250 years ago, the Otoe were in southeastern Nebraska. There, they probably occupied lands formerly inhabited by the Pawnee whose population shifted westward to more actively pursue bison hunting following introduction of the horse.

The advance of the Euro Americans into the area came in the form of three distinct frontiers. The first was the movement of the fur traders into the region. While they were few in number, the changes created by the traders in the Indian way of life were tremendous, and the successful advance of the later military and agricultural frontiers was in part dependent on these changes. The advances in major means of transportation shaped, and modified these advancing frontiers. These advances in transportation include the development of river transportation and the use of the steamboat, the development of the inland road system with its military roads and stage and freight lines, and finally the great mover of the area, the railroad.

Local folklore attributes the name “Dead Man’s Run” to one of two stories, as described below by Jim McKee of the Lincoln Journal Star and the former Lee Booksellers:

“There are two stories which relate to Dead Man's Run. Either one may be partially correct or totally wrong but the stories are all we have and seem to persist to this day. One thing to keep in mind is that the word "run" also means a creek or small bit of running water.

One version has a family travelling on the trail which went through Weeping Water to Lincoln and stopping for the night on the south bank of the creek about where Gateway Shopping Center now sits. A son was sent down to the creek for water and when there he saw a dead man lying beside the stream. He ran back for his father and when they got back the body was gone...he had "run." The man who told the story about himself as a young man later became an elected official in Lincoln and was never known for fabricating stories so it may have a basis in fact.

The other story is a bit more fanciful. A man was being pursued on foot by two American Indians who chased him to the banks of the stream where he collapsed. They took him for dead and left, but he was playing possum and "run."”

Existing conditions

There are ten properties listed on the National Register of Historic Places within one mile of the study boundary. No listed properties are within the study area.

Historic Place Name	Address
Wyuka Cemetery	3600 O St.
Kiesselbach, Theodore A., House	3232 Holdrege St.
Burnett, Edgar A., House	3256 Holdrege St.
St. Charles Apartments	4717 Baldwin Ave.
University Place Historic Residential District	Roughly Walker Ave. (51st-54Sts.), Leighton Ave. (49th-53rd Sts.)
Old Main, Nebraska Wesleyan University	50th and St. Paul Sts.
Phi Kappa Tau Fraternity House	5305 Huntington Ave.
First State Bank of Bethany	1551 N. Cotner Blvd.
Beattie, James A., House	6706 Colby St.
Whitehall	5903 Walker

A final file search with the Nebraska State Historical Society dated December 21, 2017, revealed five sites recorded within .25 miles of the study boundary. No sites are recorded within the study area.

Site Number	Description
25LC90	Prehistoric artifact scatter
25LC506	Capital Mills- historic foundation/artifacts
25 LC99	Historic artifacts
25LC193	Stuart Seed Lab- historic standing or collapsed buildings/ artifacts
25LC106	Historic artifacts

In addition, there is one Pratt pony truss bridge crossing Dead Man's Run at 38th St. on UNL's East Campus, and one steel stringer bridge (formerly Missouri Pacific Railroad, now pedestrian use only on the Mopac Trail). Both structures are listed with construction dates of 1971.

On April 12, 2018, a pedestrian survey was conducted within the Area of Potential Effect (APE). A small amount of historic artifacts were identified along the northeastern edge of the APE, but no new sites were recorded. The Corps made a determination of No Historic Properties Affected for the proposed project, and received concurrence from the Nebraska State Historic Preservation Office on April 17, 2018.

References

http://www.northeast59.com/class_forum.cfm. Message #444. Accessed June 30, 2015.

Parks, Stanley, Stacy Stupka-Burda, and Susan Tanner

1998 1997 Archeological Inventory and Testing of the Antelope Valley Major Investment Study Area, Lincoln, Nebraska.

Parks, Stanley M. and Stacy Stupka-Burda

2000 Archeological Inventory and National Register Testing of Sites 25LC90, 25LC99, and 25LC506, Antelope Valley Study Area, Lincoln, NE: An Addendum To: 1997 Archeological Inventory and Testing of the Antelope Valley Major Investment Study Area, Lincoln, Nebraska.

Simons, et. al.

2012 A Cultural Resources Survey of Three Reservoirs in the Salt Creek Watershed, Lancaster County, Nebraska. Heritage Services. Prepared for the U. S. Army Corps of Engineers, Omaha District, under Contract Number W9128F-11-P-0153.

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
1616 CAPITOL AVENUE
OMAHA NE 68102-4901

REPLY TO
ATTENTION OF

16 March 2018

Planning, Programs, and Project Management Division

Jill Dolberg, Deputy SHPO
Review and Compliance Coordinator
Nebraska State Historical Society
State Historic Preservation Office
1500 R Street
PO Box 82554
Lincoln, Nebraska 68501-2554

Dear Ms. Dolberg:

The U.S. Army Corps of Engineers (USACE) is preparing a flood risk management study that is being carried out under the authority of Section 205 of the 1948 Flood Control Act, (P.L. 80-858), as amended. Under Section 205, USACE is authorized to study and construct projects to reduce the risks of flooding, loss of life, and property damage in partnership with state and local governments. The non-federal sponsor for this study is the Lower Platte South Natural Resource District (LPS NRD) in Lincoln, Nebraska. In April of 2012, the LPS NRD submitted a request for the USACE Omaha District to analyze potential solutions to reduce flood risks within the city of Lincoln (Enclosure 1). Historical urbanization and development has led to an increased flood risk within the city of Lincoln.

During the course of this study, USACE has developed alternatives and has chosen a recommended plan. This recommended plan is called alternative one. The focus of this alternative was on increasing channel conveyance by widening the channel. This plan requires channel widening and a flume beneath the railroad bridges that form the core of the effort to lower flood stages (Enclosure 2). It was also determined that the existing access road to the grain elevator and other industrial facilities along the right bank of the West Tributary needed to be relocated. The existing access road does not have sufficient space beneath it to accommodate an additional culvert. Additionally, the further the access road is placed upstream of the confluence with Deadmans Run, the more effective the culverts underneath the roadway will be at passing flows.

The USACE performed a file search for Historic Properties within the study area. The file search yielded five cultural resources (See enclosures 3 and 4). Three of the five cultural resources have unknown eligibility (25LC90, 25LC506, 25LC99). The remaining two cultural resources have non-eligible determinations for National Register listing (25LC193 and 25LC106). Only one cultural resource is within the area of potential effect (25LC106). In addition to the cultural resources, the file search listed two surveys that have been performed within the study area (Enclosure 5). Both of these surveys have been completed within the last 20 years (1998 and 2000).

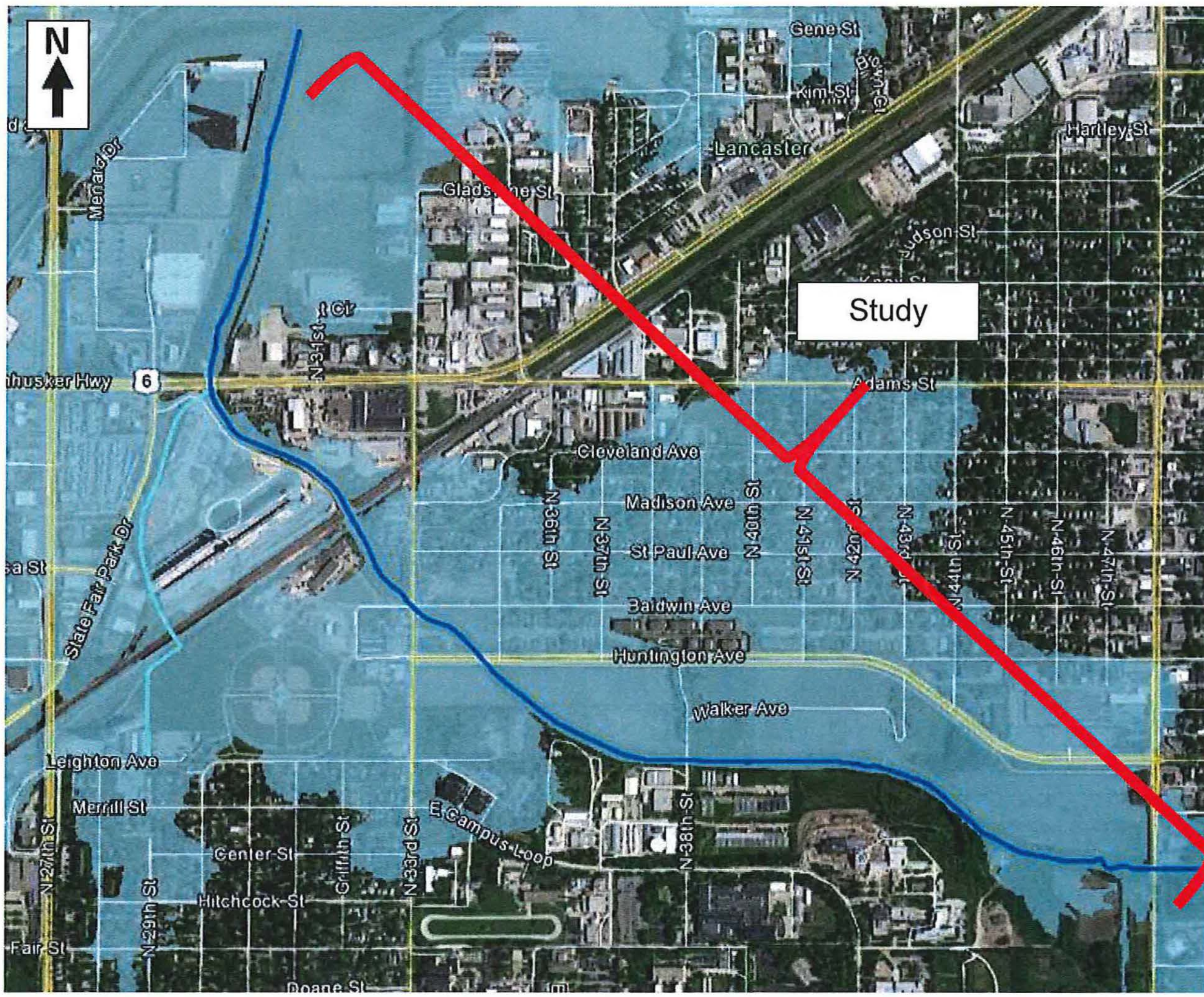
The USACE has made a determination of **No Historic Properties Affected (800.4 (d) (1))** for the recommended plan. We seek your concurrence regarding this determination. As further alternatives are developed, we plan to keep your office informed about any potential changes.

If you have any questions, please feel free to contact archeologist, Ms. Sandra Barnum at (402) 995-2674 or by email at sandra.v.barnum@usace.army.mil.

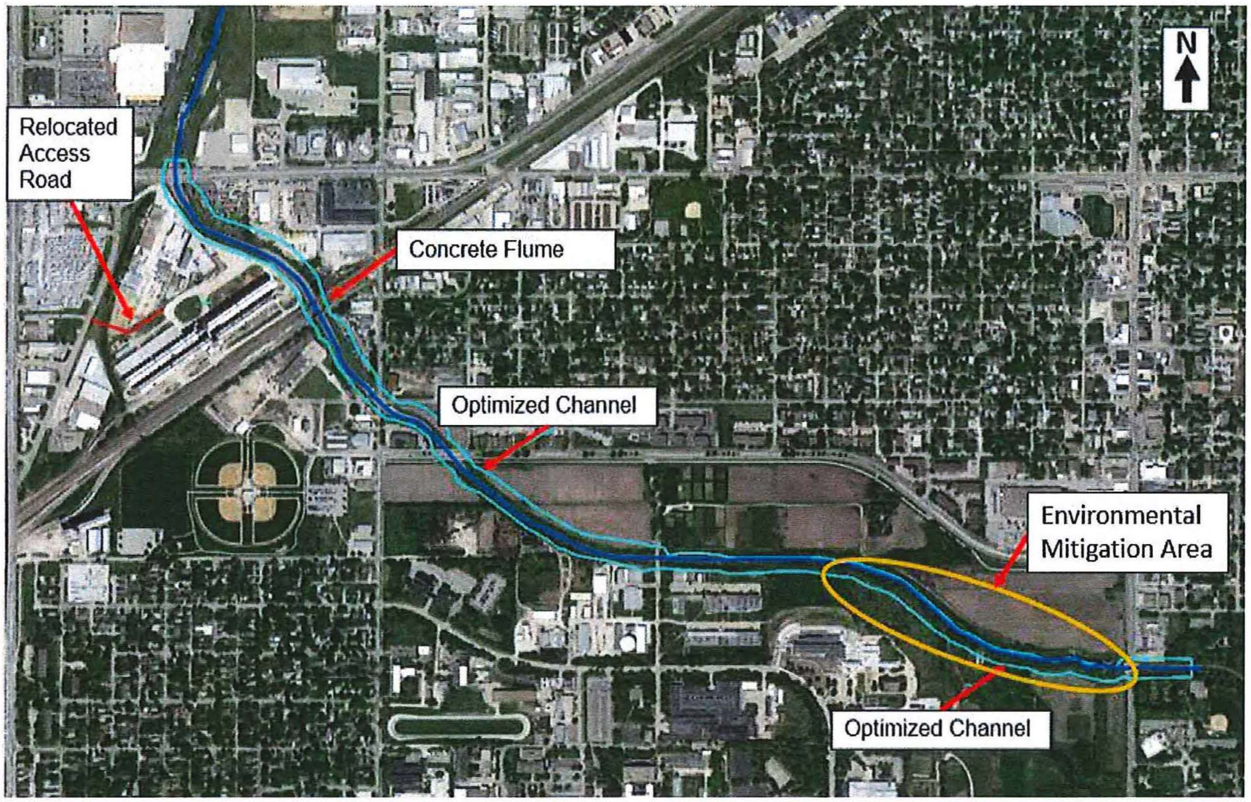
Sincerely,

Eric A. Laux
Section Chief
Environmental Section
Planning Branch

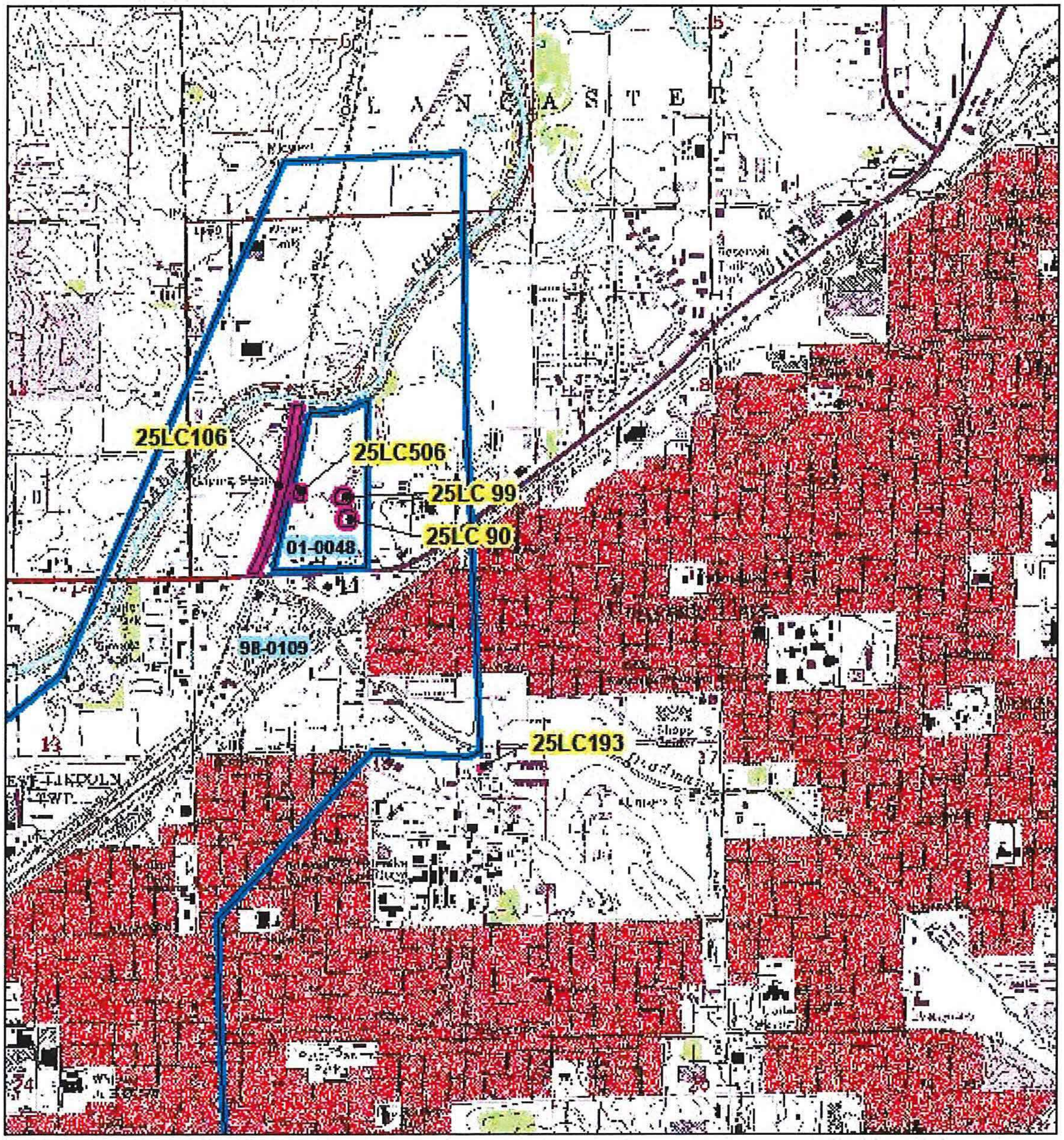
Encls:



Enclosure 1: Deadmans Run Study Area with Existing 1% Annual Chance Exceedance (ACE) Event Floodplain (light blue)



Enclosure 2: Alternative #1 Overview



Recorded Archeological Sites & Surveys within Requested Area

archeo_site

archeo_survey

0 1 Mile

Nebraska
STATE HISTORICAL SOCIETY

Enclosure 3: Nebraska File Search Results Map

SITE_NO	NAME	DESCRIPT	FUNCTION	CONTEXT	ARTIFCOL	STATUS	COND	NATREG	OWNER	DATE_
LC 90		UNK	UNK	WD UNP UNH	BYS	REP	DIS	UNK	PRI	7/23/1997
LC506	CAPITAL MILLS	BUR	OTH	EA-ICE	HAS	TES	DIS	UNK	PRI STA	9/17/1997
LC 99		OTH	OTH	EA-URB		REP	DIS	UNK	PRI	4/15/1998
LC193	STUART SEED LAB MOD.	BUR	OTH	EA-EDU	HAS FAR	PEX	DIS	NEL	STA	11/1/2007
LC106		UNK	UNK	UNH	HAS	PEX	DIS	NEL	OTH	12/15/1997

Attachment 4: Nebraska File Search Results for Cultural Resources

SURNO	REF	DATE_	Reference
01-0048	Parks and Stupka-Burda 2000	11/1/2000	Parks, Stanley M. and Stacy Stupka-Burda 2000 Archeological Inventory and National Register Testing of Sites 25LC90, 25LC99, and 25LC506, Antelope Valley Study Area, Lincoln, NE: An Addendum To: 1997 Archeological Inventory and Testing of the Antelope
98-0109	Parks et al. 1998	5/4/1998	Parks, Stanley, Stacy Stupka-Burda, and Susan Tanner 1998 1997 Archeological Inventory and Testing of the Antelope Valley Major Investment Study Area, Lincoln, Nebraska.

Attachment 5: Nebraska File Search Results for Cultural Resource Inventories

History NEBRASKA

Preserving the past. Building the future.

Eric Laux
Section Chief, Environmental Section, Planning Branch
Department of the Army Corps of Engineers (USACE)
Omaha District
1616 Capitol Ave
Omaha, NE 68102-4901

May 17, 2018

RE: HP# **1803-103-01**; Alternative One: Flood Risk Management Plan for the City of Lincoln, NE, Deadmans Run Channel and Flume Widening, Access Road Relocation, Sect. 7/18/17, T10N, R7E, Lancaster County – **RECIND OF ARCHEOLOGICAL SURVEY REQUEST**

Dear Mr. Laux:

On April 12, 2018, a pedestrian survey was conducted by the Nebraska State Historic Preservation Office, Preservation Archeologist (John Rissetto) and the U. S. Army Corps of Engineers, District Archaeologist (Sandra Barnum) of the proposed Deadmans Run Channel and Flume Widening project area on the East Campus of the University of Nebraska, Lincoln, in Lincoln, Nebraska.

The survey identified only a small distribution of disturbed historic artifacts (e.g., glass, brick, metal, ceramic) in a plot of currently active agricultural land east of North 38th Street, just south of the bridge crossing Deadmans Run. No additional cultural materials were identified either on or below the surface of the proposed project area.

Based on this new information, the Nebraska State Historic Preservation Office removes the previously determined ARCHEOLOGICAL SURVEY REQUEST recommendation for the proposed project area prior to ground disturbing activities associated with this project.

However, there is always the possibility that currently buried or otherwise obscured cultural or human remains may be discovered during the undertaking. If any such discovery is made, please contact this office immediately for further instruction.

Should you have any questions regarding this change in determination, please contact this office by phone (402-471-2609) or email (john.rissetto@nebraska.gov).

Sincerely,

John Rissetto, Ph.D.
Preservation Archeologist

1500 R Street
Lincoln, NE 68508-1651
P: 402.471.3270
P: 800.833.6747
F: 402.471.3100
history.nebraska.gov

US Army Corps of Engineers ®
Omaha District

DEADMANS RUN
LINCOLN, NEBRASKA

SECTION 205 – FLOOD RISK MANAGEMENT

FEASIBILITY REPORT

APPENDIX J
STRUCTURAL ENGINEERING

AUGUST 2018

STRUCTURAL

Project Description

Structures proposed to be removed and replaced in the current feasibility study include 3 Bridges and 1 Concrete Flume Section. The structures provided are for cost estimate purposes only, they have not been fully designed. However, the structures have been adapted from previous designs.

Structural Items

BRIDGES

The bridges in the study area include the 33rd Street Bridge, 38th Street Bridge, and 48th Street Bridge. The 33rd Street Bridge to be replaced is at the intersection of 33rd Street & Baldwin Avenue (40° 50' 17.85"N Latitude, 96° 40' 22.16"W Longitude). The existing intersection structure is a reinforced concrete box culvert with wing walls that is approximately 36 feet wide by 132 feet long. Details for the proposed bridge replacement can be found on sheets S-1 & S-2 in Appendix J.

The 38th Street Bridge to be removed and replaced runs along 38th Street, just south of Walker Avenue (40° 50' 7.18"N Latitude, 96° 39' 56.77"W Longitude). The existing bridge structure is a steel pony truss on steel piers, 130 feet long by 18 feet wide with an 8 foot sidewalk on the east side. Details for the proposed bridge replacement can be found on sheets S-5 & S-6 in Appendix J.

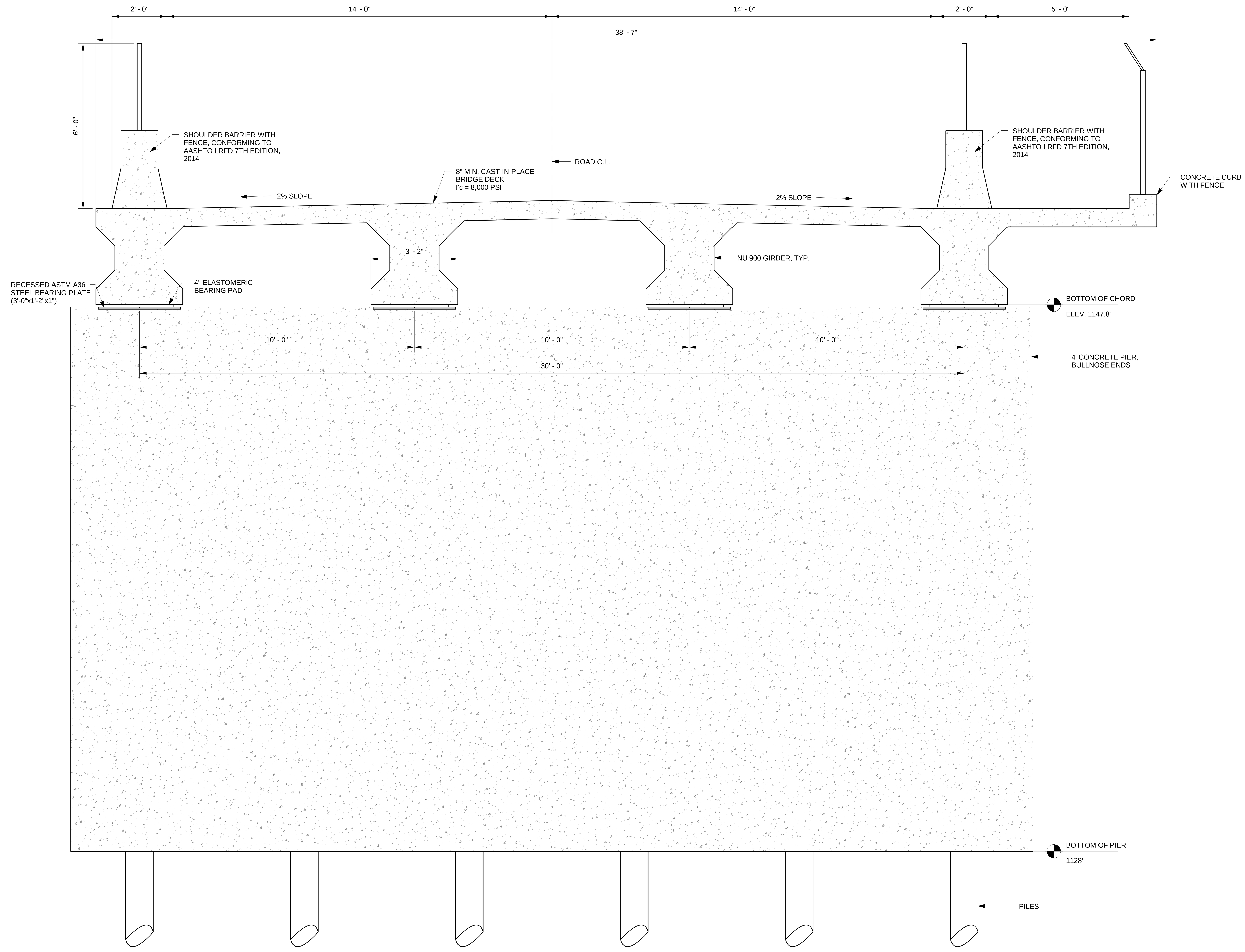
The 48th Street Bridge to be removed and replaced runs along 48th Street, just south of Garland Street (40° 49' 59.54"N Latitude, 96° 39' 13.45"W Longitude). The existing bridge structure is a reinforced concrete deck on prestressed I-beams that span to reinforced concrete abutments. The bridge is approximately 60 feet long by 42 feet wide with 8 foot sidewalks on the east and west sides. Details for the proposed bridge replacement can be found on sheets S-3 & S-4 in Appendix J.

CONCRETE FLUME

The existing flume section to be removed and replaced is located at approximately 40° 50' 24.16"N Latitude, 96° 40' 27.88"W Longitude. Details for the proposed new flume section can be found on sheet S-7 in Appendix J.

PLAN UPDATE

Although the optimized plan was economically justified, the project costs exceeded the Continuing Authorities Program Section 205 per project cost limit of approximately $15.3 million. Discussions between the Lower Platte South Natural Resource District (LPS NRD), City of Lincoln, Northwestern Division, HQ USACE, and the Omaha District PDT led to the development of a revised plan. The revised plan involves removing the three vehicle bridges from the Federal project. This plan was developed due to the City of Lincoln and LPS NRD already having identified the 48th and 38th street bridges for replacement due to their age and condition and having started discussions of replacing the 38th street culvert with a bridge to accommodate the future Railroad Transportation Safety District (RTSD) project.



2
S-1

33rd Street Bridge Cross Section

1/2" = 1'-0"

US ARMY CORPS OF ENGINEERS ®
OMAHA DISTRICT

MARK	DESCRIPTION	DATE	APPR.

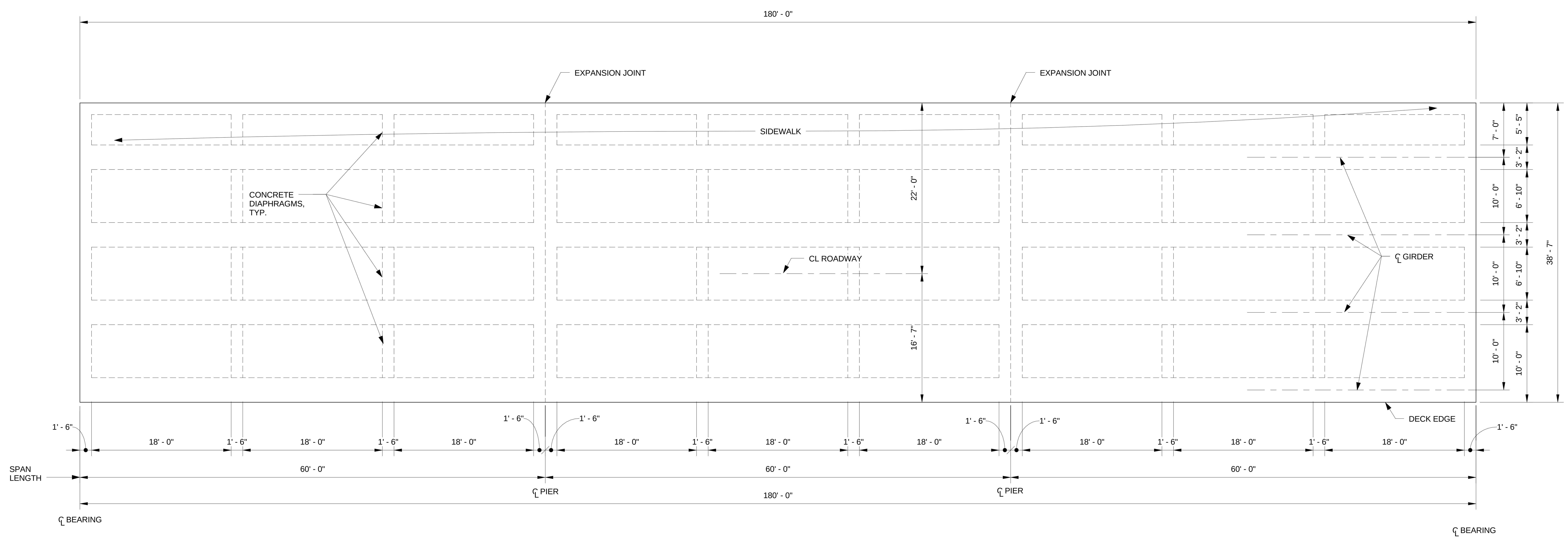
DESIGN BY: | DRAWN BY: | CKD BY: | DATE: | SOLICITATION NO.: | SBMT BY: | PLOT DATE: | CONTRACT NO.: | PLOT SCALE: | FILE NUMBER: | SIZE: | FILE NAME:

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

DEADMAN'S RUN FEASIBILITY STUDY
STRUCTURAL ALTERNATIVES
LINCOLN, NEBRASKA

33rd STREET BRIDGE CROSS SECTION

SHEET IDENTIFICATION
S-1



1 / S-2 **33rd Street Bridge - Plan**

1/8" = 1'-0"

N

US ARMY CORPS OF ENGINEERS ®
OMAHA DISTRICT

MARK	DESCRIPTION	DATE	APPR

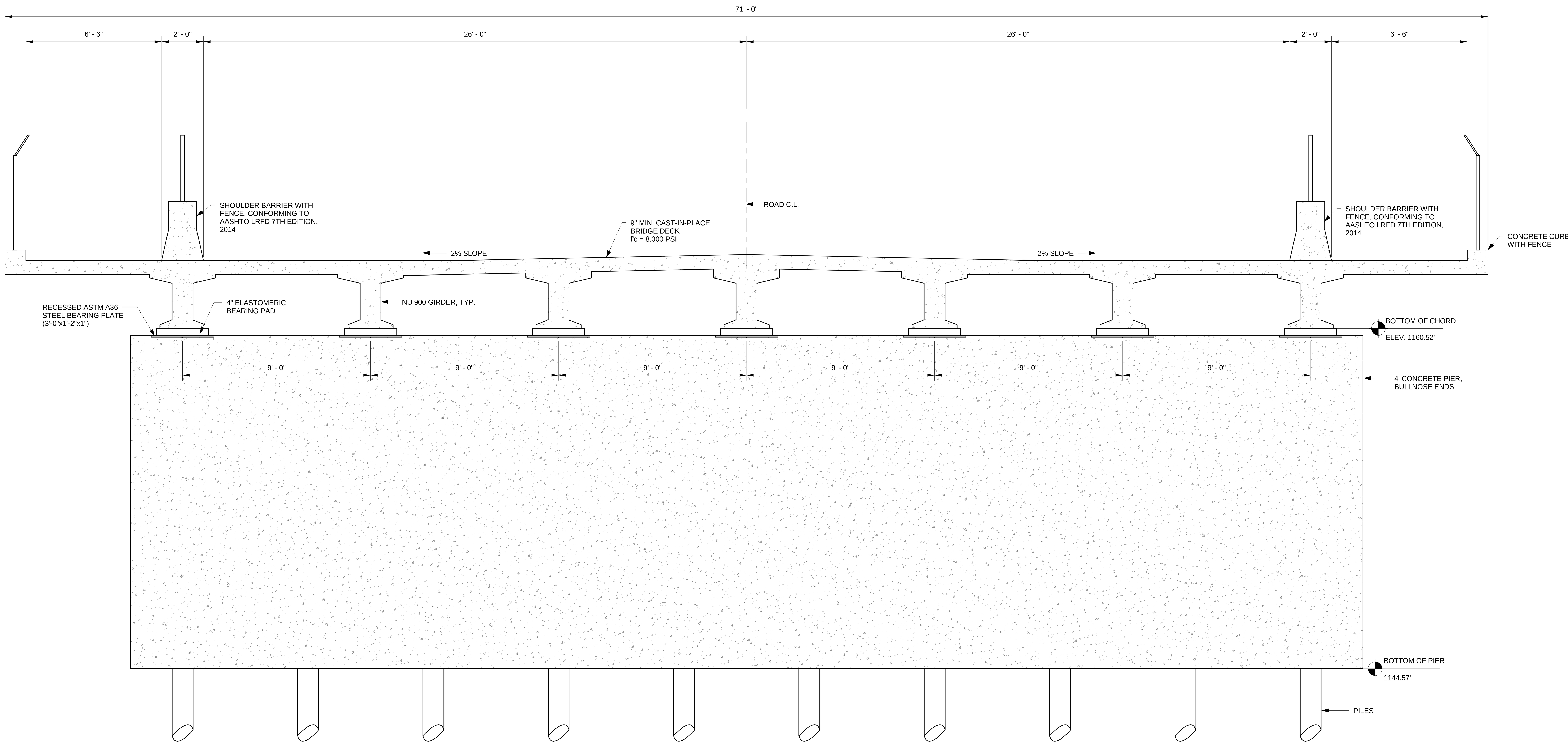
DESIGN BY: | DRAWN BY: | SBMT BY: | PLOT SCALE: | SIZE:
DATE: | CKD BY: | PLOT DATE: | FILE NAME:
SOLICITATION NO.: | CONTRACT NO.: | FILE NUMBER:

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

DEADMAN'S RUN FEASIBILITY STUDY
STRUCTURAL ALTERNATIVES
LINCOLN, NEBRASKA

33rd STREET BRIDGE PLAN

SHEET IDENTIFICATION
S-2



1
S-3

48th Street Bridge Cross Section

3/8" = 1'-0"

US ARMY CORPS OF ENGINEERS ®
OMAHA DISTRICT

MARK | DESCRIPTION | DATE | APPR.

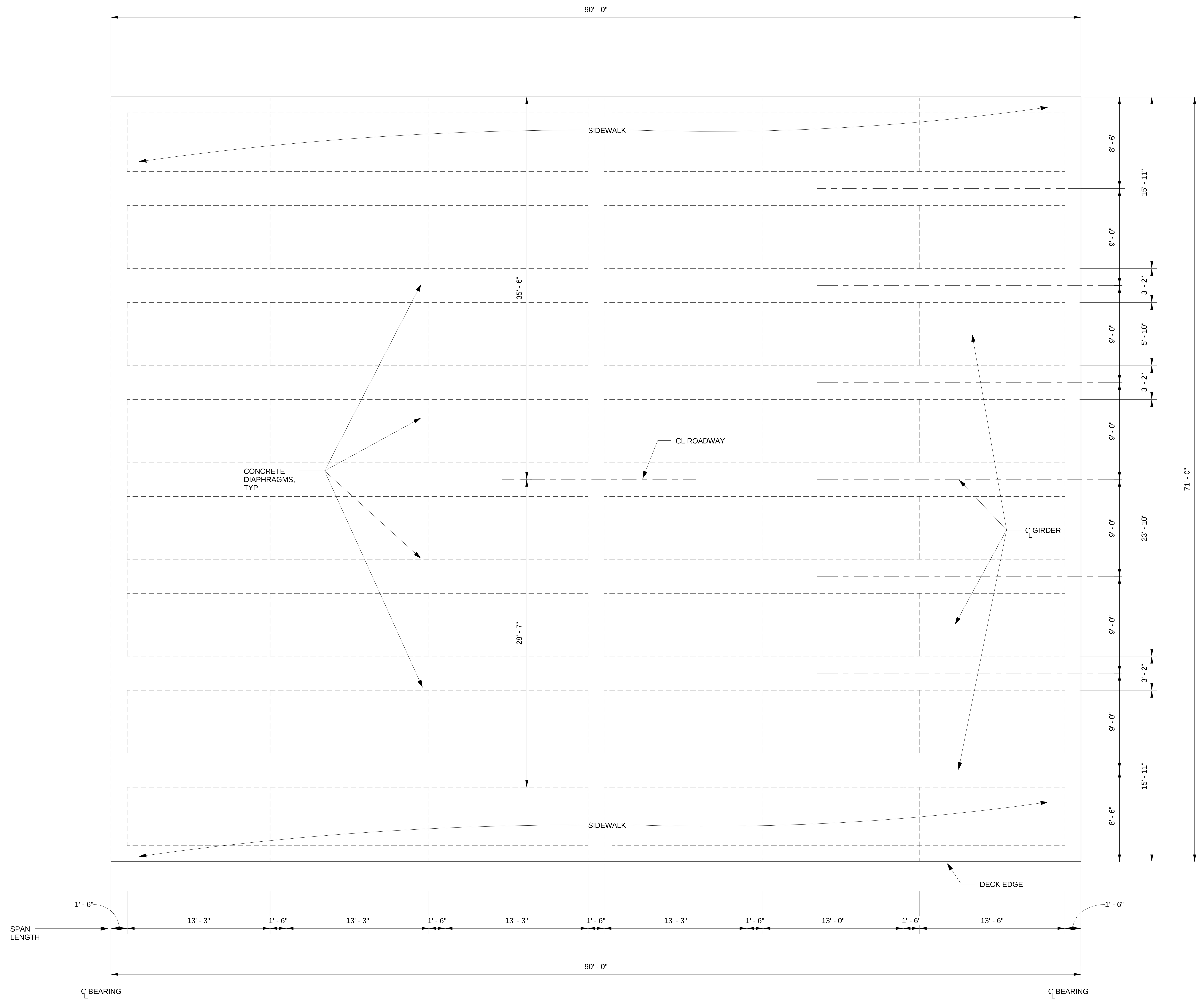
DESIGN BY: | DRAWN BY: | CKD BY: | SBMT BY: | PLOT DATE: | PLOT SCALE: | SIZE: | DATE: | SOLICITATION NO.: | CONTRACT NO.: | FILE NUMBER: | FILE NAME:

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

DEADMAN'S RUN FEASIBILITY STUDY
STRUCTURAL ALTERNATIVES
LINCOLN, NEBRASKA

48th STREET BRIDGE CROSS SECTION

SHEET IDENTIFICATION
S-3



1
S-4

48th Street Bridge - Plan

3/16" = 1'-0"

N

US ARMY CORPS OF ENGINEERS ®
OMAHA DISTRICT

MARK	DESCRIPTION	DATE	APPR.

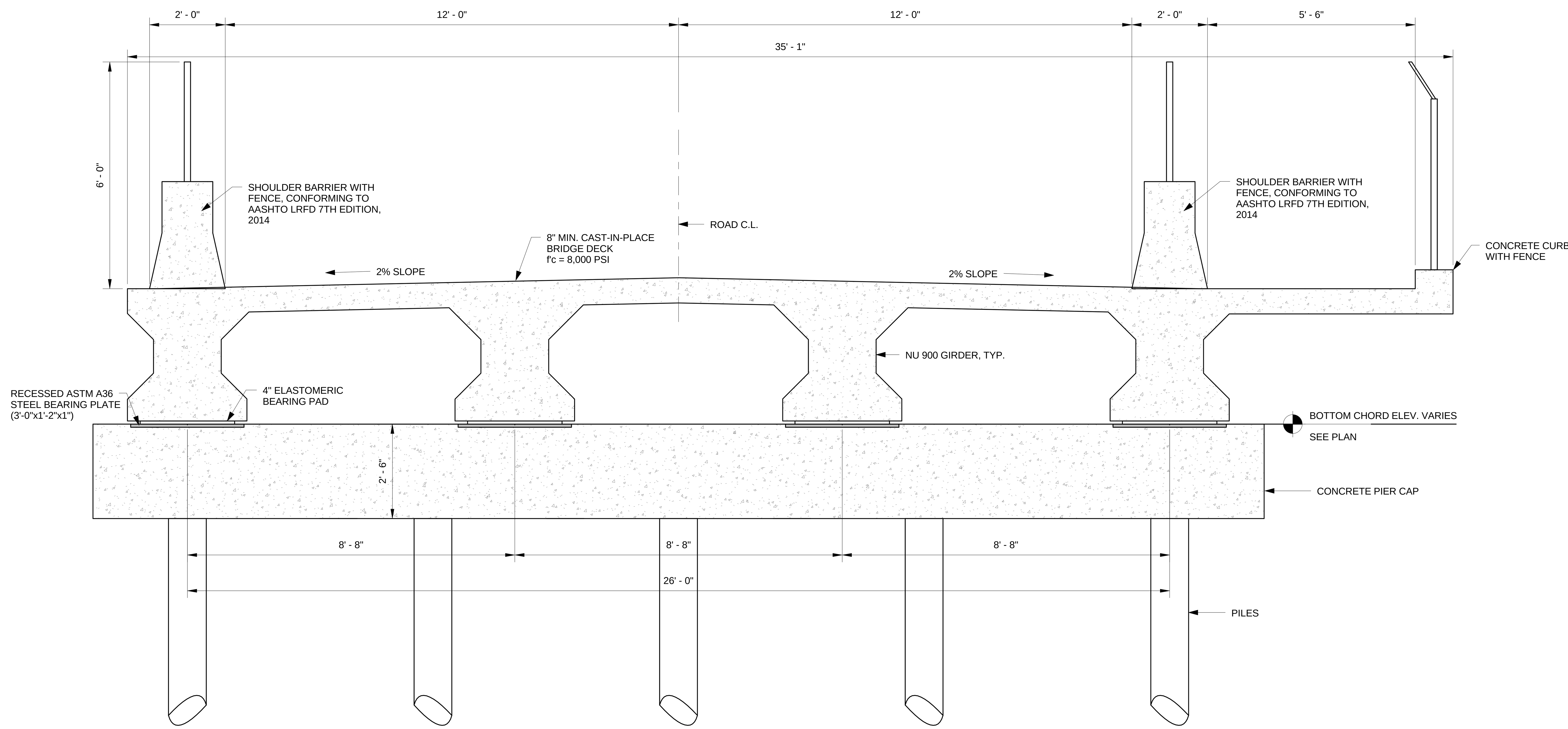
DESIGN BY: | DRAWN BY: | CKD BY: | DATE: | SBMT BY: | PLOT DATE: | SOLICITATION NO.: | PLOT SCALE: | CONTRACT NO.: | SIZE: | FILE NAME: | FILE NUMBER:

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

DEADMAN'S RUN FEASIBILITY STUDY
STRUCTURAL ALTERNATIVES
LINCOLN, NEBRASKA

48th STREET BRIDGE PLAN

SHEET IDENTIFICATION
S-4



1
S-5

38th Street Bridge Cross Section

1/2" = 1'-0"

US ARMY CORPS OF ENGINEERS ®
OMAHA DISTRICT

MARK | DESCRIPTION | DATE | APPR.

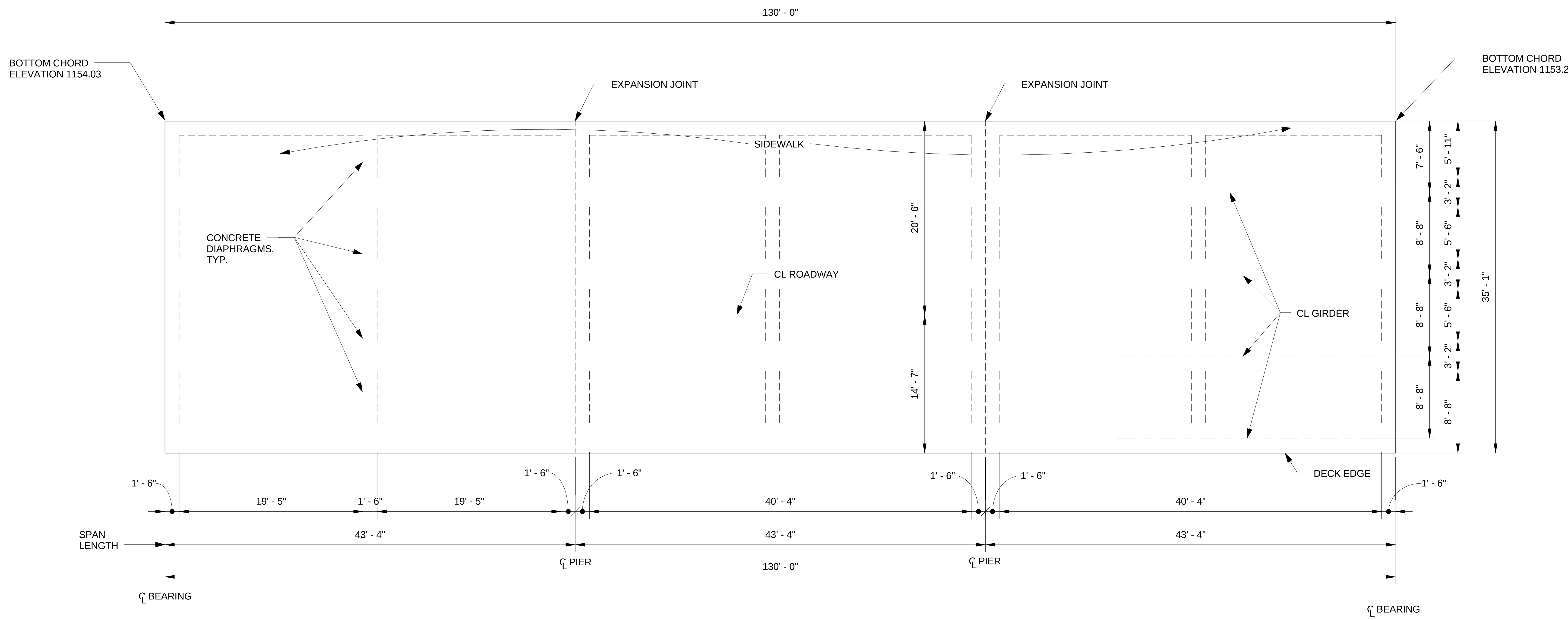
DESIGN BY: | DRAWN BY: | SBMT BY: | PLOT SCALE: | SIZE:
DATE: | CKD BY: | PLOT DATE: | FILE NAME:
SOLICITATION NO.: | CONTRACT NO.: | FILE NUMBER:

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

DEADMAN'S RUN FEASIBILITY STUDY
STRUCTURAL ALTERNATIVES
LINCOLN, NEBRASKA

38th STREET BRIDGE CROSS SECTION

SHEET IDENTIFICATION
S-5



1 S-6 38th Street Bridge - Plan

1/8" = 1'-0"

N

US ARMY CORPS OF ENGINEERS ®

OMAHA DISTRICT

MARK	DESCRIPTION	DATE	APPR.

DESIGN BY: | DRAWN BY: | CKD BY: | DATE:

SBMT BY: | PLOT DATE: | SOLICITATION NO.:

PLOT SCALE: | CONTRACT NO.:

SIZE: | FILE NAME: | FILE NUMBER:

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

DEADMAN'S RUN FEASIBILITY STUDY
STRUCTURAL ALTERNATIVES
LINCOLN, NEBRASKA

38th STREET BRIDGE PLAN

SHEET IDENTIFICATION

S-6

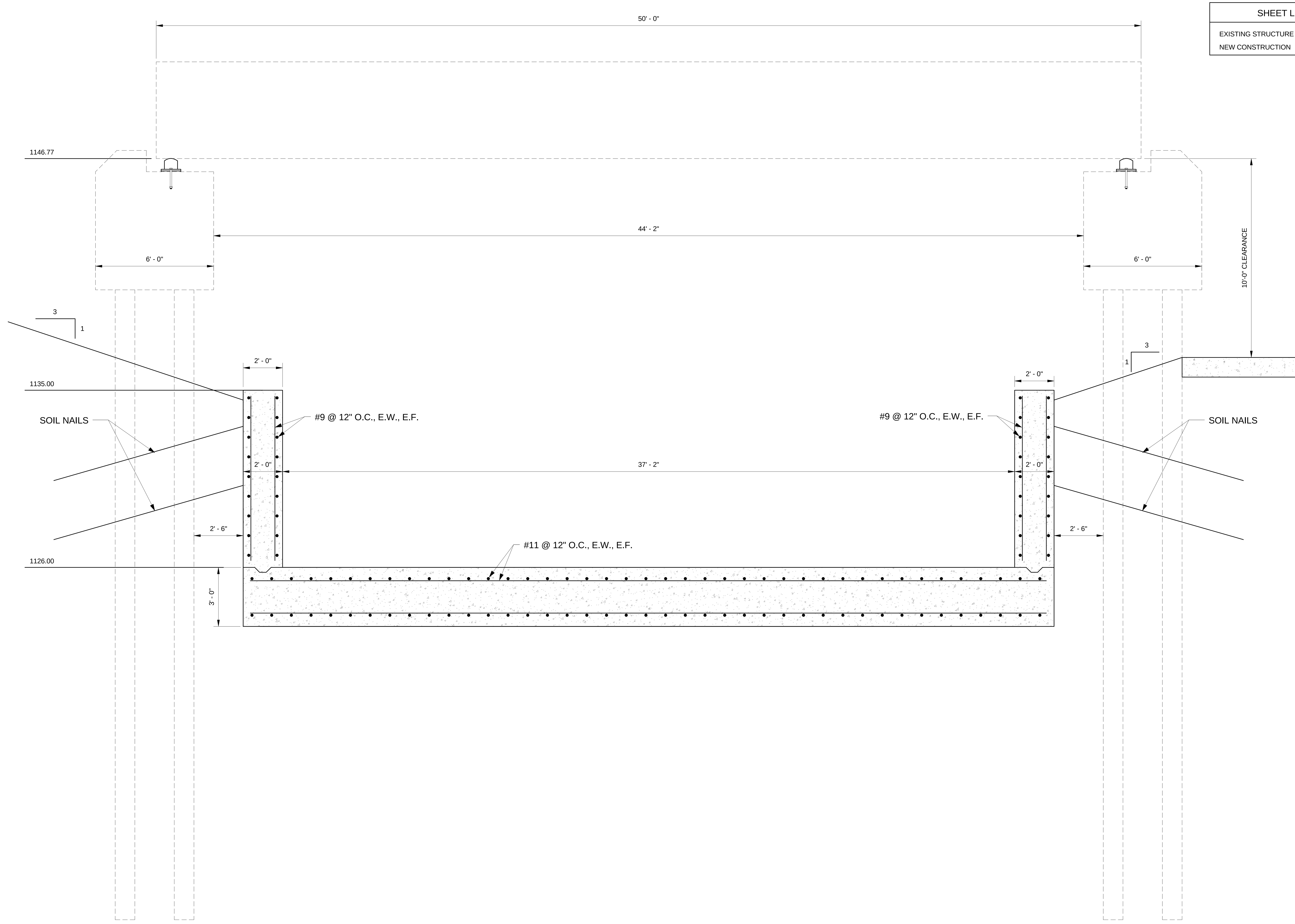
1 2 3 4 5

D C B A

SHEET LEGEND

EXISTING STRUCTURE

NEW CONSTRUCTION



1 / S-7 **Flume Cross Section**

3/8" = 1'-0"

US ARMY CORPS OF ENGINEERS ®

OMAHA DISTRICT

MARK | DESCRIPTION | DATE | APPR.

DESIGN BY: | DRAWN BY: | CKD BY: | SBMT BY: | PLOT DATE: | PLOT SCALE: | SIZE: | DATE: | SOLICITATION NO.: | CONTRACT NO.: | FILE NUMBER: | FILE NAME:

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

DEADMAN'S RUN FEASIBILITY STUDY
STRUCTURAL ALTERNATIVES
LINCOLN, NEBRASKA

RAILROAD BRIDGE
FLUME CROSS SECTION

SHEET IDENTIFICATION

S-7

2
S-8
RAILROAD BRIDGE FLUME PLAN
1 1/2" = 1'-0"

US ARMY CORPS OF ENGINEERS ®
OMAHA DISTRICT

MARK	DESCRIPTION	DATE	APPR.

DESIGN BY:
DATE:
DRAWN BY:
CKD BY:
SOLICITATION NO.:
SBMT BY:
PLOT DATE:
CONTRACT NO.:
PLOT SCALE:
FILE NUMBER:
SIZE:
FILE NAME:

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT
OMAHA, NEBRASKA

DEADMAN'S RUN FEASIBILITY STUDY
STRUCTURAL ALTERNATIVES
LINCOLN, NEBRASKA

RAILROAD BRIDGE FLUME PLAN

SHEET IDENTIFICATION
S-8

US Army Corps of Engineers ®
Omaha District

DEADMANS RUN
LINCOLN, NEBRASKA

SECTION 205 – FLOOD RISK MANAGEMENT

FEASIBILITY REPORT

REVIEW DOCUMENTATION:
DQC CERTIFICATION
ATR CERTIFICATION
COST MCX CERTIFICATION

AUGUST 2018

District Quality Check (DQC) Certification Form UPDATE JAN 2018

Deadmans Run
Lincoln, Nebraska
Section 205
Flood Risk Management
DQC Signatures

This form certifies that the District Quality Check process has been completed for the subject project, and all comments have been successfully resolved throughout the Draft Report and supporting appendices.

PDT Approvals

Name	Organization	Signature
Jeff Bohlken	CENWO-PMA-A	BOHLKEN.JEFFREY.CRAIG.1398 119238 Digitally signed by BOHLKEN.JEFFREY.CRAIG.1398119238 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=BOHLKEN.JEFFREY.CRAIG.1398119238 Date: 2018.02.01 09:08:49 -06'00'
Rebecca Podkowka	CENWO-PMA-C	PODKOWKA.REBECCA.LOUISE. 1268193142 Digitally signed by PODKOWKA.REBECCA.LOUISE.1268193142 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=PODKOWKA.REBECCA.LOUISE.1268193142 Date: 2018.01.31 11:30:01 -06'00'
Justin Brewer	CENWO-PMA-B	BREWER.JUSTIN.C.1400208154 Digitally signed by BREWER.JUSTIN.C.1400208154 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=BREWER.JUSTIN.C.1400208154 Date: 2018.02.01 09:32:23 -06'00'
Joe Gronewold	CENWO-EDG-A	GRONEWOLD.JOSEPH.T.150056 3300 Digitally signed by GRONEWOLD.JOSEPH.T.1500563300 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=GRONEWOLD.JOSEPH.T.1500563300 Date: 2018.01.31 11:48:58 -06'00'
Liz Lien	CENWO-ED	LIEN.ELIZABETH.RUTH.1501074 337 Digitally signed by LIEN.ELIZABETH.RUTH.1501074337 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=LIEN.ELIZABETH.RUTH.1501074337 Date: 2018.01.30 08:49:27 -06'00'
Jesse Brown	CENWO-EDH-D	BROWN.JESSE.MORGAN.12917 57983 Digitally signed by BROWN.JESSE.MORGAN.1291757983 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=BROWN.JESSE.MORGAN.1291757983 Date: 2018.01.30 08:14:23 -06'00'
Jennifer Christensen	CENWO-EDH-E	CHRISTENSEN.JENNIFER.P.136 7532722 Digitally signed by CHRISTENSEN.JENNIFER.P.1367532722 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=CHRISTENSEN.JENNIFER.P.1367532722 Date: 2018.01.31 11:41:43 -06'00'
Rachel Shoemaker	CENWO-EDH-B	SHOEMAKER.RACHEL.CORRIN E.1466450169 Digitally signed by SHOEMAKER.RACHEL.CORRINE.1466450169 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=SHOEMAKER.RACHEL.CORRINE.1466450169 Date: 2018.01.30 08:50:37 -06'00'
Katie Shook	CENWO-EDD-F	SHOOK.KATHLENE.I.1381224330 Digitally signed by SHOOK.KATHLENE.I.1381224330 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=SHOOK.KATHLENE.I.1381224330 Date: 2018.01.30 08:13:16 -06'00'
Sandy Barnum	CENWO-PMA-B	BARNUM.SANDRA.V.1231257957 Digitally signed by BARNUM.SANDRA.V.1231257957 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=BARNUM.SANDRA.V.1231257957 Date: 2018.01.30 09:08:49 -06'00'
Christian Davenport	CENWO-EDD-J	DAVENPORT.WILLIAM.C.140366 2271 Digitally signed by DAVENPORT.WILLIAM.C.1403662271 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=DAVENPORT.WILLIAM.C.1403662271 Date: 2018.01.31 14:12:56 -06'00'
Sean Keating	CENWO-REC	KEATING.SEAN.M.1265127874 Digitally signed by KEATING.SEAN.M.1265127874 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=KEATING.SEAN.M.1265127874 Date: 2018.02.01 10:05:27 -06'00'

Supervisor Approvals

Name	Organization	Signature
Greg Johnson	CENWO-PMA-A	JOHNSON.JOHN.GREG.1231360 650 Digitally signed by JOHNSON.JOHN.GREG.1231360650 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=JOHNSON.JOHN.GREG.1231360650 Date: 2018.02.08 14:03:59 -06'00'
Eric Laux	CENWO-PMA-C	Digitally signed by LAUX.ERIC.A.1231341427 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=LAUX.ERIC.A.1231341427 Date: 2018.02.06 10:34:23 -06'00'
Dave Brandon	CENWO-PMA-B	BRANDON.DAVID.A.1231349819 Digitally signed by BRANDON.DAVID.A.1231349819 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=BRANDON.DAVID.A.1231349819 Date: 2018.02.05 11:28:58 -06'00'
Bryan Flere	CENWO-EDG-A	FLERE.BRYAN.P.1252332142 Digitally signed by FLERE.BRYAN.P.1252332142 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=FLERE.BRYAN.P.1252332142 Date: 2018.02.06 08:35:14 -06'00'
Steve Kemp	CENWO-EDC	KEMP.STEVEN.L.1231349282 Digitally signed by KEMP.STEVEN.L.1231349282 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=KEMP.STEVEN.L.1231349282 Date: 2018.02.05 10:56:09 -06'00'
Roger Kay	CENWO-EDH-D	KAY.ROGER.L.1231244073 Digitally signed by KAY.ROGER.L.1231244073 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=KAY.ROGER.L.1231244073 Date: 2018.02.01 15:59:06 -06'00'
Marc Anderson	CENWO-EDG-S	ANDERSON.MARC.DOUGLAS.11 48220952 Digitally signed by ANDERSON.MARC.DOUGLAS.1148220952 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=ANDERSON.MARC.DOUGLAS.1148220952 Date: 2018.02.05 13:02:57 -06'00'
Josh Melliger	CENWO-EDH-E	MELLIGER.JOSHUA.JAMES.1385 431216 Digitally signed by MELLIGER.JOSHUA.JAMES.1385431216 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=MELLIGER.JOSHUA.JAMES.1385431216 Date: 2018.02.01 11:56:06 -06'00'
Tony Krause	CENWO-EDH-B	KRAUSE.TONY.DEAN.128250955 1 Digitally signed by KRAUSE.TONY.DEAN.1282509551 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=KRAUSE.TONY.DEAN.1282509551 Date: 2018.02.06 10:20:13 -06'00'
Dan Pridal	CENWO-EDH-F	PRIDAL.DANIEL.B.1231204730 Digitally signed by PRIDAL.DANIEL.B.1231204730 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=PRIDAL.DANIEL.B.1231204730 Date: 2018.02.02 13:30:01 -06'00'
Christian Davenport	CENWO-EDD-J	FANCIULLO.ANDREW.P.1402789 707 Digitally signed by FANCIULLO.ANDREW.P.1402789707 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=FANCIULLO.ANDREW.P.1402789707 Date: 2018.01.31 14:44:32 -06'00'
Wayne Boeck	CENWO-EDD-F	BOECK.WAYNE.RONALD.114885 3149 Digitally signed by BOECK.WAYNE.RONALD.1148853149 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=BOECK.WAYNE.RONALD.1148853149 Date: 2018.02.06 08:59:23 -06'00'
Rick Noel	CENWO-REC	NOEL.RICK.L.1231350426 Digitally signed by NOEL.RICK.L.1231350426 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=NOEL.RICK.L.1231350426 Date: 2018.02.01 11:54:27 -06'00'

Agency Technical Review Summary Report

AUGUST 2018

For Review Of:

Deadmans Run, Lincoln, Nebraska

Section 205 – Flood Risk Management Integrated Feasibility Report and Environmental Assessment

March 2018

Omaha District

Review Management Organization:

Northwestern Division

US Army Corps of Engineers ®

Agency Technical Review
Summary Report

Deadmans Run, Lincoln, Nebraska
Section 205 – Flood Risk Management Integrated Feasibility Report and Environmental Assessment

CONTENTS

1. Introduction
2. References
3. Review Details
4. Background Information
5. ATR Team Composition
6. Charge to Reviewers
7. Assessment of DQC
8. Review Summary and Discussion of Significant Findings
9. Status of Cost Engineering Mandatory Center of Expertise (MCX) Coordination and Certification
10. Statement of Completion of ATR

ENCLOSURES

Enclosure 1: Contact Information and Review Roles of ATR Team

Enclosure 2: Completion Statement of Agency Technical Review

Agency Technical Review
Summary Report

Deadmans Run, Lincoln, Nebraska
Section 205 – Flood Risk Management Integrated Feasibility Report and Environmental Assessment

1. Introduction

This Agency Technical Review (ATR) Summary Report documents the ATR performed for the subject product(s). The Omaha District point of contact for the review was Mr. Jeffry Bohlken. The ATR team and review was led by Mr. Eric Lynn and Mr. Cassidy Garden of the Kansas City District Planning Branch (CENWK-PMP). Northwestern Division (NWD) is the Review Management Organization (RMO) responsible for managing the ATR and assuring the overall quality of the review.

2. References

This ATR was conducted in accordance with the following documents:

a. EC 1165-2-217, 20 February 2018, Water Resources Policies and Authorities, REVIEW POLICY FOR CIVIL WORKS.
b. Deadmans Run Review Plan, approved 12 January 2015

3. Review Details

a. DrChecks Review Record

- *Project ID*: 393779
- *Project Name*: Deadmans Run, Lincoln, Nebraska Section 205 Study
- *Review ID/Edit:* 00001 ATR – Deadmans Run, Lincoln, NE

The DR. Checks review contains all comments from two separate reviews of the project report.

b. List of Product(s) Reviewed: See Table 1.

Table 1: Products Reviewed List

Document Title	Approximate Number of Pages
Main Report	115
Appendix A – Environmental	304
Appendix B – Civil Engineering	19
Appendix C – Geotechnical	59
Appendix D – Economics	41
Appendix E – Hydrology and Climate Change	63
Appendix F – Hydraulic Analysis	63
Appendix G – Flood Risk and Floodplain Management	20
Appendix H – Real Estate Plan	105
Appendix I – Cost Engineering	16
Appendix J - Structural	10
Appendix K – Cultural Resources	4
Appendix L – ESA Phase 1	681
DQC Certification	2

c. ATR Chronology

Table 2 highlights specific milestones in the ATR timeline. For more complete ATR timeline refer to the ATR Work Plan's

Table 2: Final ATR Chronology

Review Stage	Date
Review Documents Provided	6 FEB 18
Backcheck Review Documents Provided	21 MAR 18
Revised Backcheck Review Documents Provided	09 APR 18
Final Comment Closure	25 JUL 18
ATR Summary Report and Completion	9 AUG 18

4. Background Information

The first review of the project was completed in September 2017. After discussions between USACE and the City of Lincoln, it was decided to reduce the scope of the selected plan. Omaha District prepared a revised report for a second round of ATR.

5. ATR Team Composition

The ATR was conducted by a certified review team selected from outside the home district who were not involved in the day-to-day production of the product(s) reviewed. All the ATR team members are certified to perform ATR by their respective Communities of Practice, or were supervised during the review by a certified reviewer.

The composition of the ATR team for this review was based from the study's approved review plan (2. References 1.b.), and the scope and content of the product(s) to be reviewed. The contact information and review roles for each ATR team member are provided in Enclosure 1.

6. Charge to Reviewers

The project Review Plan (reference 1.b) established the specific objectives of the ATR and the specific assessment sought from the ATR team. The Review Plan reviewed and approved by the ATR Lead, the RMO, and Project Delivery Team (PDT).

7. Assessment of DQC

In accordance with Reference 1a, the ATR team examined the relevant DQC records provided by the PDT to assess the apparent adequacy of the DQC effort for the subject product(s). Based on the examination of the DQC records provided, and of the product(s) submitted for review, it appears the DQC effort was adequate.

8. Review Summary and Discussion of Significant Findings

Due to file size, a report of all comments is not included as an Enclosure to the report but can be produced from DrChecks upon request. A summary is provided here to inform decision makers of the key issues, impacts to the study, significant omissions in the documentation, and other findings of the ATR team. Most of the comments generated by the team were seeking clarification due to inconsistencies in the report and whether costs were adequately captured. The bridges, the flume, and real estate boundaries were points of discussion in this matter. The summary of comment topics below is organized by discipline in order for decision makers to quickly understand important issues.

a. Plan Formulation
Four comments were submitted to ensure the feasibility document is in compliance with USACE policy, guidance, and for clarification of a few inconsistencies.

b. Economics
Review yielded no substantive comments

c. Environmental Resources
Eighteen comments were submitted to ensure the feasibility document is in compliance with USACE policy and guidance.

d. Hydraulic Engineering
Six comments were submitted to ensure the feasibility document is in compliance with USACE policy, guidance, and for clarification of a few inconsistencies.

e. Geotechnical Engineering
Four comments were submitted to ensure costs have been adequately characterized in the estimate.

f. Cost Engineering
The MII, TPCS, and CSRA were reviewed and eighty-three comments were made. All comments affected TSP implementation.

g. Structural
Twelve comments were made to ensure the feasibility document is in compliance with USACE policy and guidance. Majority of comments called into question whether cost were adequately identified due to conflicting scope and inconsistencies throughout the report.

h. Civil
Twelve Review comments were made to ensure the real estate and costs were adequately captured and to ensure DQC was performed.

i. Real Estate
Twelve comments were made to ensure the feasibility document is in compliance with USACE policy and guidance. **Comment 7343671 was unable to be resolved between the PDT and the ATR Team and was elevated to NWD for further review and determination.**

Under direction of NWD the comment was closed in Dr. Checks by the home district Project Manager. The real estate plan is missing a discussion on mitigation lands required for the project. Resolution of the comment may affect implementation and costs. Other comments include addressing inconsistencies between the REP and the TSP as well as insufficient information to adequately define implementation requirements and costs.

9. Status of Cost Engineering Mandatory Center of Expertise (MCX) Coordination and Certification

The Cost Engineering ATR reviewer coordinated with the MCX during the review.

10. Statement of Completion of ATR

The signed Statement of Completion of ATR is included as Enclosure 3.

Enclosure 1

ATR Team Members and Contact Information

Name	Role	Office Symbol	Phone	Email
Eric Lynn	ATR Team Lead	CENWK-PMP-C	816-389-3258	Eric.S.Lynn@usace.army.mil
Cassidy Garden	Asst. Team Lead and Plan Formulation	CENWK-PMP-F	816-389-3851	Cassidy.C.Garden@usace.army.mil
Drew Minert	Economics	CENWK-PMP-F	816-389-3418	Drew.D.Minert@usace.army.mil
Jeff Tripe	Environmental	CENWK-PMP-R	816-389-2455	Jeffry.A.Tripe@usace.army.mil
William Otero	Hydraulic Engineering	CENWK-EDH-H	816-389-3727	William.Otero@usace.army.mil
Reed Brown	Geotechnical Engineering	CENWK-EDG-D	816-389-3398	Reed.Brown@usace.army.mil
Andrew Marske	Civil Engineering	CENWK-EDG-C	816-389-3371	Andrew.N.Marske@usace.army.mil
Katrina Marx	Structural Engineering	CENWK-EDD-S	816-389-3247	Katrina.S.Marx@usace.army.mil
Patrick Miramontez	Cost Engineering	CENWW-EDD-C	816-389-3322	Patrick.J.Miramontez@usace.army.mil
Meredith Harmon	Real Estate	CENWK-REC	816-389-3557	Meredith.L.Harmon@usace.army.mil

Enclosure 2

Statement of Completion of Agency Technical Review

ATR CERTIFICATION
COMPLETION OF AGENCY TECHNICAL REVIEW

The Agency Technical Review (ATR) has been completed on the integrated feasibility report and EA for the Deadmans Run, Lincoln, NE Section 205 project. The ATR was conducted as defined in the "Deadmans Run, Lincoln, NE Section 205 Review Plan", which was approved by Northwestern Division on 12 Jan 2015. This review plan was developed in accordance with the NWD Model Review Plan for Continuing Authorities Program Section 103 and 205 Projects. During the ATR, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of: assumptions, methods, procedures, and material used in analyses, alternatives evaluated, the appropriateness of data used and level obtained, and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing US Army Corps of Engineers policy. The ATR also assessed the District Quality Control (DQC) documentation and made the determination that the DQC activities employed appear to be appropriate and effective. All ATR comments have been closed in Dr Checks with one comment elevated to NWD for final resolution.

Eric S Lynn Digitally signed by LYNN.ERIC.S.1270505518
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Date: 2018.08.09 15:41:49 -05'00'

9 August 2018

Eric Lynn
ATR Team Leader
CENWK-PMP-C

Date

BOHLKEN.JEFFREY.CRAIG.1398119238 Digitally signed by BOHLKEN.JEFFREY.CRAIG.1398119238
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=BOHLKEN.JEFFREY.CRAIG.1398119238
Date: 2018.08.09 16:25:01 -05'00'

9 August 2018

Jeff Bohlken
Project Manager
CENWO-PMA-A

Date

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Date: 2018.08.09 14:53:36 -07'00'

Jeremy J. Weber
Review Management Office Representative
CENWD-PDD

Date

CERTIFICATION OF AGENCY TECHNICAL REVIEW

Initial areas of concern identified during the ATR included the adequacy of proposed channel features and the real estate requirements for project implementation under the existing railroad bridge. Additional documentation of the plan formulation process was requested to ensure report clarity and completeness. The PDT provided all requested supporting detail and document edits necessary to resolve the ATR concerns.

As noted above, all concerns resulting from the ATR of the project have been fully resolved.

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Date: 2018.08.13 12:16:27 -05'00'

John J. Bertino, Jr
Chief, Engineering Division
CENWO-ED

Date

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Date: 2018.08.13 12:25:59 -05'00'

Bradley E. Thompson
Chief, Planning Branch
CENWO-PMA

Date

WALLA WALLA COST ENGINEERING
MANDATORY CENTER OF EXPERTISE

COST AGENCY TECHNICAL REVIEW

CERTIFICATION STATEMENT

For Project No. 393779

NWO – Deadman's Run Flood Risk Management Study
Section 205

The Deadman's Run Section 205 Feasibility Study, as presented by Omaha District, has undergone a successful Cost Agency Technical Review (Cost ATR), performed by the Walla Walla District Cost Engineering Mandatory Center of Expertise (Cost MCX) team. The Cost ATR included study of the project scope, report, cost estimates, schedules, escalation, and risk-based contingencies. This certification signifies the products meet the quality standards as prescribed in ER 1110-2-1150 Engineering and Design for Civil Works Projects and ER 1110-2-1302 Civil Works Cost Engineering.

As of April 10, 2018, the Cost MCX certifies the estimated total project cost:

FY 2018 Project First Cost:	$13,285,000
Total Project Cost:	$14,288,000
Estimated Federal Cost:	$9,987,000

It remains the responsibility of the District to correctly reflect these cost values within the Final Report and to implement effective project management controls and implementation procedures including risk management through the period of Federal participation.

JACOBS.MICHAEL.PIERRE.1160569537

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Date: 2018.04.13 12:51:17 -07'00'

Michael P. Jacobs, PE, CCE
Chief, Cost Engineering MCX
Walla Walla District

**** TOTAL PROJECT COST SUMMARY ****

PROJECT: **Deadmans Run** DISTRICT: **Omaha** PREPARED: **3/23/2018**
PROJECT NO: **393779**
LOCATION: **Lincoln, NE** POC: **Steven Kemp**

This Estimate reflects the scope and schedule in report; Deadmans Run, Lincoln, NE Sec 205

Civil Works Work Breakdown Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)						TOTAL PROJECT COST (FULLY FUNDED)			
								Program Year (Budget EC):	2018						
								Effective Price Level Date:	1-Oct- 17						
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	REMAINING COST ($K)	Spent Thru: 1-Mar-18 ($K)	TOTAL FIRST COST ($K)	ESC (%)	COST ($K)	CNTG ($K)	FULL ($K)
02	RELOCATIONS	$577	$133	23%	$710		$577	$133	$710		$710	6.7%	$616	$142	$758
09	CHANNELS AND CANALS	$3,872	$891	23%	$4,762		$3,872	$891	$4,762		$4,762	8.3%	$4,193	$964	$5,158
15	FLOODWAY CONTROL AND DIVERSIO	$1,687	$388	23%	$2,075		$1,687	$388	$2,075		$2,075	6.7%	$1,801	$414	$2,215
16	BANK STABILIZATION	$2,122	$488	23%	$2,610		$2,122	$488	$2,610		$2,610	5.9%	$2,247	$517	$2,764
	CONSTRUCTION ESTIMATE TOTALS:	$8,258	$1,899		$10,158		$8,258	$1,899	$10,158		$10,158	7.2%	$8,857	$2,037	$10,894
01	LANDS AND DAMAGES	$1,580	$70	4%	$1,650		$1,580	$70	$1,650		$1,650	5.7%	$1,669	$74	$1,743
30	PLANNING, ENGINEERING & DESIGN	$705	$162	23%	$867		$705	$162	$867		$867	7.8%	$760	$175	$935
31	CONSTRUCTION MANAGEMENT	$496	$114	23%	$610		$496	$114	$610		$610	17.3%	$582	$134	$715
	PROJECT COST TOTALS:	$11,039	$2,246	20%	$13,285		$11,039	$2,246	$13,285		$13,285	7.5%	$11,868	$2,420	$14,288

ESTIMATED TOTAL PROJECT COST:		$14,288
ESTIMATED FEDERAL COST:	65%	$9,287
ESTIMATED NON-FEDERAL COST:	35%	$5,001
22 - FEASIBILITY STUDY (CAP studies):		$1,300
ESTIMATED FEDERAL COST:	54%	$700
ESTIMATED NON-FEDERAL COST:	46%	$600
ESTIMATED FEDERAL COST OF PROJECT		$9,987

____________________ Steven Kemp

____________________ Jeff Bohlken

____________________ Sue Goding

____________________ CHIEF, PLANNING, XXX

____________________ CHIEF, ENGINEERING, XXX

____________________ CHIEF, OPERATIONS, XXX

____________________ CHIEF, CONSTRUCTION, XXX

____________________ CHIEF, CONTRACTING, XXX

____________________ CHIEF, PM-PB, xxxx

____________________ CHIEF, DPM, XXX

Filename: CAP TPCS ATR 03302018.xlsx
TPCS

**** TOTAL PROJECT COST SUMMARY ****

**** CONTRACT COST SUMMARY ****

PROJECT: Deadmans Run
LOCATION: Lincoln, NE
This Estimate reflects the scope and schedule in report; Deadmans Run, Lincoln, NE Sec 205

DISTRICT: Omaha
POC: Steven Kemp

PREPARED: 3/23/2018

WBS Structure		ESTIMATED COST				PROJECT FIRST COST (Constant Dollar Basis)				TOTAL PROJECT COST (FULLY FUNDED)				
		Estimate Prepared: 23-Mar-18				Program Year (Budget EC): 2018								
		Estimate Price Level: 1-Oct-17				Effective Price Level Date: 1 -Oct-17								
				RISK BASED										
WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	ESC (%)	COST ($K)	CNTG ($K)	FULL ($K)
A	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*	*P*	*L*	*M*	*N*	*O*
	PHASE 1 or CONTRACT 1													
02	RELOCATIONS	$577	$133	23.0%	$710		$577	$133	$710	2021Q2	6.7%	$616	$142	$758
09	CHANNELS AND CANALS	$3,872	$891	23.0%	$4,762		$3,872	$891	$4,762	2022Q1	8.3%	$4,193	$964	$5,158
15	FLOODWAY CONTROL AND DIVERSIO	$1,687	$388	23.0%	$2,075		$1,687	$388	$2,075	2021Q2	6.7%	$1,801	$414	$2,215
16	BANK STABILIZATION	$2,122	$488	23.0%	$2,610		$2,122	$488	$2,610	2022Q1	5.9%	$2,247	$517	$2,764
	CONSTRUCTION ESTIMATE TOTALS:	$8,258	$1,899	23.0%	$10,158		$8,258	$1,899	$10,158			$8,857	$2,037	$10,894
01	LANDS AND DAMAGES	$1,580	$70	4.4%	$1,650		$1,580	$70	$1,650	2020Q4	5.7%	$1,669	$74	$1,743
30	PLANNING, ENGINEERING & DESIGN													
1.0%	Project Management	$83	$19	23.0%	$102		$83	$19	$102	2019Q2	4.9%	$87	$20	$107
1.0%	Planning & Environmental Compliance	$83	$19	23.0%	$102		$83	$19	$102	2019Q2	4.9%	$87	$20	$107
1.5%	Engineering & Design	$124	$29	23.0%	$153		$124	$29	$153	2019Q2	4.9%	$130	$30	$160
1.0%	Engineering Tech Review ITR & VE	$83	$19	23.0%	$102		$83	$19	$102	2019Q2	4.9%	$87	$20	$107
1.0%	Contracting & Reprographics	$83	$19	23.0%	$102		$83	$19	$102	2019Q2	4.9%	$87	$20	$107
1.0%	Engineering During Construction	$83	$19	23.0%	$102		$83	$19	$102	2022Q1	17.3%	$97	$22	$120
1.0%	Planning During Construction	$83	$19	23.0%	$102		$83	$19	$102	2022Q1	17.3%	$97	$22	$120
1.0%	Project Operations	$83	$19	23.0%	$102		$83	$19	$102	2019Q2	4.9%	$87	$20	$107
	Pre-Construction Monitoring													
	Post Construction Monitoring													
31	CONSTRUCTION MANAGEMENT													
3.0%	Construction Management	$248	$57	23.0%	$305		$248	$57	$305	2022Q1	17.3%	$291	$67	$358
2.0%	Project Operation:	$165	$38	23.0%	$203		$165	$38	$203	2022Q1	17.3%	$194	$45	$238
1.0%	Project Management	$83	$19	23.0%	$102		$83	$19	$102	2022Q1	17.3%	$97	$22	$120
	CONTRACT COST TOTALS:	$11,039	$2,246		$13,285		$11,039	$2,246	**$13,285**			$11,868	$2,420	**$14,288**

US Army Corps
of Engineers ®
Omaha District

DEADMANS RUN
LINCOLN, NEBRASKA

SECTION 205 – FLOOD RISK MANAGEMENT

FEASIBILITY REPORT

LETTERS OF SUPPORT:
LOWER PLATTE SOUTH
NATURAL RESOURCE DISTRICT
&
CITY OF LINCOLN

AUGUST 2018

LOWER PLATTE SOUTH
natural resources district

3125 Portia Street | P.O. Box 83581 • Lincoln, Nebraska 68501-3581 | P: 402.476.2729 • F: 402.476.6454 | www. lpsnrd.org

June 20, 2018

COL John L. Hudson
District Commander
US Army Corps of Engineers
1616 Capitol Avenue
Omaha, NE 68102

Dear COL Hudson:

The Lower Platte South Natural Resources District has reviewed the Feasibility Report, Draft Project Partnership Agreement (PPA), and Project Management Plan (PMP) for the Section 205 Project in Lincoln, Nebraska. The Lower Platte South Natural Resources District Board of Directors have approved the project and our attorney, Steve Seglin, has reviewed the PPA and found it to be legally sufficient.

We are aware as the project sponsor that the Lower Platte South Natural Resources District and City of Lincoln are responsible for thirty-five percent of the total project costs, currently estimated at $15.3M, which includes providing the necessary lands, easements, rights-of-way, relocations and disposals. Of that 35%, a minimum 5% cash contribution is required which cannot be accomplished through in-kind contributions. We also understand that acceptance of in-kind contributions must result in deliverables for design and/or construction which are not related to real estate requirements as mutually agreed upon prior to execution of the PPA. We understand that these are preliminary estimates, subject to change during more detailed design.

Based upon final Feasibility Report approval by the Northwestern Division and signing of the PPA, we acknowledge that as the project sponsor we will be required to perform the following items as outlined in the Articles of Cooperation in the report and PPA:

1. Provide without cost to the United States, all lands, easements, rights-of-way, and relocations, including suitable borrow and disposal placement areas ILERRD), as determined by the federal government to be necessary for the design and implementation of the project. The value of LERRD will be included in the total project costs and credited toward the sponsor's share of these costs, as defined in the PPA.
2. Hold and save the United States free from claims for damages, which may result from the construction and subsequent maintenance of the project, except damages due to the fault or negligence of the United States or its contractors.

3. Prevent future encroachment which might interfere with the proper functioning of the project for flood control.
4. Assume responsibility for all costs in excess of the federal portion which has a cost limitation of $10 million.
5. Assure maintenance and repair of the project during the useful life of the work as required to serve the project's intended purpose, with no additional cost to the federal government.
6. If the total of the LERRD plus the estimated cash contribution based upon the recommended plan does not exceed thirty-five percent of the project costs, provide an additional cash contribution to make the total equal to the required share.

This letter is intended to serve as our intent to proceed with design and implementation of the Section 205 Project in Lincoln, Nebraska by entering into the Project Partnership Agreement. The Lower Platte South Natural Resources District has the legal authority and is capable of meeting the financial requirements as well as the obligations outlined above to implement the project. The Lower Platte South Natural Resources District will be the signatory of the PPA and PMP.

Sincerely,

Paul D. Zillig
General Manager

CITY OF LINCOLN NEBRASKA

PUBLIC WORKS & UTILITIES DEPARTMENT
555 South 10th Street Suite 208 Lincoln, NE 68508
lincoln.ne.gov

July 10, 2018

COL John L. Hudson
District Commander
US Army Corps of Engineers
1616 Capitol Avenue
Omaha, NE 68102

Dear COL Hudson:

The City of Lincoln has reviewed the Feasibility Report for the Section 205 Project in Lincoln, Nebraska. The City is aware that the Lower Plate South Natural Resources District (LPSNRD) and City of Lincoln are responsible for 35% of the total project costs, currently estimated at $15.3 million, which includes providing the necessary lands, easements, rights-of-way, relocations and disposals. Of that 35%, a minimum 5% cash contribution is required which cannot be accomplished through in-kind contributions. It is also understood that acceptance of in-kind contributions must result in deliverables for design and/or construction which are not related to real estate requirements as mutually agreed upon prior to execution of the Project Partnership Agreement (PPA). We understand that these are preliminary estimates, subject to change during more detailed design.

Based upon final Feasibility Report approval by the Northwestern Division and signing of the PPA, we acknowledge that the City will work with the LPSNRD to perform the following items as outlined in the Articles of Cooperation in the report and PPA:

1. Provide without cost to the United States, all Lands, Easements, Rights-of-way, Relocations including suitable borrow, and Disposal placement areas (LERRD), as determined by the federal government to be necessary for the design and implementation of the project. The value of LERRD will be included in the total project costs and credited toward the sponsor's share of these costs, as defined in the PPA.

2. Hold and save the United States free from claims for damages, which may result from the construction and subsequent maintenance of the project, except damages due to the fault or negligence of the United State or its contractors.

3. Prevent future encroachment which might interfere with the proper functioning of the project for flood control.

4. Assume responsibility for all costs in excess of the federal portion which has a cost limitation of $10 million.

5. If the total of the LERRD plus the estimated cash contribution based upon the recommended plan does not exceed 35% of the project cots, provide an additional cash contribution to make the total equal to the required share.

This letter is intended to serve as our intent to proceed with design and implementation of the Section 205 Project in Lincoln, Nebraska by working with the LPSNRD on the Project Partnership Agreement. The City of Lincoln has the legal authority and is capable of meeting the financial requirements as well as the obligations outlined above to implement the project.

Sincerely,

Miki Esposito
Director, Public Works & Utilities

Cc; Donna Garden, Ben Higgins; City of Lincoln, Public Works & Utilities
Paul Zillig; Lower Platte South Natural Resources District

US Army Corps of Engineers ®
Omaha District

DEADMANS RUN
LINCOLN, NEBRASKA

SECTION 205 – FLOOD RISK MANAGEMENT

FEASIBILITY REPORT

APPENDICES VOLUME IV:
APPENDIX L
PART 1 OF 2

AUGUST 2018

US Army Corps of Engineers ®
Omaha District

DEADMANS RUN
LINCOLN, NEBRASKA

SECTION 205 – FLOOD RISK MANAGEMENT

FEASIBILITY REPORT

APPENDIX L
PHASE I ENVIRONMENTAL CONDITION OF PROPERTY DETERMINATION
PART 1 OF 2

AUGUST 2018

FINAL REPORT PHASE 1 ENVIRONMENTAL CONDITION OF PROPERTY DETERMINATION

Deadmans Run Study Area
Lincoln, Nebraska

Prepared For:
Lower Platte South
Natural Resources District

Prepared By:
CDM Smith Inc.
9200 Ward Parkway, Suite 500
Kansas City, MO 64114

CDM Smith Project No.
107730

April 2015

CDM Smith

Signature of Environmental Professional

I declare that, to the best of my professional knowledge and belief, I meet the definition of an Environmental Professional as defined in 312.10 of 40 CFR 312 and have the specific qualifications based on education, training, and experience to assess the properties of the nature, history, and setting of properties within the Deadmans Run Project Area. I have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

Laura Splichal

Laura Splichal, CHMM

CDM Smith Inc.

Signature of Environmental Professional

I declare that, to the best of my professional knowledge and belief, I meet the definition of an Environmental Professional as defined in 312.10 of 40 CFR 312 and have the specific qualifications based on education, training, and experience to assess the properties of the nature, history, and setting of properties within the Deadmans Run Project Area. I have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312, pursuant to observations made during the site reconnaissance visits to the selected properties.

Bill Imig

Bill Imig, CHMM

Olsson Associates

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Acronyms

ACBM	asbestos-containing building material
ACM	asbestos-containing material
AIRS	Aerometric Information Retrieval System
amsl	above mean sea level
AST	aboveground storage tank
ASTM	American Society for Testing and Materials
BTEX	benzene, toluene, ethylbenzene, xylenes
CDM Smith	CDM Smith Inc.
CESQG	conditionally exempt small quantity generator
CFR	Code of Federal Regulations
CORRACTS	RCRA Corrective Action Activity
EDR	Environmental Data Resources, Inc.
EPA	U.S. Environmental Protection Agency
FINDS	Facility Index System
GIS	geographic information system
LAST	leaking aboveground storage tank
LPSNRD	Lower Platte South Natural Resource District
LQG	large quantity generator
LUST	leaking underground storage tank
MCL	maximum contaminant level
NE	Nebraska
NFA	No Further Action
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
Project Area	Deadmans Run Flood Control Project Area (191 Parcels; 269 acres)
PWS	public water supply
RCRA	Resource Conservation and Recovery Act
REC	Recognized Environmental Condition
RGA	recovered government archive
SHWS	State Hazardous Waste Site
SQG	small quantity generator
TSCA	Toxic Substances Control Act
TSDF	treatment, storage, disposal facility
USACE	United States Corps of Engineers
USGS	United States Geological Survey
UST	underground storage tank

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Executive Summary

CDM Smith Inc. (CDM Smith) conducted this Phase I study to determine the environmental condition of properties near Deadmans Run for the Lower Platte South Natural Resources District (LPSNRD). The Project Area was designated by LPSNRD and included a portion of Deadmans Run being evaluated for implementation of flood control measures in a Section 205 Feasibility Study being conducted by the U.S. Army Corps of Engineers (USACE). The information gathered during the assessment will be used to assist the USACE and LPSNRD in determining the liability and feasibility of possible flood control mitigation options.

The Phase I study was performed in accordance with American Society for Testing and Materials (ASTM) Standard Practice E 1527-13, and the limitations, exceptions, and scope modifications described herein. The results of this study were based upon information obtained by CDM Smith through review of reasonably ascertainable environmental records, client-provided documents, and observations specific to environmental conditions within the Project Area made by Olsson Associates during a site reconnaissance conducted on February 10, 2015 and February 13, 2015.

The Project Area consists of parcels zoned for residential, industrial and commercial businesses. Below is a synopsis of the main conclusions and opinions developed by CDM Smith as a result of completing this Phase I study:

- The Project Area crosses approximately 191 parcels and covers approximately 269 acres.
- The State and Federal environmental databases had a total of 185 environmental listings within the ASTM required search distances from the Project Area.
- There were 48 residences identified as being built prior to 1978 that have the potential for lead-based paint.
- There were 67 properties with recognized environmental conditions (RECs) identified that have potential to impact the Project Area.

This report is a preliminary assessment of environmental condition of the properties based on the information that was reviewed and a limited site reconnaissance. CDM Smith recommends further data be collected at the RECs identified in this report depending on the flood control measures that are selected for implementation. A number of RECs were designated as such due to documented releases of hazardous substances or petroleum products that have likely affected the groundwater at or near the Deadmans Run Project Area. If the planned flood control measures will not encounter groundwater, these RECs would not be a significant concern.

This Executive Summary is not intended to be read as a stand-alone document. The reader should review the detailed information contained in this report.

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Section 1

Introduction

CDM Smith Inc. (CDM Smith) conducted this Phase I study to determine the environmental condition of properties near Deadmans Run for the Lower Platte South Natural Resources District (LPSNRD). The Deadmans Run Project Area is located in Lincoln, Lancaster County, Nebraska and is shown on **Figure 1** provided in Appendix A. The Project Area was designated by LPSNRD and included the portion of Deadmans Run being evaluated for implementation of flood control measures in a Section 205 Feasibility Study being conducted by the U.S. Army Corps of Engineers (USACE).

CDM Smith completed this Phase I study for LPSNRD in accordance with CDM Smith's contract dated January 9, 2015, and American Society for Testing and Materials (ASTM) Standard Practice E 1527-13. The results of the study were based upon information obtained by CDM Smith through review of reasonably ascertainable environmental records, client-provided documents, and observations specific to environmental conditions of the Project Area made by Olsson Associates during a site reconnaissance conducted on February 10 and February 13, 2015.

The LPSNRD requested this study to determine the liability and feasibility of possible flood control mitigation options for Deadmans Run within the Project Area. The Project Area crosses approximately 191 parcels and covers approximately 269 acres. The Project Area crosses areas zoned for residential, industrial, and commercial use.

1.1 Purpose

The purpose of this Phase I study is to review the physical settings, sources, and findings in the environmental records for approximately 191 properties (Appendix A – **Figure 1**) to identify properties with recognized environmental conditions (RECs) that could potentially affect the Deadmans Run Flood Control Project and potentially require additional investigation.

This Phase I study was performed in general accordance with ASTM Practice E 1527-13, *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process* (ASTM, 2013), with the limitations described in Section 1.4. The Phase I study also meets 40 Code of Federal Regulations (CFR) Part 312, Standards and Practices for All Appropriate Inquiries.

1.2 Scope of Services

The scope of work to determine the environmental condition of properties within the Deadmans Run Project Area included the following tasks:

- Review of environmental databases maintained by the U.S. Environmental Protection Agency (EPA), State of Nebraska, and local agencies to identify properties within the Project Area or adjacent or nearby properties that are documented hazardous waste generators or are known or suspected of having contamination. Environmental Data Resources, Inc. (EDR) performed the computerized environmental database search; a copy of their report is provided in Appendix B.

- Conduct a reconnaissance of 30 properties within the Project Area to observe present use and conditions and to identify potential sources of soil, surface water, and/or groundwater contamination. These properties were identified for inspection based on review of the information in the EDR report that indicated they may be potentially impacted by hazardous substances or petroleum products. The list of properties that were inspected, as well as photographs that were taken during the site reconnaissance are provided in Appendix C. Environmental site assessment checklists were completed at each property to record field observations; the completed checklists are also included in Appendix C.

- Review of property histories from standard historical record sources including historical photographs (Appendix D), Sanborn map (Appendix B), and Lancaster County Assessor's Office website records (Appendix E).

- Participate in a public meeting in Lincoln, Nebraska to gather public comments. Public meeting materials are provided in Appendix F.

This report summarizes the assessment methodology and presents our findings and opinions.

1.3 Significant Assumptions

The conclusions of this Phase I study are based on research of available current and historic information sources, public comments, and a site reconnaissance. On CDM Smith's behalf, EDR conducted a search of federal, state, tribal, and specialty environmental databases for records pertaining to the Project Area, and those properties within the required ASTM search distances. CDM Smith assumes that products provided by EDR are accurate, complete, and can be relied upon for the purposes of this study.

1.4 Limitations and Exceptions

Services were performed in accordance with ASTM E 1527-13 and generally accepted professional practice applicable to work of similar nature and complexity at similar localities at the time performed. This work was intended to provide an indication of the current environmental conditions at properties within the Project Area at the time of the assessment. However, the professional services rendered by CDM Smith, and conclusions and opinions provided herein, are not guaranteed to be a representation of actual site conditions or contamination, which are subject to change with time as a result of natural or man-made processes.

Site inspections were conducted from public right-of-ways. The properties were not entered and buildings on the properties were not inspected. In addition, none of the property owners were contacted for interviews; however, a public availability session was held where property owners were invited to attend and give information regarding the environmental condition of their property. A title search was not conducted for this project, and historical uses of the properties were not ascertained beyond the information that was available in the EDR report and other historical materials that were reviewed.

CDM Smith makes no warranties or guarantees as to the accuracy or completeness of information provided or compiled by others. It is possible that information exists beyond the scope of this investigation. If no hazardous substances or petroleum products are identified as part of this limited scope of work, such a conclusion should not be construed as a guaranteed absence of such materials, but merely the results of the evaluation. Additional information, which was not found or available to CDM Smith at the time of report preparation, may result in a modification of the conclusions presented.

1.5 Special Terms and Conditions

There are no special terms or conditions associated with this Phase I study.

1.6 User Reliance

This document was prepared for the sole use of LPSNRD and USACE. Any use of, or reliance on, this document by any other party shall be at that party's sole risk and without liability or legal exposure to CDM Smith.

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Section 2

User Provided Information

This section presents the information received from LPSNRD for consideration in completing the Phase I study. The provided information is summarized below.

2.1 Historical Photographs

Aerial photographs of the Project Area and surrounding area were provided for 1940, 1949, 1993, and 2014 for review as part of this report. Copies of these aerial photographs are included in Appendix D. The aerial photographs were reviewed and observations are discussed in Section 3.4.

A photograph of Deadmans Run channel was also provided by LPSNRD (Appendix D – 1967 photograph).

2.2 Specialized Knowledge

LPSNRD completed a User Questionnaire and provided information on groundwater samples collected on NRD property near the Lincoln Grain/Continental Grain property located at 3001 Cornhusker Highway. The samples were collected in 2014 and the following contaminants were detected: carbon tetrachloride, chloroform, carbon disulfide, ethylene dibromide, and methylene chloride. The concentrations of carbon tetrachloride, chloroform, and ethylene dibromide exceeded maximum contaminant levels (MCLs) established by the Safe Drinking Water Act. This contaminated groundwater is located within the Project Area.

The provided information also notes that there are 45 registered wells in the same section as the Lincoln Grain/Continental Grain property that are all monitoring or recovery wells. The well data that was provided in the EDR report are discussed in Section 3.

The completed questionnaire is included in Appendix G.

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Section 3

Records Review

3.1 Standard Environmental Records Sources

CDM Smith conducted a review of regulatory search information prepared by EDR. The EDR search radius was a minimum of 1.0 mile around the Project Area, based on the State and Federal National Priorities List (NPL) site list and the Federal Resource Conservation and Recovery Act (RCRA) CORRACTS facilities list minimum search distances required by ASTM E 1527-13. A regulatory search of this nature is based on information published by State and Federal regulatory agencies. It should be noted that these listings include only those facilities that are known to the agency at the time of the publication. The EDR report dated January 14, 2015 is provided in Appendix B.

The federal, state, local, tribal, and EDR proprietary records searched are listed in the Executive Summary of the attached EDR report (Appendix B). A total of 185 listings were identified. The EDR Map shows 65 sites (Appendix B). In many instances, a single site was associated with more than one address and listing. **Table 3-1** lists the number of sites in each database that were identified during the records search (Map Findings Summary in Appendix B).

Table 3-1 EDR Map Findings Summary

Records	Database	Total Listings	Records	Database	Total Listings
	NE SHWS	**1**		**CORRACTS**	**2**
	NE LUST	**76**		RCRA-TSDF	1
	NE UST	43		RCRA-LQG	2
	NE HIST UST	18		RCRA-SQG	3
	NE LAST	**5**		RCRA-CESQG	5
	WI MANIFEST	1	**Federal**	RCRA NonGen/NLR	7
State and Local	**NE SPILLS**	**10**		US ENG CONTROLS	1
	NE INST CONTROL	1		FINDS	15
	NE DRYCLEANERS	1		US AIRS	4
	NE BROWNFIELDS	1		2020 COR ACTION	1
	NE NPDES	14		EDR US HIST AUTO STAT	34
	NE AIRS	8	**EDR Proprietary**	EDR US HIST CLEANERS	6
	NE TIER 2	5		**NE RGA LUST***	**3**

*These listings were also included in the NE LUST database

Bolded listings are sites with a documented release to the environment

The EDR report provided information on 220 wells identified and shown on the EDR Well ID Map (Appendix B). The EDR search identified one Sanborn Map for the Project Area. The Sanborn Map is included in Appendix B and discussed in Section 3.4.1. The well information provided by EDR is discussed in Section 3.3.

The review approach was to focus on listings within the Project Area and listings within the ASTM required distances from the Project Area that have the potential to impact any soil near and within the Project Area or groundwater below the Project Area. An initial review of the EDR findings was performed to determine which properties should be included in the site reconnaissance task. During this initial review the proximity of the listings to the Project Area, the topography of the search area, and the type of environmental listing were used to determine the sites to be visited. Listings in the following categories were viewed as a documented release of a hazardous substance or petroleum product to the environment:

- LUST – leaking underground storage tank
- LAST – leaking aboveground storage tank
- SPILL Site – documented surface spill
- CORRACTS Site – RCRA corrective action site
- NE SHWS – state hazardous waste site

These listings were examined for details in the EDR report as well as location relative to the Project Area to determine if they should be identified as an REC. Any listings without an indication of environmental release were not considered an REC without additional evidence.

Although the status of No Further Action (NFA) indicates the site was addressed to the satisfaction of the local regulatory agency, these sites are still considered RECs in this report if the site is close enough to the Project Area to potentially impact soils, or if it is located upgradient of the Project Area indicating a potential to impact groundwater below the Project Area. Sites located downgradient of the Project Area, NFA or otherwise, were not considered RECs as these sites were considered to be outside an area of potential impact to soil or groundwater below the Project Area.

The Project Area runs approximately 2.0 miles north/south and 2.5 miles east/west. The Project Area has an average surface elevation of 1190 feet above mean sea level (amsl). The western portion of the project (west of N 33rd Street) is relatively flat with an average elevation of 1135 feet amsl and a difference in elevation of approximately 10 feet over an approximate 125-acre area. The lowest elevation within the Project Area (approximately 1120 feet amsl) is located along the southern edge of Salt Creek at the northern end of Deadmans Run. The eastern portion of the Project Area has the highest elevation at 1200 feet amsl. Topographic contours are shown on **Figure 2** in Appendix A.

Based on this information, shallow groundwater is generally assumed to follow surface elevations and flow to the west-northwest towards Salt Creek. Topographic contours south of Deadmans Run indicate a flow direction towards Deadmans Run, trending in the northwest direction. Topographic contours north of Deadmans Run are generally west towards Salt Creek, but also show a southerly component towards Deadmans Run, especially east of North 50th Street.

3.2 Identified RECs from the EDR Records Search

Taking into consideration the expected flow of shallow groundwater with surface topography, 66 of the 76 identified Nebraska (NE) LUST sites have the potential to affect groundwater below the Project Area (**Figure 2**). A table with the complete list of the NE LUST Sites is provided with Figure 2 in Appendix A. These 66 sites are all considered RECs with the potential to impact groundwater below the Project Area. Six properties have more than 1 LUST site reported.

Table 3-2 lists the NE LUST sites at locations that may have the ability to impact groundwater below the Project Area with a facility status other than NFA. These sites are of particular concern regarding potential to impact groundwater below the Project Area. If groundwater will be encountered during flood control activities associated with Deadmans Run, additional research or investigation of these LUST properties, as well as the NFA LUST properties, may be warranted.

Table 3-2 Non-NFA Nebraska LUST Sites

Site	Address	Facility Status	Figure 2 MAP ID
ANIMAL RESEARCH FARM	3940 FAIR ST	Risk Based Corrective Action Investigation	93
NE TELECOMMUNICATIONS	1800 N 33RD		100
WENTZ PLUMBING*	2949 CORNHUSKER HWY		52
GAS N SHOP	3010 CORNHUSKER HWY	Voluntary Remedial Action Program	61
LINCOLN FOOD BANK	3645 ADAMS STREET	High-risk site, currently in active investigation or remediation	64
PITTMAN AUTO REPAIR	3248 CORNHUSKER HWY		53
CITY OF LINCOLN MAINT DIV	3200 BALDWIN	Additional work needed, DEQ has not yet directed the work to begin	50
CULLER JR HIGH	5201 VINE ST		121
F & F OIL COMPANY	4000 ADAMS, N SIDE		17
GAME & PARKS COMMISSION	2200 N 33RD ST		91
H R BOOKSTROM CONS	3260 LEIGHTON AVE		90
HANK BUIS CONSTRUCTION	3110 N 40TH ST		62
KWIK SHOP #650	5600 HOLDREGE		104
KWIK SHOP #680	1441 N COTNER BLVD		110
PERFORMANCE 66 SERVICE (2 Incidents)	7000 VINE ST	Additional work needed, DEQ has not yet directed the work to begin Priority List for orphan sites (Responsible Party not viable)	123
27TH ST ASSN TANK	3000 N 27TH	Priority List for orphan sites (Responsible Party not viable)	13
TREASURE CITY STATE	NW CRNR 48 & LEIGHTON		55
WILLIAMS CLEANERS	48 & BALDWIN		84
RGA LUST Site			
ANDERSEN SERVICE	1445 N 56TH STREET	NE LUST Status – NFA	107

*WENTZ PLUMBING has 2 listings in the NE RGA LUST database

A draft risk-based corrective action Tier 1 Assessment report was obtained for the City of Lincoln Maintenance Division property located at 3200 Baldwin (Olsson 2015). This investigation was recently completed at the property in February 2015; soil and groundwater samples were collected for fuel-related contaminants. Surface soil and subsurface soil were noted as not impacted; groundwater was impacted by benzene, toluene, ethylbenzene, xylenes (BTEX) at monitoring well MW-1, but concentrations were below MCLs. Based on this report, the subject property is not considered a REC for the Deadmans Run Project Area.

There was one dry cleaner site identified within the Project Area (**Figure 2** – Map ID 25); this site was listed in multiple databases as shown on **Table 3-3** below. It is also considered an REC for the Project Area with the potential to impact groundwater.

Table 3-3 Williams Cleaners & Launderers (2541 N 48th St) Database Listings

Database	Comments/Description
RCRA-SQG	Spent halogenated solvents used in degreasing Tetrachloroethylene. (Multiple violations in 2004)
NE DRYCLEANERS	Dry cleaning Plants Except Rug Cleaning
NE LUST	NFA
NE AIRS	Facility ID: 60638
FINDS	Registry ID: 110001515851
US AIRS	Potential uncontrolled emissions < 100 tons/year
EDR US Hist Cleaners	2004 through 2010

There were a total of 5 NE LAST listings found within the overall search area. The 5 NE LAST listings are shown on **Table 3-4** and in **Figure 3**. Four of the LAST sites were determined to be outside of the area of potential impact to groundwater or soil. The LAST listing associated with University of Nebraska-East Campus is considered an REC due to the proximity adjacent to Deadmans Run.

Table 3-4 NE LAST Sites

Site	Address	Facility Status	Figure 3 MAP ID
UNIV OF NEBR-LINCOLN	E CMPUS POW PLT,36	NFA	94
Sites Outside Area of Potential Impact			
SANFORD & SON LLC	3900 INDUSTRIAL AVE	VOLUNTARY REMEDIAL ACTION PROGRAM	2
GENERAL DYNAMICS-OTS INC	4300 INDUSTRIAL AVE	NFA	1
PENSKE AUTO CENTER	3300 N 27TH STREET		9
WHEELER TRANSPORT	40 & ADAMS		19

NFA = no further action

The Nebraska surface spills list included a total of 10 sites within the entire search area. Four sites were found to be outside of the area of potential impact to groundwater or soil. The other six sites are all classified as NFA and are included on the REC list due to their location relative to the project area. The 10 NE spills listings are shown on **Table 3-5** and in **Figure 3**.

Table 3-5 NE Spills Sites

Site	Address	Facility Status	Incident Type	Figure 3 MAP ID
EASTMONT TOWERS	6315 O ST	NFA	OTHER	134
GAME & PARKS COMMISSION	2200 N 33RD ST	NFA	ABOVE GROUND TANK	91
J & I CARWASH	2110 NORTH 48TH ST	NFA	MOTOR VEHICLE	36
UNIV OF NEBR-LINCOLN	E CMPUS POW PLT,36	NFA	ABOVE GROUND TANK	94
Unknown*	56TH & HOLDREGE	NFA	FIXED FACILITY	106
Unknown*	5600 HOLDREGE ST	NFA	MOTOR VEHICLE	104
Sites Outside Area of Potential Impact				
GENERAL DYNAMICS-OTS INC	4300 INDUSTRIAL AVE	NFA	FIXED FACILITY & ABOVE GROUND TANK	1
PENSKE AUTO CENTER	3300 N 27TH STREET	NFA	ABOVE GROUND TANK	9
SANFORD & SON LLC	3900 INDUSTRIAL AVE	VOLUNTARY REMEDIAL ACTION	ABOVE GROUND TANK	2
WHEELER TRANSPORT	40 & ADAMS	NFA	ABOVE GROUND TANK	19

*The EDR report did not identify a facility name with this listing; only an address.

NFA = no further action

Three sites in **Table 3-6** were listed on the RCRA Corrective Action list or as a Nebraska Hazardous Waste Site. These listings indicate environmental contamination exists in soil or groundwater associated with these properties. The location of these sites are shown on **Figure 3**. All three sites are at locations that do not appear to impact the Project Area. General Dynamics and Sanford and Son are on the west side of Salt Creek, and groundwater would be expected to flow towards Salt Creek. Snyder Industries is located north of the Project Area, and groundwater would be expected to flow west towards Salt Creek and not impact Deadmans Run.

Table 3-6 CORRACTS and Nebraska Hazardous Waste Sites

Site	Address	Facility Status	Figure 3 MAP ID
Sites Outside Area of Potential Impact			
GENERAL DYNAMICS	4300 INDUSTRIAL AVE	RCRA CORRECTIVE ACTION	1
SANFORD & SON LLC	3900 INDUSTRIAL AVE	NE SHWS - VOLUNTARY REMEDIAL ACTION PROGRAM	2
SNYDER INDUSTRIES, INC	4700 FREMONT STREET	RCRA CORRECTIVE ACTION	10

3.3 Well Records

Of the 220 wells identified in the EDR search report and shown on the EDR Well ID Map (Appendix B), possible monitoring wells were determined by ownership and are listed in **Table 3-7**.

Two of the wells identified in the EDR search had major violations in the past. **Table 3-8** lists the two drinking water wells and their associated violations. These were coliform violations in two public supply wells, which is a disinfection issue and not indicative of an environmental concern.

Additionally, data from three monitoring wells (listed on **Table 3-9**) near Lincoln Grain/Continental Grain property at 3001 Cornhusker Highway list carbon tetrachloride in the groundwater. This finding is consistent with the information provided by LPSNRD in Appendix G. This property is considered an REC with known groundwater contamination that has impacted the Project Area.

Figures 2 and **3** in Appendix A show the locations of the wells listed in **Table 3-7** and **Table 3-9** to correspond with identified LUST sites, LAST sites, and spill sites. The location of the two drinking water wells are additionally shown in **Figure 4**.

Table 3-7 Possible Monitoring Wells

Well ID	Site ID	EDR MAP ID	Figure 3 MAP ID
United States Geological Survey (USGS) Nebraska Water Science Center Wells			
USGS-405102096412601	USGS40000735438	12	W1
USGS-404958096410401	USGS40000735074	34	W2
USGS-404943096400401	USGS40000734973	39	W3
EPA Wells			
137616	NE5000000065180	4	W4
137617	NE5000000065162	4	W5

Table 3-7 Possible Monitoring Wells (continued)

Well ID	Site ID	EDR MAP ID	Figure 3 MAP ID
Nebraska Department of Environmental Quality Wells			
151891	NE5000000063682	19	W6
151889	NE5000000063676	19	W7
151890	NE5000000063669	19	W8
151892	NE5000000063638	19	W9
200337	NE5000000061660	45	W10
200336	NE5000000061627	45	W11
200335	NE5000000061637	45	W12
200334	NE5000000061624	45	W13

Table 3-8 Public Water Supply (PWS) Wells with Contaminant Readings

Well PWS ID	Contaminant	Timeframe	Figure 3 MAP ID
EDR Map Findings Summary			
NE3150400	Coliform	1993-2004*	W14
NE3150090	Coliform	1998	W15

*Multiple violations across a span of over 10 years.

Table 3-9 Monitoring Wells at Lincoln Grain/Continental Grain with Contaminants

Well ID	Contaminant	Timeframe	Figure 3 MAP ID
HP-511	Carbon tetrachloride	2014	W16
TMW-512	Carbon tetrachloride	2014	W17
TMW-504	Carbon tetrachloride	2014	W18

3.4 Properties with Potential for Lead-Based Paint or Asbestos

3.4.1 Lead Based Paint

Potential environmental issues for residential properties can occur due to the use of lead-based paint on properties constructed prior to 1978. In order to determine the date of construction for residential properties within the Project Area, a search of the geographic information system (GIS) parcel file was performed for type of property. The file identified single family residences with an R in the Property Class field. Using this information the Lancaster County Assessor's (Lancaster) website was utilized to determine the year the residence was built (Appendix E – Assessors_Webpages). During this process additional multi-family properties were identified through visual inspection of GIS aerial photographs and due to proximity with single family parcels. The multi-family parcels were confirmed by information contained within the Lancaster parcel database.

A total of 60 residential parcels were identified as having some portion of the parcel within the Project Area. Of the 60 parcels, 48 residences were built prior to 1978, the date use of lead paint was outlawed. The addresses of the residential properties and associated year they were built are included in Appendix E. The use of lead paint can result in lead being present in surface soils, typically close to the drip line of the structure. The proximity of homes constructed prior to 1978 to the flood control project should be evaluated in regards to potential lead-impacted soils.

3.4.2 Asbestos

Asbestos is a naturally occurring mineral fiber that was once widely used in building materials and products for its thermal insulating properties and fire resistance. EPA defines asbestos-containing material (ACM) as material that contains more than 1-percent asbestos. Building products containing ACM are often referred to as asbestos-containing building materials (ACBM). Undisturbed ACBM generally does not pose a health risk. However, ACBM may pose an increased risk if damaged, disturbed, or if it deteriorates so that asbestos fibers can be released into building air.

Many building materials such as structural steel fireproofing, acoustic finishes, ceiling texture, ceiling tile, suspended ceiling panels, textured and elastomeric paints, window putty, flexible duct connectors, rubbery pipe insulation tape, building wiring insulation, pipe, boiler, vessel insulation, interior plaster, and duct insulation commonly contained asbestos until the late 1970s. Other types of ACM were commonly used until the middle to late 1980s such as drywall joint, compound, exterior stucco, sheet vinyl flooring, vinyl flooring products, flooring and other mastics (adhesives), roof tiles and coatings, asbestos-cement products, and flues. Under the Toxic Substance Control Act (TSCA), EPA banned the use of asbestos in many products in 1993. However, several categories of building products were not subject to the ban. Thus, existing and even new buildings may lawfully contain ACBM.

If any buildings are to be demolished as part of the flood control project, they should be inspected for ACM, and any identified ACM disposed of properly. Several residences were constructed prior to 1980, for which this is a particular concern.

3.5 Historical Use Information

3.5.1 Sanborn Maps

EDR identified one Sanborn map within the Project Area that is included in Appendix B. This is a map from 1964 that shows a series of concrete grain elevators labeled as Lincoln Grain, Inc. built in 1956, and West Central Co-op Grain Co. built in 1951 and 1954. Four steel grain storage tanks are also shown north of the Lincoln Grain concrete grain elevators that are 42 feet high and 117 feet in diameter. Carbon tetrachloride was historically used as a grain fumigant associated with these types of steel grain bins. Carbon tetrachloride has been documented in groundwater associated with this property as discussed in Sections 2.2 and 3.2. The Continental Grain property has been identified as an REC.

3.5.2 Historical Aerial Photographs

Aerial photographs of the Project Area and surrounding area were provided by LPSNRD for the years 1940, 1949, 1993, and 2014. Copies of these aerial photographs are included in Appendix D. CDM Smith observed the following in the aerial photographs.

- <u>1940 Aerial Photograph:</u> This aerial is of the northwest portion of the Project Area (north of Leighton Avenue and west of North 33rd Street). The majority of the area shown is relatively undeveloped. Exceptions include what appear to be structures on the western side of the aerial.

- <u>1949 Aerial Photograph:</u> This aerial is of the northern portion of the Project Area (north of Francis Street). The western edge of the aerial is dark and difficult to discern development. Overall, the majority of the area shown is relatively undeveloped. Exceptions include the residence built in 1900 at 2320 N 43 Street, (**Figure 5** – Map ID P- 23), for which lead paint may be an issue.

- 1993 Aerial Photograph: This aerial shows all of the Project Area. The Project Area is significantly developed, except immediately along Deadmans run. This aerial also shows an increase in impervious area along both previously developed parcels and previously undeveloped parcels. Development includes the grain elevators and steel storage tanks south of Cornhusker Highway and east of North 27th Street (**Figure 5** - Map ID P-9) and the development of University Place Park (**Figure 5** - Map ID P-24). The University of Nebraska East Campus shows significant development on its two parcels (**Figure 5** – MAP ID P-25 and P-26) though most of the development is outside of the Project Area. The Leighton Avenue Shopping Center was developed as shown in **Figure 5** –MAP ID P-28.

  This aerial also shows the residential developments along Huntington Avenue (Appendix E for list of residential properties within Project Area). Another change is the removal of development on PID 1718250002000 (**Figure 5** - Map ID P-10) and 1718250003000 (**Figure 5** - Map ID P-14), which now appear to be farmed.

- 2014 Aerial Photograph: This aerial shows all of the Project Area. Changes from the 1993 Aerial include the removal of the four steel grain storage tanks from the Lincoln Grain/Continental Grain property (**Figure 5** - Map ID P-9) and the development of Fleming Fields (**Figure 5** - Map ID P-6). This aerial also shows an increase in impervious area along both previously developed parcels and previously undeveloped parcels.

3.5.3 Historical Photographs

The 1967 photo of Deadmans Run channel provided by LPSNRD was taken from the 37th Street bridge facing north (Appendix D). It shows that the channel is an unlined channel. The channel has steep banks with multiple areas of erosion. Additionally, this photo provides a partial view of the grain elevators located south of Cornhusker Highway and east of North 27th Street.

Section 4

Site Reconnaissance

4.1 Methodology and Limiting Conditions

Mr. Nicolas Anderson of Olsson Associates conducted a non-intrusive visual site reconnaissance of 30 sites on February 10, 2015 and February 13, 2015. Site reconnaissance documentation is provided in Appendix C.

The purpose of the site reconnaissance was to identify visible indications of hazardous or potentially hazardous substances or petroleum products that could have been used, generated, stored, or disposed of on or near the Project Area. It should be understood that the site reconnaissance as performed is limited in its ability to fully assess potential environmental issues. All observations were made from public right-of-ways, and none of the buildings were entered to allow observations regarding potential environmental releases. Further investigation would be required to fully inspect properties with potential environmental impacts. The findings presented below are based on conditions observed at the time of the site reconnaissance.

4.2 General Site Setting

The sites visited consisted of commercial and industrial properties within the Project Area. These properties included fuel stations, grain elevators, a dry cleaner, auto salvage facility, auto repair shops, auto sales lots, manufacturing facilities, schools, a car wash, a box store, and City of Lincoln facilities (Appendix C – List of Sites). During the site reconnaissance it was also noted that there is a rail yard and railways within the Project Area.

4.3 Site Reconnaissance Summary

Notable observations from the site reconnaissance of identified properties of interest are listed on **Table 4-1** and include the following:

- An old above ground storage tank (AST) was observed on the bank of Deadmans Run directly adjacent to Cornhusker International Truck. The tank is on Star City Auto Sales property, see Cornhusker International Photo Log - Photos #5 and #6. This tank is considered an REC as the condition of the tank or its contents is unknown. The tank could have corrosion holes allowing a release of the former contents if it had not been cleaned out.

- Star City Auto Salvage is located immediately adjacent to Deadmans Run (Star City Photo Log - Photo #3). Storage of old vehicles at this property could result in contamination to the Project Area if fuel or motor oil releases have occurred. The vehicles stored on this property are considered an REC.

- A debris pile with no containment observed on the bank of Deadmans Run was found on the north side of the House of Mufflers and Brakes property. An old grain bin is also located on this property close to the debris pile (see House of Mufflers Photo Log - Photo #9; Home Depot Photo #11 also shows this grain bin, as well as an area of erosion related to surface runoff into Deadmans Run). Contamination originating from the debris pile or the grain bin could impact the Project Area. This property is considered an REC based on these observations.

- The Crashbuster Body & Paint Inc. (Crashbuster) property had numerous debris piles. These piles were composed of constructions material, auto parts, railroad ties, and assorted refuse. Refer to Crashbuster Body Photo Log. In some areas around these piles the soil and vegetation appeared to be stressed. Two ASTs were also noted on the property. It appears that the tank owners may only be using piping and gravity to control the flow of fluid out of the tank. Refer to Crashbuster Body Photo Log Photo #2. Stressed soil and vegetation could be a result of contamination. This property is considered an REC based on these observations.

- A sizable stain was noted on the Olstons Import Auto (Olstons) property. This stain is related to a release to the environment that most likely impacted the soil underlying the pavement due to the presence of cracks in the pavement. See Olstons Photo Log picture #4. This observation of a fuel or motor oil release is considered a REC.

- Mapes Industries Inc (Mapes) is listed on multiple databases in the EDR report, including being a RCRA-LQG. There are drums stacked at the Mapes facility (photos 2 and 3) on pallets but without any apparent spill containment. This could result in contamination if drums are damaged and releases occur. The manner in which these drums were being stored is considered a REC with the potential to impact the Project Area.

- Possible soil and vegetation stress was observed, which could be related to environmental contamination, on the north side of Kwik Shop #650. See Kwik Shop #650 Photo Log picture #4. The stained soil is considered a REC.

- Lincoln Public Works has fuel pumps and drums stacked in a facility storage area (Photos #1 and #3) that indicate a potential for release of fuel or hazardous substances to the environment. However, Olsson recently completed a risk-based corrective action Tier 1 Assessment at this property at 3200 Baldwin (Olsson 2015). Soil and groundwater samples were collected at this property for fuel-related contaminants. Surface soil and subsurface soil were noted as not impacted; groundwater was impacted by benzene, toluene, ethylbenzene, xylenes (BTEX) at monitoring well MW-1, but concentrations were below MCLs. Based on this report, the subject property is not considered a REC for the Deadmans Run Project Area.

Table 4-1 RECs Identified during Site Reconnaissance

NAME	ADDRESS	REC DESCRIPTION
Star City Auto Sales	3101 Cornhusker Hwy	Old AST Condition and contents unknown
Star City Auto Salvage	2705 N 33rd St	Vehicles stored on property
House of Mufflers and Brakes	2920 Cornhusker Hwy	Old grain bin and debris pile on this property
Crashbuster	3221 Huntington	Stressed soil and vegetation around piles of material
Olstons	2435 N 33 St	Observation of a fuel or motor oil release
Mapes Industries, Inc.	2929 Cornhusker Hwy	Drums on pallets without spill containment
Kwik Shop #650	5600 Holdrege	Stained soil

Observations that were made during the site reconnaissance that indicated hazardous substances or petroleum products may have been released to the environment or could be released to the environment; and thus, impact the Project Area were identified as RECs. This was conservatively done for this report given the limitation of the Phase 1 (no onsite inspections were performed or interviews with property owners or site workers). These sites should be considered for further investigation after the flood control activities have been determined if work will be conducted near these properties. It should be noted that the address for Kwik Shop #650 (5600 Holdrege), is the same address as two unidentified spill site listings and is likely the same property. The spill site listings are shown in **Table 3-5**.

Section 5

Public Meeting

A public meeting was held at the Fourth Presbyterian Church, 52nd and Francis Street in Lincoln, Nebraska on the evening of February 19, 2015, to gather and record any verbal and written comments from property owners regarding the environmental condition of properties within the Project Area. The public meeting was held in lieu of conducting individual property-specific interviews. LPSNRD sent letters of invitation to property owners within the Project Area to attend the public meeting.

CDM Smith prepared a questionnaire that was available at the meeting for members of the public to record environmental information related to their properties. Flood plain maps, historic photographs of Deadmans Run, and historic aerial photographs were available at the meeting, as well as information on the status of the Section 205 feasibility study. Approximately 20 people attended the meeting, reviewed the presented information and asked questions pertaining to floodplain designations and the status of the Section 205 study. Attendees did not provide any information related to the environmental condition of the properties, and none of the environmental questionnaires were completed during the meeting or returned to LPSNRD.

The invitation letter, list of invitees, environmental questionnaire, and the sign-in sheet for the public meeting are included in Appendix F.

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Section 6

Evaluation

6.1 Findings, Opinions and Concusions

CDM Smith has performed a Phase I study to determine the environmental condition of properties within the Deadmans Run Study Area in conformance with the scope and limitations of ASTM Practice E1527-13. Exceptions to, or deletions from, this practice are described in Section 1 of this report.

The following findings are based on the information presented in this report:

- The Project Area crosses 191 parcels and covers 269 acres.
- A search of standard State and Federal environmental databases resulted in finding 185 environmental listings within 1 mile of the Project Area.
- 48 residences were identified as being built prior to 1978 that have the potential for lead-based paint.
- 67 properties were identified with recognized environmental conditions (RECs) that have the potential to impact the Project Area.

This assessment has revealed several RECs within or near the Project Area. Table 6-1 provides a comprehensive summary list of the RECs. **Figure 6** in Appendix A shows the locations of the identified RECs. RECs include the following:

- 65 LUST sites – 47 sites were designated as no further action; 18 sites had a status other than NFA. One LUST site was eliminated as an REC based on results of a recent Tier 1 assessment. Six properties had more than 1 LUST site reported.
- Williams Dry Cleaner located at 2541 N. 48th Street is on the LUST list as a priority list for orphan sites and also appears on several listings associated with dry cleaning, dry cleaning emissions to air, and on the small quantity generator list. This property is considered an REC.
- UNL East Campus was on the LAST listing. This property borders Deadmans Run, and this release is considered an REC even though it was listed as no further action. UNL East Campus also has multiple LUST site listings.
- Six properties were included in the spill site listings at locations where the release could impact groundwater below Deadmans Run. The listings included the UNL LAST listing, as well as two spills at Kwik Shop #650, which was also listed as a LUST. All of the spills sites were also on the LUST listing except for J&I Carwash located at 2110 N. 48th Street. This spill site is in close proximity to Deadmans Run and is considered an REC.
- Continental Grain located at 3001 Cornhusker Highway has documented groundwater contamination. Groundwater samples taken from LPSNRD property adjacent to Continental Grain contained carbon tetrachloride, chloroform, and ethylene dibromide at concentrations above drinking water standards (i.e. MCLs).

- Seven properties were identified with RECs during the site reconnaissance as discussed in Section 4. One property, Kwik Shop #650 located at 5600 Holdrege, is also included in the LUST and spills listings.

No environmental impacts were indicated for any of the remaining properties within the Project Area.

Table 6-1 REC Summary Table

MAP ID	ADDRESS	OWNER	NE LUST	NE LAST	NE SPILLS	Dry Cleaner	REC from Recon.	Other	REC DESCRIPTION	PARCEL ID
REC-01	3001 CORNHUSKER HWY	CONTINENTAL GRAIN COMPANY						X	Three monitoring wells with reported Carbon tetrachloride (2014); User provided information; 1967 Sanborn Map Review	1718100039000
REC-02	3310 HOLDREGE ST, LINCOLN, NE	BOARD OF REGENTS UNIV OF NEBR	X	X	X				Listed in NE LUST Site database; also LAST and SPILLS - NFA	1718400001000
REC-03	1875 N 42 ST	BOARD OF REGENTS UNIV OF NEBR	3						Listed in NE LUST Site database, Risk Based Corrective Action investigation	1717300001000
REC-04	6315 O ST	EASTMONT TOWERS	X		X				Listed in NE LUST and SPILLS Site database, NFA	1728212023000
REC-05	5201 VINE ST	CULLER JR HIGH	X						Listed in NE LUST Site database, Additional work needed, DEQ has not yet directed the work to begin	1720407006000
REC-06	3221 HUNTINGTON AVE	DUERR, ROGER F (Crashbuster)					X		Recon: Some areas of soil appear to be stressed around observed piles of debris	1718117012000
REC-07	4000 ADAMS, N SIDE (4002 ADAMS)	F & F OIL COMPANY	X						Listed in NE LUST Site database, as other than NFA	1707407011000
REC-08	2200 N 33RD ST	GAME & PARKS COMMISSION	X		X				Listed in NE LUST Site database, Additional work needed, DEQ has not yet directed the work to begin	1718400003000
REC-09	3010 CORNHUSKER HWY	GAS N SHOP	X						Listed in NE LUST Site database, Voluntary Remedial Action program	1707300006000
REC-10	3110 N 40TH ST	HANK BUIS CONSTRUCT.	X						Listed in NE LUST Site database, Additional work needed, DEQ has not yet directed the work to begin	1707407008000
REC-11	7000 VINE ST	KINGHORN'S 66 SERVICE (2 Incidents)	2						Listed in NE LUST Site database, Additional work needed, DEQ has not yet directed the work to begin	1722130001000
REC-12	5600 HOLDREGE	KWIK SHOP #650	X		2		X		Recon: Soil and vegetation stress possible environmental contamination, In NE LUST Site database, as other than NFA, & in NE Spills 2 times - NFA	1716320005000
REC-13	1441 N COTNER BLVD	KWIK SHOP #680	X						Listed in NE LUST Site database, Additional work needed, DEQ has not yet directed the work to begin	1721202001000
REC-14	3645 ADAMS STREET	LINCOLN FOOD BANK	X						Listed in NE LUST Site database, High-risk site, currently in active investigation or remediation	1718204005000
REC-15	1100 N 56 ST	LINCOLN LUTHERAN SCHOOL ASSN	X						Listed in NE LUST Site database, NFA	1721100017000
REC-16	2445 N 33 ST	MALOUSEK, ROBERT & ROXANE (Olston Import Auto)					X		Recon: Sizeable stain related to release to environment that could enter soil through cracks in pavement	1718117002000
REC-17	2929 CORNHUSKER HWY	MAPES INDUSTRIES INC					X		Recon: Drums without spill containment, could result in contamination if spills occur	1718100041000
REC-18	1800 N 33RD	NE TELECOMMUNICATION	X						Listed in NE LUST Site database, Risk Based Corrective Action investigation	1718400004000
REC-19	2920 CORNHUSKER HWY	NORTHGATE PARK INC (House of Mufflers)					X		Recon: A debris pile with no containment observed on the bank of Deadmans Run	1707312001000
REC-20	3248 CORNHUSKER HWY	PITTMAN AUTO REPAIR	X						Listed in NE LUST Site database, High-risk site, currently in active investigation or remediation	1707418002000
REC-21	2110 N 48 ST, LINCOLN, NE	ROTTINGHAUS, SUSAN & DONALD (J&I Carwash)			X				Listed in NE SPILLS Site database, NFA	1717407003000
REC-22	3101 CORNHUSKER HWY	SKOROHOD, GEORGE & CAROLENE V (Star Auto Sales)					X		Recon: Observed old above ground storage tank contents and condition unknown	1718100007000
REC-23	2705 N 33 ST	SKOROHOD, GEORGE & CAROLENE V (Star Auto Salvage)					X		Recon: immediately adjacent to Deadmans Run possible contamination if fuel releases occur	1718102006000
REC-24	2949 CORNHUSKER HWY	WENTZ PLUMBING	X						Site listed twice in NE RGA LUST Site database and Listed in NE LUST Site database, as other than NFA	1718100043000
REC-25	2541 N 48TH ST	WILLIAMS CLEANERS & LAUNDERERS	2			X			Listed as an active Dry Cleaner, Listed in NE LUST Site database, NFA	1717134002000
REC-26	3000 N 27TH	27TH ST ASSN TANK	X						Listed in NE LUST Site database, Priority List for orphan sites (Responsible Party not viable)	
REC-27	1445 N 56TH STREET	ANDERSEN SERVICE	X						Listed in NE LUST Site database, Listed in NE RGA LUST and NE LUST Status – NFA	
REC-28	4000 ADAMS, N SIDE	F & F OIL COMPANY	X						Listed in NE LUST Site database, Additional work needed, DEQ has not yet directed the work to begin	
REC-29	3260 LEIGHTON AVE	H R BOOKSTROM CONS.	X						Listed in NE LUST Site database, Additional work needed, DEQ has not yet directed the work to begin	
REC-30	5600 HOLDREGE	KWIK SHOP #650	X						Listed in NE LUST Site database, Additional work needed, DEQ has not yet directed the work to begin	
REC-31	NW CRNR 48 & LEIGHTON	TREASURE CITY STATE	X						Listed in NE LUST Site database, Priority List for orphan sites (Responsible Party not viable)	
REC-32	3301 CORNHUSKER HWY	AUTO CORRAL	X						Listed in NE LUST Site database, NFA	1718200001000
REC-33	6000 AYLESWORTH	BROWNELL ELEMENTARY	X						Listed in NE LUST Site database, NFA	1716348009000
REC-34	3421 N 35TH ST	CAPITOL SIGN	X						Listed in NE LUST Site database, NFA	1707412004000
REC-35	640 N 56TH ST	CHURCH OF JESUS CHRIST	X						Listed in NE LUST Site database, NFA	1721300029000
REC-36	2021 N 27TH ST	CITY OF LINCOLN WATER DEPT	X						Listed in NE LUST Site database, NFA	1113402002000
REC-37	1448 NORTH 48TH ST	CORMACK ENTERPRISE	X						Listed in NE LUST Site database, NFA	1720200010000
REC-38	3131 CORNHUSKER HWY	CORNHUSKER INTERNATIONAL TRUCK	X						Listed in NE LUST Site database, NFA	1718100008000
REC-39	2200 N 48TH ST	FAST BREAK - UNI PLACE	X						Listed in NE LUST Site database, NFA	1717400007000

Table 6-1 REC Summary Table

MAP ID	ADDRESS	OWNER	NE LUST	NE LAST	NE SPILLS	Dry Cleaner	REC from Recon.	Other	REC DESCRIPTION	PARCEL ID
REC-40	6100 'O' ST; JC PENNEY	GATEWAY MALL	2						Listed in NE LUST Site database, NFA	1721322004000
REC-41	2740 N 27TH ST	HARDING GLASS	X						Listed in NE LUST Site database, NFA	1718100024000
REC-42	6135 O ST	HUSKER CAR WASH	X						Listed in NE LUST Site database, NFA	1728103002000
REC-43	1241 N 48TH ST	JACK KEEF IMPORTS	X						Listed in NE LUST Site database, NFA	1720158001000
REC-44	3450 N. 35TH CIRCLE	JIM OLSTON IMP.	X						Listed in NE LUST Site database, NFA	1707412006000
REC-45	3301 N 33RD ST (PID 3301 Holdrege St)	KWIK SHOP	X						Listed in NE LUST Site database, NFA	1719200005000
REC-46	1111 N COTNER BLVD	KWIK SHOP #620	X						Listed in NE LUST Site database, NFA	1721269003000
REC-47	7200 VINE ST	MEADOWLANE ELEMENTARY	X						Listed in NE LUST Site database, NFA	1722134008000
REC-48	6400 Q ST	MEGGINIS FORD	X						Listed in NE LUST Site database, NFA	1721400010000
REC-49	3441 NORTH 35TH	MUDLOCK SAND & GRAVEL	X						Listed in NE LUST Site database, NFA	1707412005000
REC-50	2401 N 48 ST	ORPHAN USTS	X						Listed in NE LUST Site database, NFA	1717148002000
REC-51	2304 N 48TH	RAUSCH ENTERPRISES	X						Listed in NE LUST Site database, NFA	1717228010000
REC-52	5024 ORCHARD (PID 5021 ORCHARD ST)	RILEY ELEMENTARY	X						Listed in NE LUST Site database, NFA	1720230015000
REC-53	6400 O STREET (PID 6420 O ST)	SEARS ROEBUCK & CO	X						Listed in NE LUST Site database, NFA	1721322003000
REC-54	6236 VINE ST	SKOROHOD CONOCO	X						Listed in NE LUST Site database, NFA	1721100040000
REC-55	4848 WALKER AVE	WINDSTREAM COMMUNICATIONS	X						Listed in NE LUST Site database, NFA	1717221009000
REC-56	1200 N COTNER BLVD		X						Listed in NE LUST Site database, NFA	
REC-57	GATEWAY/BEHIND BACK	BANKERS LIFE	X						Listed in NE LUST Site database, NFA	
REC-58	300 N 66TH ST	BRIDGESTON/FIRESTONE	X						Listed in NE LUST Site database, NFA	
REC-59	3133 N 33RD ST	UNITED PARCEL SERVICE	2						Listed in NE LUST Site database, NFA	
REC-60	2502 N 48TH ST	FORMER AMOCO STATION	X						Listed in NE LUST Site database, NFA	
REC-61	2711 N 27TH	INTERSTATE BRANDS	X						Listed in NE LUST Site database, NFA	
REC-62	2930 N 33RD ST	JONES OIL CO	X						Listed in NE LUST Site database, NFA	
REC-63	5145 COLBY ST	LINCOLN PUBLIC WORKS	X						Listed in NE LUST Site database, NFA	
REC-64	1440 N COTNER BLVD	MCCARTNEY AUTO SERVICE	X						Listed in NE LUST Site database, NFA	
REC-65	2320 N 57TH ST	NE CENTER FOR CHILDREN	X						Listed in NE LUST Site database, NFA	
REC-66	2800 NORTH 27TH ST	ROGGE ENGINEERING	X						Listed in NE LUST Site database, NFA	
REC-67	1133 N COTNER BLVD	TYRRELLS FLOWERS	X						Listed in NE LUST Site database, NFA	

Section 7

Recommendations

Numerous environmental database listings were reported pertaining to the Project Area and other properties within the ASTM search distances. A conservative approach was used to identify the database site listings and site reconnaissance observations as an REC, since the site inspections, interviews, and follow-up research into the identified sites was limited. Additional investigation or sampling at the properties identified as RECs may be needed, depending upon the extent and scope of flood control measures that are implemented for Deadmans Run.

CDM Smith recommends a Phase II investigation be conducted to confirm the presence of hazardous waste or petroleum products within the Project Area at properties with RECs identified in this report, as needed depending on the scope of flood control activities. This investigation should include soil borings drilled to the water table and collection of soil and groundwater samples. The hazardous materials and petroleum products associated with the potential RECs (volatile organic compounds and fuels) also pose a potential threat via vapor intrusion into structures or inhalation of ambient air. Soil gas samples may be warranted to investigate this pathway.

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Section 8

References

American Society of Testing & Materials (ASTM), 2013. *Standard Practice for Environmental Site Assessments, Phase I Environmental Site Assessment Process*-Designation E 1527-13.

Olsson Associates. 2015. *Risk-Based Corrective Action (RBCA) Tier 1 Assessment Report, Street Maintenance Operations, 3200 Baldwin Avenue, Lincoln, Nebraska.* February.

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Appendix A

Figures

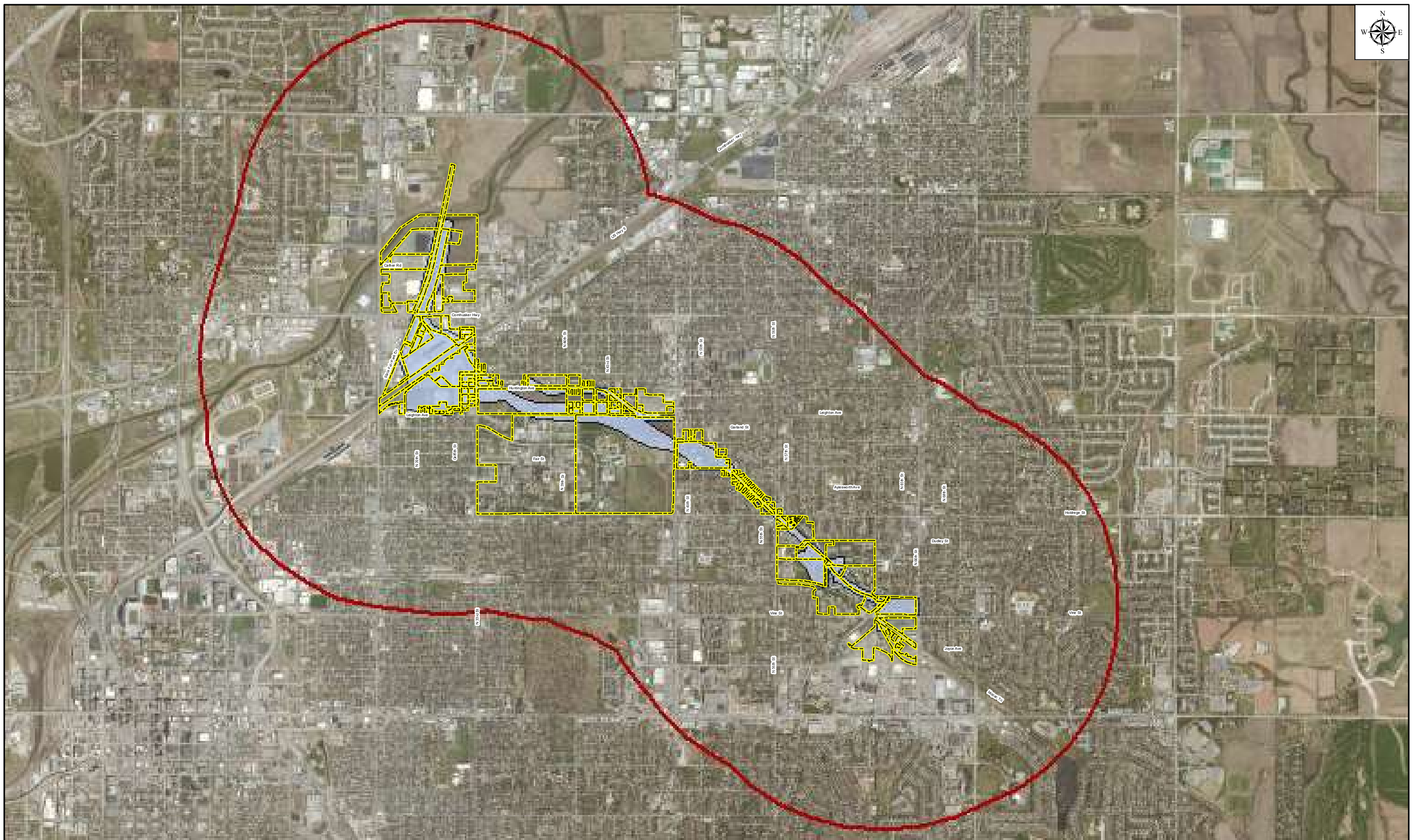

Figure 1 Deadmans Run Project Location Map

EDR Search Boundary (1 Mile) Parcels Intersecting Project Path Project Area

0 1,200 2,400 4,800 Feet

Aerial source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

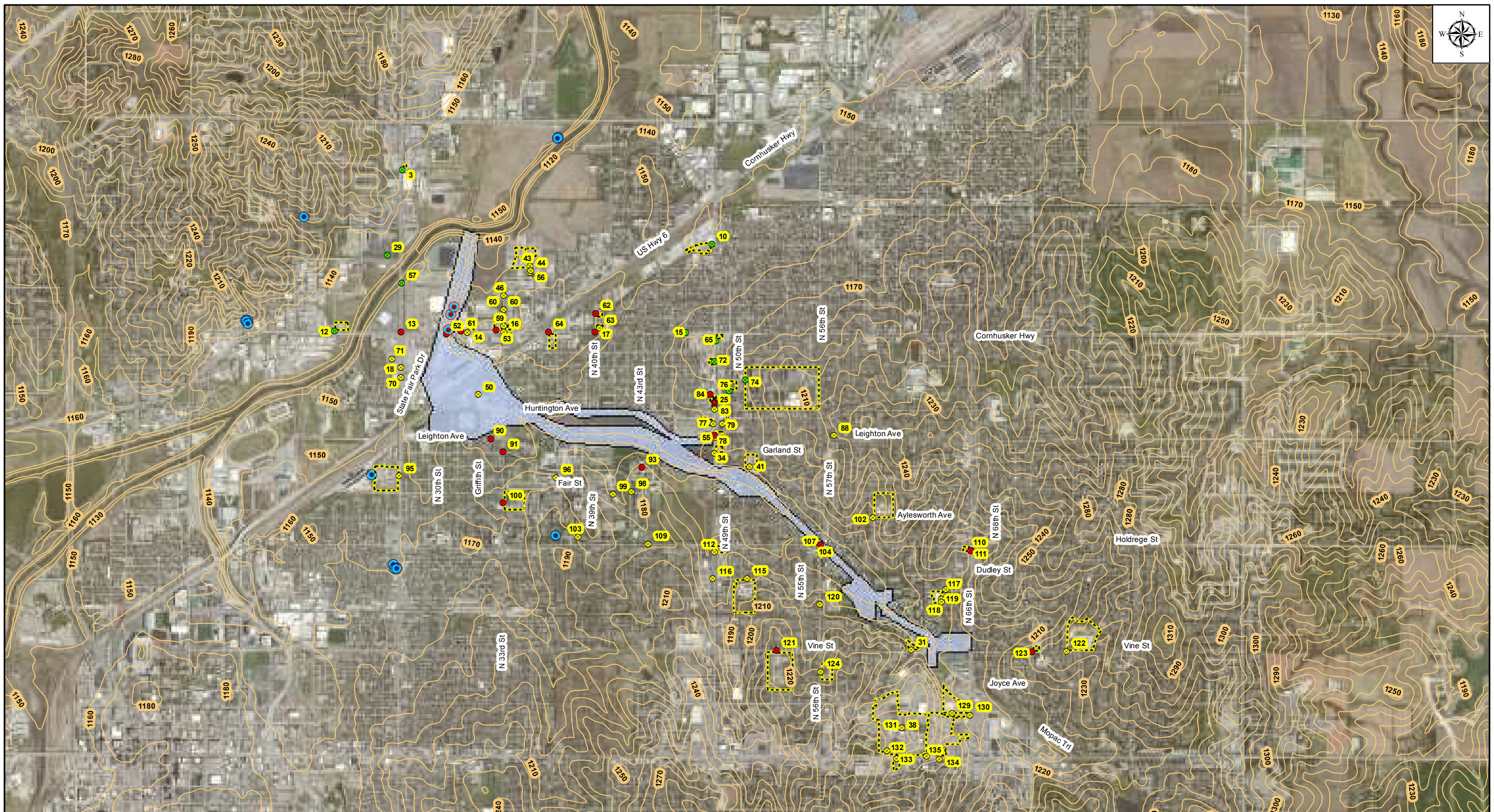

Figure 2 Potential Groundwater Sites

NE LUST Sites

- Lust Site - REC/NFA
- Lust Site - REC
- Lust Site - Not REC
- DryCleaner Site - REC
- Potential Monitoring Well
- Well with Carbon tetrachloride
- Topographic Contours (10-foot)
- LUST Parcel
- Project Area

CDM Smith

0 1,200 2,400 4,800 Feet

Aerial source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Figure 2 - Index of NE LUST Sites

NAME	ADDRESS	MAP ID	Facility Status
27TH & DAN COMMERCIAL CENTER	2700 DAN AVE	3	NFA
SNYDER INDUSTRIES, INC.	4700 FREMONT STREET	10	NFA
KWIK SHOP #619	2302 CORNHUSKER HWY	12	NFA
27TH ST ASSN TANK	3000 N 27TH	13	Priority List for orphan sites (Responsible Party not viable)
CORNHUSKER INTERNATIONAL TRUCK	3131 CORNHUSKER HWY	14	NFA
HUNTINGTON ELEMENT	4601 ADAMS	15	NFA
AUTO CORRAL	3301 CORNHUSKER HWY	16	NFA
F & F OIL COMPANY	4000 ADAMS, N SIDE	17	Additional work needed, DEQ has not yet directed the work to begin
ROGGE ENGINEERING	2800 NORTH 27TH ST	18	NFA
WILLIAMS CLEANERS & LAUNDERERS	2541 N 48TH ST	25	NFA
LINCOLN ELECTRIC	27 & FAIRFIELD SVC	29	NFA
SKOROHOD CONOCO	6236 VINE ST	31	NFA
FAST BREAK - UNI PLACE	2200 N 48TH ST	34	NFA
GATEWAY MALL	6100 O ST	38	NFA
LINCOLN PUBLIC WORKS	5145 COLBY ST	41	NFA
JIM OLSTON IMP.	3450 N. 35TH CIRCLE	43	NFA
MUDLOCK SAND & GRAVEL	3441 NORTH 35TH	44	NFA
KWIK SHOP	3301 N 33RD ST	46	NFA
CITY OF LINCOLN MAINT DIVISION	3200 BALDWIN	50	Risk-based corrective action Tier 1 Assessment at this property at 3200 Baldwin (report dated February 2015)
WENTZ PLUMBING	2949 CORNHUSKER HWY	52	Listed in NE RGA LUST & NE LUST Status - Risk Based Corrective Action investigation
PITTMAN AUTO REPAIR	3248 CORNHUSKER HWY	53	High-risk site, currently in active investigation or remediation
TREASURE CITY STATE	NW CRNR 48 & LEIGHTON	55	Priority List for orphan sites (Responsible Party not viable)
CAPITOL SIGN	3421 N 35TH ST	56	NFA
28TH & CATHER SHOPPING CENTER	3400 N 27TH ST	57	NFA
JONES OIL CO	2930 N 33RD ST	59	NFA
UNITED PARCEL SERVICE	3133 N 33RD ST	60	NFA
UNITED PARCEL SERVICE	3133 N 33RD ST	60	NFA
GAS N SHOP	3010 CORNHUSKER HWY	61	Voluntary Remedial Action program
HANK BUIS CONSTRUCT.	3110 N 40TH ST	62	Additional work needed, DEQ has not yet directed the work to begin
CASEYS GENERAL STORE	4002 ADAMS	63	NFA
LINCOLN FOOD BANK	3645 ADAMS STREET	64	High-risk site, currently in active investigation or remediation
ADAMS STREET CONOCO	2958 N 48TH ST	65	NFA
HARDING GLASS	2740 N 27TH ST	70	NFA
INTERSTATE BRANDS	2711 N 27TH	71	NFA
KWIK SHOP #641	2811 N 48TH ST	72	NFA
NE WESLEYAN UNIVERSITY	50 & ST. PAUL	74	NFA
LINCOLN MANOR	2626 N 49TH	76	NFA
ORPHAN USTS	2401 N 48 ST	77	NFA
RAUSCH ENTERPRISES	2304 N 48TH	78	NFA
WINDSTREAM COMMUNICATIONS	4848 WALKER AVE	79	NFA
FORMER AMOCO STATION	2502 N 48TH ST	83	NFA
WILLIAMS CLEANERS INC	48 & BALDWIN	84	Priority List for orphan sites (Responsible Party not viable)
NE CENTER FOR CHILDREN	2320 N 57TH ST	88	NFA
H R BOOKSTROM CONS.	3260 LEIGHTON AVE	90	Additional work needed, DEQ has not yet directed the work to begin

Figure 2 - Index of NE LUST Sites

GAME & PARKS COMMISSION	2200 N 33RD ST	91	Additional work needed, DEQ has not yet directed the work to begin
ANIMAL RESEARCH FACILITY	3940 FAIR ST	93	Risk Based Corrective Action investigation
CITY OF LINCOLN WATER DEPT	2021 N 27TH ST	95	NFA
EAST CAMPUS SVC ST	37TH & FAIR ST, NW	96	NFA
UN-L VETERINARY	FAIR ST & E CAMPUS	98	NFA
TRACTOR TESTING	TRACTOR TESTING	99	NFA
NE TELECOMMUNICATION	1800 N 33RD	100	Risk Based Corrective Action investigation
BROWNELL ELEMENTARY	6000 AYLESWORTH	102	NFA
UN-L EAST CAMPUS U	38TH & EAST CAMPUS	103	NFA
KWIK SHOP #650	5600 HOLDREGE	104	Additional work needed, DEQ has not yet directed the work to begin
ANDERSEN SERVICE	1445 N 56TH STREET	107	Listed in NE RGA LUST and NE LUST Status – NFA
UNIVERSITY OF NEBRASKA	43RD AND HOLDREGE	109	NFA
KWIK SHOP #680	1441 N COTNER BLVD	110	Additional work needed, DEQ has not yet directed the work to begin
MCCARTNEY AUTO SERVICE	1440 N COTNER BLVD	111	NFA
CORMACK ENTERPRISE	1448 NORTH 48TH ST	112	NFA
RILEY ELEMENTARY	5024 ORCHARD	115	NFA
JACK KEEF IMPORTS	1241 N 48TH ST	116	NFA
	1200 N COTNER BLVD	117	NFA
KWIK SHOP #620	1111 N COTNER BLVD	118	NFA
TYRRELLS FLOWERS	1133 N COTNER BLVD	119	NFA
LINCOLN LUTHERAN SCHOOL	1100 N 56TH ST	120	NFA
CULLER JR HIGH	5201 VINE ST	121	Additional work needed, DEQ has not yet directed the work to begin
MEADOWLANE ELEMENTARY	7200 VINE ST	122	NFA
KINGHORN'S 66 SERVICE (2 Incidents)	7000 VINE ST	123	Additional work needed, DEQ has not yet directed the work to begin
CHURCH OF JESUS CHRIST	640 N 56	124	NFA
MEGGINIS FORD	6400 Q ST	129	NFA
BRIDGESTON/FIRESTONE	300 N 66TH ST	130	NFA
GATEWAY MALL	6100 'O' ST; JC PENNEY	131	NFA
BANKERS LIFE	GATEWAY/BEHIND BACK	132	NFA
HUSKER CAR WASH	6135 O ST	133	NFA
EASTMONT TOWERS	6315 O ST	134	NFA
SEARS ROEBUCK & CO	6400 O STREET	135	NFA

Green cell site outside of area of effect for Project Area

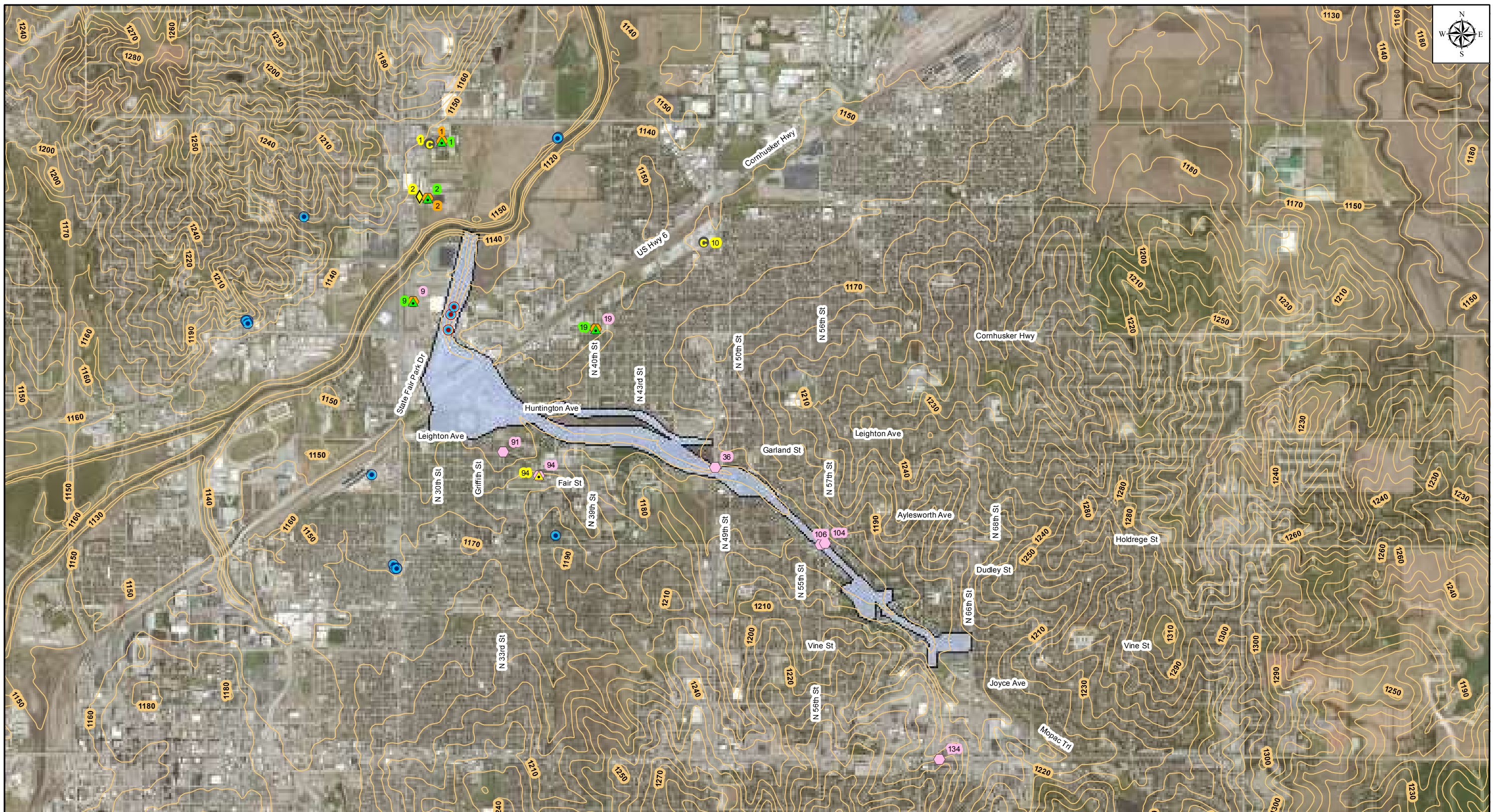

Figure 3 - NE LAST, Spills, CORRACTS and Hazardous Waste Sites

CORRACTS Site
NE Hazardous Waste Site
NE LAST Site -REC/NFA
NE LAST Site -NON REC
NE SPILLS Site - REC/NFA
NE SPILLS Site - Not REC
Potential Monitoring Well
Well with Carbon tetrachloride
Topographic Contours (10-foot)
Project Area

0 1,200 2,400 4,800 Feet

Aerial source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Figure 4 Potential Monitoring Wells

- Drinking Water Well with Coliform
- Potential Monitoring Well
- Well with Carbon tetrachloride
- Project Area

0 1,000 2,000 4,000 Feet

CDM Smith

Aerial source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

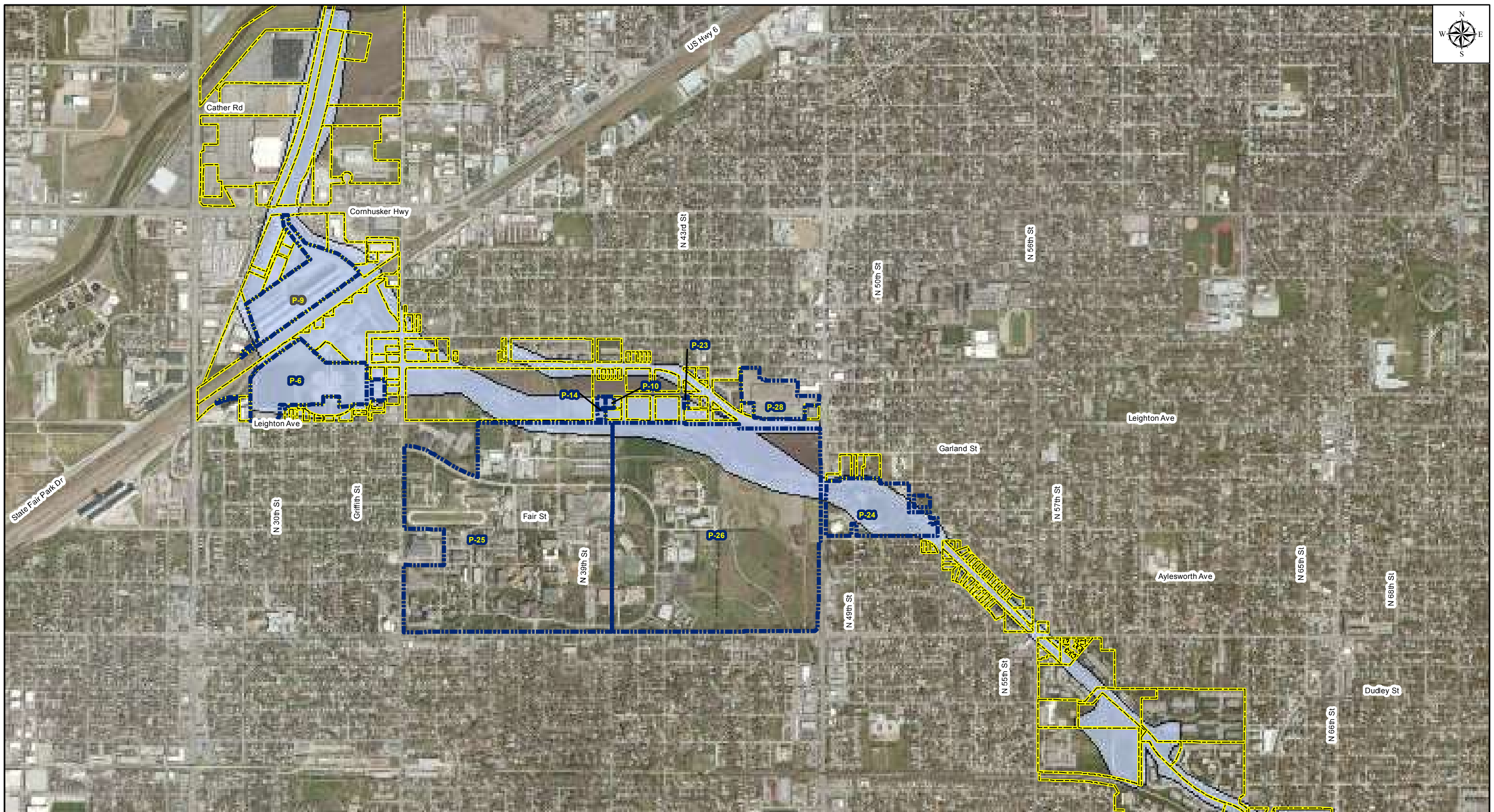

Figure 5 Historical Parcel Comparison Map

Parcels Identified in Historical Aerials Review
Parcels Intersecting Project Area
Project Area

0 600 1,200 2,400 Feet

Aerial source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

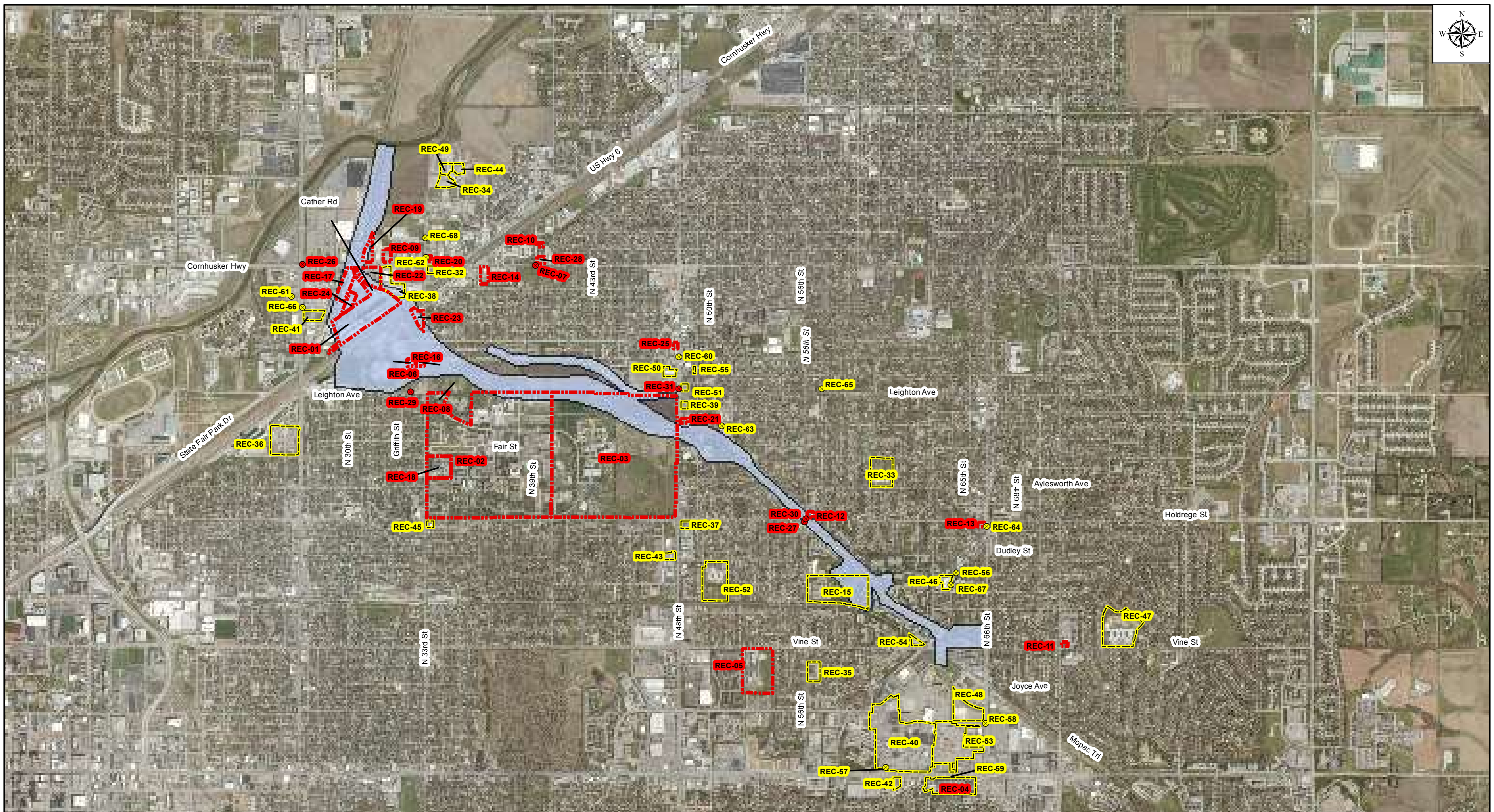

Figure 6 Comprehensive REC Sites Map

- REC Location
- REC (LUST-NFA) Location
- REC Parcel
- REC (LUST-NFA) Parcel
- Project Area

0 1,000 2,000 4,000 Feet

Aerial source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

CDM Smith

Appendix B

EDR Database Search Report

Part 1 of 2

Deadmans Run
Lincoln, NE 68583

Inquiry Number: 4180777.5s
January 14, 2015

EDR DataMap™ Area Study

EDR® Environmental Data Resources Inc

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EXECUTIVE SUMMARY

TARGET PROPERTY INFORMATION

ADDRESS

LINCOLN, NE 68583
LINCOLN, NE 68583

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records within the requested search area for the following databases:

FEDERAL RECORDS

NPL	National Priority List
Proposed NPL	Proposed National Priority List Sites
Delisted NPL	National Priority List Deletions
NPL LIENS	Federal Superfund Liens
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CERC-NFRAP	CERCLIS No Further Remedial Action Planned
LIENS 2	CERCLA Lien Information
US INST CONTROL	Sites with Institutional Controls
ERNS	Emergency Response Notification System
HMIRS	Hazardous Materials Information Reporting System
DOT OPS	Incident and Accident Data
US CDL	Clandestine Drug Labs
US BROWNFIELDS	A Listing of Brownfields Sites
DOD	Department of Defense Sites
FUDS	Formerly Used Defense Sites
LUCIS	Land Use Control Information System
CONSENT	Superfund (CERCLA) Consent Decrees
ROD	Records Of Decision
UMTRA	Uranium Mill Tailings Sites
ODI	Open Dump Inventory
DEBRIS REGION 9	Torres Martinez Reservation Illegal Dump Site Locations
US MINES	Mines Master Index File
TRIS	Toxic Chemical Release Inventory System
TSCA	Toxic Substances Control Act
FTTS	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
HIST FTTS	FIFRA/TSCA Tracking System Administrative Case Listing
SSTS	Section 7 Tracking Systems
ICIS	Integrated Compliance Information System
PADS	PCB Activity Database System
MLTS	Material Licensing Tracking System
RADINFO	Radiation Information Database
RAATS	RCRA Administrative Action Tracking System
RMP	Risk Management Plans
LEAD SMELTERS	Lead Smelter Sites

EXECUTIVE SUMMARY

FEMA UST	Underground Storage Tank Listing
COAL ASH DOE	Steam-Electric Plant Operation Data
PRP	Potentially Responsible Parties
EPA WATCH LIST	EPA WATCH LIST
US FIN ASSUR	Financial Assurance Information
FEDERAL FACILITY	Federal Facility Site Information listing
SCRD DRYCLEANERS	State Coalition for Remediation of Drycleaners Listing
COAL ASH EPA	Coal Combustion Residues Surface Impoundments List
PCB TRANSFORMER	PCB Transformer Registration Database
US HIST CDL	National Clandestine Laboratory Register

STATE AND LOCAL RECORDS

NE SWF/LF	Licensed Landfill List
NE UIC	Undergound Injection Control Database
NE SWRCY	Recycling Resource Directory
NE AST	Hazardous Chemical AST List
NE HIST AST	Aboveground Storage Tank Database Listing
NE VCP	RAPMA Sites

TRIBAL RECORDS

INDIAN RESERV	Indian Reservations
INDIAN ODI	Report on the Status of Open Dumps on Indian Lands
INDIAN LUST	Leaking Underground Storage Tanks on Indian Land
INDIAN UST	Underground Storage Tanks on Indian Land
INDIAN VCP	Voluntary Cleanup Priority Listing

EDR PROPRIETARY RECORDS

EDR MGP	EDR Proprietary Manufactured Gas Plants
NE RGA HWS	Recovered Government Archive State Hazardous Waste Facilities List

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified.

Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

FEDERAL RECORDS

CORRACTS: CORRACTS is a list of handlers with RCRA Corrective Action Activity. This report shows which nationally-defined corrective action core events have occurred for every handler that has had corrective action activity.

A review of the CORRACTS list, as provided by EDR, and dated 06/10/2014 has revealed that there are 2 CORRACTS sites within the searched area.

Site	Address	Map ID	Page
GENERAL DYNAMICS	***4300 INDUSTRIAL AVENUE***	***1***	***3***
SNYDER INDUSTRIES, INC.	***4700 FREMONT STREET***	***4***	***56***

EXECUTIVE SUMMARY

RCRA-TSDF: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

A review of the RCRA-TSDF list, as provided by EDR, and dated 06/10/2014 has revealed that there is 1 RCRA-TSDF site within the searched area.

Site	Address	Map ID	Page
GENERAL DYNAMICS	***4300 INDUSTRIAL AVENUE***	***1***	***3***

RCRA-LQG: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

A review of the RCRA-LQG list, as provided by EDR, and dated 06/10/2014 has revealed that there are 2 RCRA-LQG sites within the searched area.

Site	Address	Map ID	Page
GENERAL DYNAMICS	***4300 INDUSTRIAL AVENUE***	***1***	***3***
MAPES INDUSTRIES INC	***2929 CORNHUSKER HWY***	***8***	***67***

RCRA-SQG: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

A review of the RCRA-SQG list, as provided by EDR, and dated 06/10/2014 has revealed that there are 3 RCRA-SQG sites within the searched area.

Site	Address	Map ID	Page
SNYDER INDUSTRIES, INC.	***4700 FREMONT STREET***	***4***	***56***
HOME DEPOT USA INC HD3209	3300 N 27TH STREET	9	103
WILLIAMS CLEANERS & LAUNDERERS	***2541 N 48TH ST***	***26***	***136***

RCRA-CESQG: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

A review of the RCRA-CESQG list, as provided by EDR, and dated 06/10/2014 has revealed that there are

5 RCRA-CESQG sites within the searched area.

Site	Address	Map ID	Page
CORNHUSKER INTERNATIONAL TRUCK	3131 CORNHUSKER HWY	8	83
CITY OF LINCOLN WASTEWATER TRM	***2400 THERESA ST***	***23***	***123***
OLSTONS IMPORT AUTO	2435 NORTH 33RD STREET	28	152
CRASHBUSTER BODY & PAINT INC	***3221 HUNTINGTON***	***28***	***154***
JOE'S BODY SHOP	2505 NORTH 33RD	28	159

RCRA NonGen / NLR: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

A review of the RCRA NonGen / NLR list, as provided by EDR, and dated 06/10/2014 has revealed that there are 7 RCRA NonGen / NLR sites within the searched area.

Site	Address	Map ID	Page
YAMAHA MOTORSPORTS SALES	2940 CORNHUSKER HWY	8	87
JONES ENVIRONMENTAL COMPANY	2930 N 33RD ST	8	94
WEESNER AUTO REPAIR	3140 N 33RD	8	99
PENSKE AUTO CENTER	3300 N 27TH ST	9	102
BLUM'S AUTO REPAIR	2415 N 33RD ST	28	149
GENERAL JOHN J PERSHING USARTC	2000 NORTH 33RD STREET	37	169
SHERWIN-WILLIAMS	228 LINCOLN GATEWAY 61	59	190

US ENG CONTROLS: A listing of sites with engineering controls in place.

A review of the US ENG CONTROLS list, as provided by EDR, and dated 09/18/2014 has revealed that there is 1 US ENG CONTROLS site within the searched area.

Site	Address	Map ID	Page
GENERAL DYNAMICS	***4300 INDUSTRIAL AVENUE***	***1***	***3***

FINDS: The Facility Index System contains both facility information and "pointers" to other sources of information that contain more detail. These include: RCRIS; Permit Compliance System (PCS); Aerometric Information Retrieval System (AIRS); FATES (FIFRA [Federal Insecticide Fungicide Rodenticide Act] and TSCA Enforcement System, FTTS [FIFRA/TSCA Tracking System]; CERCLIS; DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes); Federal Underground Injection Control (FURS); Federal Reporting Data System (FRDS); Surface Impoundments (SIA); TSCA Chemicals in Commerce Information System (CICS); PADS; RCRA-J (medical waste transporters/disposers); TRIS; and TSCA. The source of this database is the U.S. EPA/NTIS.

A review of the FINDS list, as provided by EDR, and dated 08/16/2014 has revealed that there are 15 FINDS sites within the searched area.

Site	Address	Map ID	Page
GENERAL DYNAMICS	***4300 INDUSTRIAL AVENUE***	***1***	***3***

EXECUTIVE SUMMARY

Site	Address	Map ID	Page
MAPES INDUSTRIES INC	***2929 CORNHUSKER HWY***	***8***	***67***
HINKLE MACHINE SHOP INC	***2939 CORNHUSKER HWY***	***8***	***78***
JOHN HENRY'S PLUMBING HEATING	2949 CORNHUSKER HWY	8	80
YAMAHA MOTORSPORTS SALES	2940 CORNHUSKER HWY	8	87
UNITED PARCEL SERVICE	***3133 N 33RD ST***	***8***	***97***
STAR CITY AUTO SALVAGE	***2705 N 33RD ST***	***20***	***119***
STREET MAINTENANCE OPERATIONS	3200 BALDWIN AVE	25	126
WINDSTREAM COMMUNICATIONS	***4848 WALKER AVE***	***26***	***131***
WILLIAMS CLEANERS & LAUNDERERS	***2541 N 48TH ST***	***26***	***136***
OLSTONS IMPORT AUTO	2435 N 33 ST	28	154
CRASHBUSTERS BODY & PAINT INC	3221 HUNTINGTON	28	157
FLEMING FIELDS	3300 HUNTINGTON AVE	28	157
JOE'S BODY SHOP	2505 NORTH 33RD	28	158
EASTMONT TOWERS	***6315 O ST***	***65***	***195***

US AIRS: The database is a sub-system of Aerometric Information Retrieval System (AIRS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants.

A review of the US AIRS list, as provided by EDR, and dated 10/16/2014 has revealed that there are 4 US AIRS sites within the searched area.

Site	Address	Map ID	Page
GENERAL DYNAMICS	***4300 INDUSTRIAL AVENUE***	***1***	***3***
MAPES INDUSTRIES INC	***2929 CORNHUSKER HWY***	***8***	***67***
CITY OF LINCOLN WASTEWATER TRM	***2400 THERESA ST***	***23***	***123***
WILLIAMS CLEANERS & LAUNDERERS	***2541 N 48TH ST***	***26***	***136***

2020 COR ACTION: The EPA has set ambitious goals for the RCRA Corrective Action program by creating the 2020 Corrective Action Universe. This RCRA cleanup baseline includes facilities expected to need corrective action. The 2020 universe contains a wide variety of sites. Some properties are heavily contaminated while others were contaminated but have since been cleaned up. Still others have not been fully investigated yet, and may require little or no remediation. Inclusion in the 2020 Universe does not necessarily imply failure on the part of a facility to meet its RCRA obligations.

A review of the 2020 COR ACTION list, as provided by EDR, and dated 11/11/2011 has revealed that there is 1 2020 COR ACTION site within the searched area.

Site	Address	Map ID	Page
GENERAL DYNAMICS	***4300 INDUSTRIAL AVENUE***	***1***	***3***

EXECUTIVE SUMMARY

STATE AND LOCAL RECORDS

NE SHWS: The Nebraska Department of Environmental Quality is providing this information from it's own database. The data, although not verified to be the most current or accurate for any specific site, is generally based on the contents of the physical documents in the files. You may contact the Records Management Unit at (402) 471-3557 to make arrangements to view or to get a photocopy of the physical file.

A review of the NE SHWS list, as provided by EDR, and dated 09/23/2014 has revealed that there is 1 NE SHWS site within the searched area.

Site	Address	Map ID	Page
SANFORD & SON LLC	***3900 INDUSTRIAL AVE***	***3***	***55***

NE LUST: The Leaking Underground Storage Tank Incident Reports contain an inventory of reported leaking underground storage tank incidents. The data come from the Department of Environmental Control's Spill Tracking Reports.

A review of the NE LUST list, as provided by EDR, and dated 09/01/2014 has revealed that there are 76 NE LUST sites within the searched area.

Site	Address	Map ID	Page
27TH & DAN COMMERCIAL CENTER Facility Status: NFA	***2700 DAN AVE***	***2***	***54***
SNYDER INDUSTRIES, INC. Facility Status: NFA	***4700 FREMONT STREET***	***4***	***56***
LINCOLN ELECTRIC S Facility Status: NFA	27 & FAIRFIELD SVC	5	64
CAPITOL SIGN Facility Status: NFA	3421 N 35TH ST	6	64
MUDLOCK SAND & GRA Facility Status: NFA	3441 NORTH 35TH	6	64
JIM OLSTON IMP. AU Facility Status: NFA	3450 N. 35TH CIRCL	6	64
28TH & CATHER SHOPPING CENTER Facility Status: NFA	***3400 N 27TH ST***	***7***	***65***
WENTZ PLUMBING & H Facility Status: RBCA INV	2949 CORNHUSKER HW	8	79
CORNHUSKER INTERNATIONAL Facility Status: NFA	***3131 CORNHUSKER HWY***	***8***	***81***
AUTO CORRAL Facility Status: NFA	***3301 CORNHUSKER HWY***	***8***	***85***
GAS N SHOP Facility Status: VOL REM AC Facility Status: NFA	***3010 CORNHUSKER HWY***	***8***	***89***
PITTMAN AUTO REPAI Facility Status: ACTIVE	3248 CORNHUSKER HW	8	91
JONES OIL CO Facility Status: NFA	***2930 N 33RD ST***	***8***	***95***
UNITED PARCEL SERVICE Facility Status: NFA	***3133 N 33RD ST***	***8***	***96***

EXECUTIVE SUMMARY

Site	Address	Map ID	Page
UNITED PARCEL SERVICE Facility Status: NFA	***3133 N 33RD ST***	***8***	***97***
KWIK SHOP Facility Status: NFA	3301 N 33RD ST	8	101
HANK BUIS CONSTRUC Facility Status: BACKLOG	3110 N 40TH ST	10	107
F & F OIL COMPANY Facility Status: BACKLOG	4000 ADAMS, N SIDE	11	107
CASEYS GENERAL STO Facility Status: NFA	4002 ADAMS	11	107
KWIK SHOP #619 Facility Status: NFA	***2302 CORNHUSKER HWY***	***12***	***108***
27TH ST ASSN TANK Facility Status: PL	3000 N 27TH	13	111
LINCOLN FOOD BANK Facility Status: ACTIVE	3645 ADAMS STREET	14	111
HUNTINGTON ELEMENT Facility Status: NFA	4601 ADAMS	15	112
ADAMS STREET CONOC Facility Status: NFA	2958 N 48TH ST	16	112
HARDING GLASS Facility Status: NFA	2740 N 27TH ST	18	117
ROGGE ENGINEERING Facility Status: NFA	2800 NORTH 27TH ST	18	118
INTERSTATE BRANDS Facility Status: NFA	2711 N 27TH	18	118
KWIK SHOP #641 Facility Status: NFA	***2811 N 48TH ST***	***19***	***118***
NE WESLEYAN UNIVER Facility Status: NFA	50 & ST. PAUL	22	121
LINCOLN MANOR Facility Status: NFA	2626 N 49TH	24	126
CITY OF LINCOLN MAINT DIV Facility Status: BACKLOG	***3200 BALDWIN***	***25***	***127***
RAUSCH ENTERPRISES Facility Status: NFA	2304 N 48TH (48TH	26	129
TREASURE CITY STAT Facility Status: PL	NW CRNR 48 & LEIGH	26	130
WINDSTREAM COMMUNICATIONS Facility Status: NFA	***4848 WALKER AVE***	***26***	***131***
ORPHAN USTS Facility Status: NFA	2401 N 48 ST	26	134
FORMER AMOCO STATI Facility Status: NFA	2502 N 48TH ST	26	135
WILLIAMS CLEANERS & LAUNDERERS Facility Status: NFA	***2541 N 48TH ST***	***26***	***136***

Site	Address	Map ID	Page
WILLIAMS CLEANERS Facility Status: PL Facility Status: NFA	48 & BALDWIN	26	146
NE CENTER FOR CHIL Facility Status: NFA	2320 N 57TH ST	29	160
GAME & PARKS COMMISSION Facility Status: BACKLOG	***2200 N 33RD ST***	***30***	***161***
H R BOOKSTROM CONS Facility Status: BACKLOG	3260 LEIGHTON AVE	30	162
STOP N SHOP #5 Facility Status: NFA	***2200 N 48TH ST***	***31***	***163***
LINCOLN PUBLIC WOR Facility Status: NFA	5145 COLBY ST.	32	164
ANIMAL RESEARCH FA Facility Status: RBCA INV	3940 FAIR ST (ANIM	33	166
CITY OF LINCOLN WATER DEPT Facility Status: NFA	***2021 N 27TH ST***	***35***	***167***
EAST CAMPUS SVC ST Facility Status: NFA	37TH & FAIR ST, NW	36	169
UN-L VETERINARY DI Facility Status: NFA	FAIR ST & E CAMPUS	38	171
TRACTOR TESTING TR Facility Status: NFA	TRACTOR TESTING TR	39	171
NE TELECOMMUNICATI Facility Status: RBCA INV	1800 N 33RD	40	171
BROWNELL ELEMENTAR Facility Status: NFA	6000 AYLESWORTH	42	172
UN-L EAST CAMPUS U Facility Status: NFA	38TH & EAST CAMPUS	43	172
ANDERSEN SERVICE Facility Status: NFA (PL)	1445 N 56TH STREET	44	173
KWIK SHOP #650 Facility Status: BACKLOG	***5600 HOLDREGE***	***44***	***176***
UNIVERSITY OF NEBR Facility Status: NFA	43RD AND HOLDREGE	45	178
MCCARTNEY AUTO SER Facility Status: NFA	1440 N COTNER BLVD	46	178
KWIK SHOP #680 Facility Status: NFA Facility Status: BACKLOG	***1441 N COTNER BLVD***	***46***	***179***
CORMACK ENTERPRISE Facility Status: NFA	1448 NORTH 48TH ST	47	181
RILEY ELEMENTARY Facility Status: NFA	5024 ORCHARD	50	182
JACK KEEF IMPORTS Facility Status: NFA	1241 N 48TH ST	51	182
KWIK SHOP #620 Facility Status: NFA	***1111 N COTNER BLVD***	***52***	***182***

EXECUTIVE SUMMARY

Site	Address	Map ID	Page
TYRRELLS FLOWERS Facility Status: NFA	1133 N COTNER BLVD	52	183
Not reported Facility Status: NFA (PL)	1200 N COTNER BLVD	52	184
LINCOLN LUTHERAN S Facility Status: NFA	1100 N 56TH ST	53	185
SKOROHOD CONOCO Facility Status: NFA	***6236 VINE ST***	***54***	***185***
CULLER JR HIGH Facility Status: NFA Facility Status: BACKLOG	5201 VINE ST	55	187
MEADOWLANE ELEMENT Facility Status: NFA	7200 VINE ST	56	187
PERFORMANCE 66 SERVICE Facility Status: BACKLOG Facility Status: PL	***7000 VINE ST***	***57***	***188***
CHURCH OF JESUS CH Facility Status: NFA	640 N 56	58	189
MEGGINIS FORD Facility Status: NFA	6400 Q ST	61	193
BRIDGESTON/FIRESTO Facility Status: NFA	300 N. 66TH ST.	62	193
GATEWAY MALL Facility Status: NFA	6100 'O' ST; JC PE	63	194
GATEWAY MALL Facility Status: NFA	***6100 O ST***	***63***	***194***
HUSKER CAR WASH Facility Status: NFA	***6135 O ST***	***64***	***194***
BANKERS LIFE Facility Status: NFA	GATEWAY/BEHIND BAK	64	195
EASTMONT TOWERS Facility Status: NFA	***6315 O ST***	***65***	***195***
SEARS ROEBUCK & CO Facility Status: NFA	6400 O STREET	65	196

NE UST: The Underground Storage Tank database contains registered USTs. USTs are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA). The data come from the Department of Environmental Control's Facility and Tank Data.

A review of the NE UST list, as provided by EDR, and dated 10/29/2014 has revealed that there are 43 NE UST sites within the searched area.

Site	Address	Map ID	Page
NORTHWEST METAL CO (FORMER)	3900 INDUSTRIAL AVE	3	55
SNYDER INDUSTRIES, INC.	***4700 FREMONT STREET***	***4***	***56***
CATHER & SONS CONSTRUCTION CO	3400 N 27TH ST	7	65
WENTZ PLUMBING & HEATING CO	2949 CORNHUSKER HWY	8	79

Site	Address	Map ID	Page
CORNHUSKER INTERNATIONAL TRUCK	3131 CORNHUSKER HWY	8	80
AUTO CORRAL	***3301 CORNHUSKER HWY***	***8***	***85***
LINCOLN GRAIN INC	31ST & CORNHUSKER HWY	8	86
CASEYS GENERAL STORE #2706	3010 CORNHUSKER HWY	8	89
PITTMANS 66 SERVICE	3248 CORNHUSKER HWY	8	91
U STOP	***3244 CORNHUSKER HWY***	***8***	***92***
JONES OIL CO INC	2930 N 33RD ST	8	94
UNITED PARCEL SERVICE	***3133 N 33RD ST***	***8***	***96***
KWIK SHOP #619	***2302 CORNHUSKER HWY***	***12***	***108***
K-MART	27TH & CORNHUSKER HWY	13	110
SUPER STOP	2710 CORNHUSKER HWY	13	111
INTERSTATE BRANDS CORP	2711 N 27TH ST	18	116
HARDING GLASS IND INC	2740 N 27TH ST	18	116
ROGGE ENGINEERING INC	2800 N 27TH ST	18	117
KWIK SHOP #641	***2811 N 48TH ST***	***19***	***118***
CITY OF LINCOLN/WATER POLLUTIO	***2400 THERESA ST***	***23***	***121***
CITY OF LINCOLN MAINT DIV	***3200 BALDWIN***	***25***	***127***
UNI 66 SERVICE	2304 N 48TH ST	26	129
WINDSTREAM NEBRASKA WALKER CEN	4848 WALKER AVE	26	131
AMOCO (FORMER)	2402 N 48TH ST	26	134
WILLIAMS CLEANERS INC	2541 N 48TH ST	26	135
NEBCO REALTY GROUP	2405 N 33RD ST	28	148
NEBRASKA GAME & PARKS COMMISSI	2200 N 33RD ST	30	161
H R BOOKSTROM CONST CO	3260 LEIGHTON AVE	30	162
STOP N SHOP #5	***2200 N 48TH ST***	***31***	***163***
LINCOLN PARKS DEPT	***5045 COLBY AVE***	***32***	***165***
CITY OF LINCOLN WATER DEPT	***2021 N 27TH ST***	***35***	***167***
WILLIAMS GARDEN CTR INC	1742 N 48TH ST	41	171
AUTO CONNECTION	1445 N 56TH ST	44	173
ROCS STOP & SHOP	1449 N 56TH ST	44	174
KWIK SHOP #650	***5600 HOLDREGE***	***44***	***176***
KWIK SHOP #680	***1441 N COTNER BLVD***	***46***	***179***
KWIK SHOP #620	***1111 N COTNER BLVD***	***52***	***182***
TYRRELLS FLOWERS INC	1133 N COTNER BLVD	52	183
LINCOLN LUTHRTSN SCHOOL ASSOC	1100 N 56TH ST	53	184
SKOROHOD CONOCO	***6236 VINE ST***	***54***	***185***
PERFORMANCE 66 SERVICE	***7000 VINE ST***	***57***	***188***
LINCOLN TELEPHONE CO	500 N 66TH ST	60	193
HUSKER CAR WASH	***6135 O ST***	***64***	***194***

NE HIST UST: A listing of underground storage tank locations. This listing contains detail information that the UST listing does not. It is no longer updated by the agency. For current information see the UST listing.

A review of the NE HIST UST list, as provided by EDR, and dated 02/28/2005 has revealed that there are 18 NE HIST UST sites within the searched area.

Site	Address	Map ID	Page
SNYDER INDUSTRIES, INC.	***4700 FREMONT STREET***	***4***	***56***
GAS N SHOP	***3010 CORNHUSKER HWY***	***8***	***89***
U STOP	***3244 CORNHUSKER HWY***	***8***	***92***
UNITED PARCEL SERVICE	***3133 N 33RD ST***	***8***	***96***
KWIK SHOP #619	***2302 CORNHUSKER HWY***	***12***	***108***

EXECUTIVE SUMMARY

Site	Address	Map ID	Page
KWIK SHOP #641	*2811 N 48TH ST*	*19*	*118*
CITY OF LINCOLN/WATER POLLUTIO	*2400 THERESA ST*	*23*	*121*
CITY OF LINCOLN MAINT DIV	*3200 BALDWIN*	*25*	*127*
WINDSTREAM COMMUNICATIONS	*4848 WALKER AVE*	*26*	*131*
STOP N SHOP #5	*2200 N 48TH ST*	*31*	*163*
LINCOLN PARKS DEPT	*5045 COLBY AVE*	*32*	*165*
CITY OF LINCOLN WATER DEPT	*2021 N 27TH ST*	*35*	*167*
ROBIN INC	DBA U-STOP 1449 N 56TH	44	175
KWIK SHOP #650	*5600 HOLDREGE*	*44*	*176*
KWIK SHOP #680	*1441 N COTNER BLVD*	*46*	*179*
KWIK SHOP #620	*1111 N COTNER BLVD*	*52*	*182*
SKOROHOD CONOCO	*6236 VINE ST*	*54*	*185*
PERFORMANCE 66 SERVICE	*7000 VINE ST*	*57*	*188*

NE LAST: The Leaking Aboveground Storage Tanks database

A review of the NE LAST list, as provided by EDR, and dated 09/01/2014 has revealed that there are 5 NE LAST sites within the searched area.

Site	Address	Map ID	Page
GENERAL DYNAMICS-OTS INC Facility Status: NFA	*4300 INDUSTRIAL AVE*	*1*	*43*
SANFORD & SON LLC Facility Status: VOL REM AC	*3900 INDUSTRIAL AVE*	*3*	*55*
PENSKE AUTO CENTER Facility Status: NFA	*3300 N 27TH STREET*	*9*	*106*
WHEELER TRANSPORT Facility Status: NFA	*40 & ADAMS*	*11*	*107*
UNIV OF NEBR-LINCO Facility Status: NFA	*E CMPUS POW PLT,36*	*34*	*167*

WI MANIFEST: Hazardous waste manifest information.

A review of the WI MANIFEST list, as provided by EDR, has revealed that there is 1 WI MANIFEST site within the searched area.

Site	Address	Map ID	Page
CRASHBUSTER BODY & PAINT INC	*3221 HUNTINGTON*	*28*	*154*

EXECUTIVE SUMMARY

NE SPILLS: Nebraska Surface Spill List.

A review of the NE SPILLS list, as provided by EDR, and dated 09/01/2014 has revealed that there are 10 NE SPILLS sites within the searched area.

Site	Address	Map ID	Page
GENERAL DYNAMICS-OTS INC Facility Status: NFA	***4300 INDUSTRIAL AVE***	***1***	***43***
SANFORD & SON LLC Facility Status: VOL REM AC	***3900 INDUSTRIAL AVE***	***3***	***55***
PENSKE AUTO CENTER Facility Status: NFA	***3300 N 27TH STREET***	***9***	***106***
WHEELER TRANSPORT Facility Status: NFA	***40 & ADAMS***	***11***	***107***
GAME & PARKS COMMISSION Facility Status: NFA	***2200 N 33RD ST***	***30***	***161***
J & I CARWASH Facility Status: NFA	2110 NORTH 48TH ST	31	162
UNIV OF NEBR-LINCO Facility Status: NFA	***E CMPUS POW PLT,36***	***34***	***167***
Not reported Facility Status: NFA	56TH & HOLDREGE	44	178
Not reported Facility Status: NFA	5600 HOLDREGE STRE	44	178
EASTMONT TOWERS Facility Status: NFA	***6315 O ST***	***65***	***195***

NE INST CONTROL: A list of sites within Nebraska that have institutional controls. According to the Environmental Protection Agency (EPA), institutional controls are "non-engineering measures designed to prevent or limit exposure to hazardous substances left in place at a site, or assure effectiveness of the chosen remedy. Institutional controls are usually, but not always, legal controls, such as easements, restrictive covenants, and zoning ordinances " In short, institutional controls are a type of environmental covenant typically used when property is to be cleanup to a level determined by the potential environmental risks posed by a planned use, rather than to unrestricted use standards. This method of control has proven to be both environmentally and economically beneficial.

A review of the NE INST CONTROL list, as provided by EDR, and dated 02/01/2014 has revealed that there is 1 NE INST CONTROL site within the searched area.

Site	Address	Map ID	Page
GENERAL DYNAMICS-OTS INC	***4300 INDUSTRIAL AVE***	***1***	***43***

EXECUTIVE SUMMARY

NE DRYCLEANERS: Drycleaner Facility Listing.

A review of the NE DRYCLEANERS list, as provided by EDR, and dated 01/17/2006 has revealed that there is 1 NE DRYCLEANERS site within the searched area.

Site	Address	Map ID	Page
WILLIAMS CLEANERS & LAUNDERERS	*2541 N 48TH ST*	*26*	*136*

NE BROWNFIELDS: A listing of potential brownfields sites.

A review of the NE BROWNFIELDS list, as provided by EDR, and dated 09/23/2014 has revealed that there is 1 NE BROWNFIELDS site within the searched area.

Site	Address	Map ID	Page
LINCOLN THERESA ST WASTEWATER	*2400 THERESA ST*	*23*	*122*

NE NPDES: A listing of permitted wastewater facilities.

A review of the NE NPDES list, as provided by EDR, and dated 12/08/2014 has revealed that there are 14 NE NPDES sites within the searched area.

Site	Address	Map ID	Page
GENERAL DYNAMICS-OTS INC	*4300 INDUSTRIAL AVE*	*1*	*43*
27TH & DAN COMMERCIAL CENTER	*2700 DAN AVE*	*2*	*54*
SANFORD & SON LLC	*3900 INDUSTRIAL AVE*	*3*	*55*
SNYDER INDUSTRIES, INC.	*4700 FREMONT STREET*	*4*	*56*
28TH & CATHER SHOPPING CENTER	*3400 N 27TH ST*	*7*	*65*
MAPES PANELS LLC	*2929 CORNHUSKER HWY*	*8*	*66*
HINKLE MACHINE SHOP INC	*2939 CORNHUSKER HWY*	*8*	*78*
JONES OIL CO	*2930 N 33RD ST*	*8*	*95*
UNITED PARCEL SERVICE	*3133 N 33RD ST*	*8*	*97*
STAR CITY AUTO SALVAGE	*2705 N 33RD ST*	*20*	*119*
LINCOLN THERESA ST WASTEWATER	*2400 THERESA ST*	*23*	*122*
FLEMING FIELDS	3300 HUNTINGTON AVE	28	157
SKOROHOD CONOCO	*6236 VINE ST*	*54*	*185*
GATEWAY MALL	*6100 O ST*	*63*	*194*

NE AIRS: A listing of air program facilities.

A review of the NE AIRS list, as provided by EDR, and dated 09/23/2014 has revealed that there are 8 NE AIRS sites within the searched area.

Site	Address	Map ID	Page
GENERAL DYNAMICS-OTS INC	*4300 INDUSTRIAL AVE*	*1*	*43*
SANFORD & SON LLC	*3900 INDUSTRIAL AVE*	*3*	*55*
SNYDER INDUSTRIES, INC.	*4700 FREMONT STREET*	*4*	*56*
MAPES PANELS LLC	*2929 CORNHUSKER HWY*	*8*	*66*
LINCOLN THERESA ST WASTEWATER	*2400 THERESA ST*	*23*	*122*
WILLIAMS CLEANERS & LAUNDERERS	*2541 N 48TH ST*	*26*	*136*

EXECUTIVE SUMMARY

Site	Address	Map ID	Page
GAME & PARKS COMMISSION	*2200 N 33RD ST*	*30*	*161*
GATEWAY MALL	*6100 O ST*	*63*	*194*

NE TIER 2: A listing of facilities which store or manufacture hazardous materials that submit a chemical inventory report.

A review of the NE TIER 2 list, as provided by EDR, and dated 12/31/2013 has revealed that there are 5 NE TIER 2 sites within the searched area.

Site	Address	Map ID	Page
GENERAL DYNAMICS-OTS INC	*4300 INDUSTRIAL AVE*	*1*	*43*
MAPES PANELS LLC	*2929 CORNHUSKER HWY*	*8*	*66*
CORNHUSKER INTERNATIONAL	*3131 CORNHUSKER HWY*	*8*	*81*
UNITED PARCEL SERVICE	*3133 N 33RD ST*	*8*	*97*
WINDSTREAM COMMUNICATIONS	*4848 WALKER AVE*	*26*	*131*

EDR PROPRIETARY RECORDS

EDR US Hist Auto Stat: EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

A review of the EDR US Hist Auto Stat list, as provided by EDR, has revealed that there are 34 EDR US Hist Auto Stat sites within the searched area.

Site	Address	Map ID	Page
Not reported	3420 N 27TH ST	7	66
Not reported	3301 CORNHUSKER HWY	8	85
Not reported	2920 CORNHUSKER HWY	8	86
Not reported	2940 CORNHUSKER HWY	8	88
Not reported	3000 CORNHUSKER HWY	8	88
Not reported	3130 CORNHUSKER HWY	8	90
Not reported	3030 N 33RD ST	8	95
Not reported	3140 N 33RD ST	8	100
Not reported	3200 N 33RD ST	8	101
Not reported	3235 N 33RD ST	8	101
Not reported	3300 N 27TH ST	9	103
Not reported	2901 N 27TH ST	13	110
Not reported	2801 N 35TH ST	17	112
Not reported	2851 N 35TH ST	17	112
Not reported	3420 CLEVELAND AVE	17	113
Not reported	3530 CLEVELAND AVE	17	113
Not reported	3550 CLEVELAND AVE	17	114

Site	Address	Map ID	Page
Not reported	3540 CLEVELAND AVE	17	114
Not reported	3320 CLEVELAND AVE	17	115
Not reported	2701 N 27TH ST	18	115
Not reported	3318 MADISON AVE	20	120
Not reported	3312 MADISON AVE	20	120
Not reported	2304 N 48TH ST	26	129
Not reported	2335 N 49TH ST	26	130
Not reported	2525 STATE FAIR PARK D	27	146
Not reported	2542 N 27TH ST	27	147
Not reported	2415 N 33RD ST	28	150
Not reported	2435 N 33RD ST	28	151
Not reported	3221 HUNTINGTON AVE	28	156
Not reported	2505 N 33RD ST	28	157
Not reported	3281 MERRILL ST	30	160
Not reported	1201 N 54TH ST	49	181
Not reported	162 GATEWAY MALL	59	190
Not reported	210 GATEWAY MALL	59	190

EDR US Hist Cleaners: EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

A review of the EDR US Hist Cleaners list, as provided by EDR, has revealed that there are 6 EDR US Hist Cleaners sites within the searched area.

Site	Address	Map ID	Page
Not reported	4030 SAINT PAUL AVE	21	120
Not reported	4740 HUNTINGTON AVE	26	135
Not reported	2541 N 48TH ST	26	145
Not reported	5204 COLBY ST	32	165
Not reported	1440 N 56TH ST	44	172
Not reported	6033 DOBBINS DR	48	181

NE RGA LUST: The EDR Recovered Government Archive Leaking Underground Storage Tank database provides a list of LUST incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Environmental Quality in Nebraska.

A review of the NE RGA LUST list, as provided by EDR, has revealed that there are 3 NE RGA LUST sites within the searched area.

Site	Address	Map ID	Page
WENTZ PLUMBING & H	2949 CORNHUSKER HW	8	78
WENTZ PLUMBING & HEA	2949 CORNHUSKER HWY	8	79
ANDERSEN SERVICE	1445 N 56TH STREET	44	174

EXECUTIVE SUMMARY

Please refer to the end of the findings report for unmapped orphan sites due to poor or inadequate address information.

MAP FINDINGS SUMMARY

FEDERAL RECORDS

Database	Total Plotted
NPL	0
Proposed NPL	0
Delisted NPL	0
NPL LIENS	0
CERCLIS	0
CERC-NFRAP	0
LIENS 2	0
CORRACTS	2
RCRA-TSDF	1
RCRA-LQG	2
RCRA-SQG	3
RCRA-CESQG	5
RCRA NonGen / NLR	7
US ENG CONTROLS	1
US INST CONTROL	0
ERNS	0
HMIRS	0
DOT OPS	0
US CDL	0
US BROWNFIELDS	0
DOD	0
FUDS	0
LUCIS	0
CONSENT	0
ROD	0
UMTRA	0
ODI	0
DEBRIS REGION 9	0
US MINES	0
TRIS	0
TSCA	0
FTTS	0
HIST FTTS	0
SSTS	0
ICIS	0
PADS	0
MLTS	0
RADINFO	0
FINDS	15
RAATS	0
RMP	0
US AIRS	4
LEAD SMELTERS	0
FEMA UST	0
COAL ASH DOE	0
2020 COR ACTION	1
PRP	0
EPA WATCH LIST	0

MAP FINDINGS SUMMARY

Database	Total Plotted
US FIN ASSUR	0
FEDERAL FACILITY	0
SCRD DRYCLEANERS	0
COAL ASH EPA	0
PCB TRANSFORMER	0
US HIST CDL	0
STATE AND LOCAL RECORDS	
NE SHWS	1
NE SWF/LF	0
NE UIC	0
NE SWRCY	0
NE LUST	76
NE UST	43
NE HIST UST	18
NE LAST	5
NE AST	0
NE HIST AST	0
WI MANIFEST	1
NE SPILLS	10
NE INST CONTROL	1
NE VCP	0
NE DRYCLEANERS	1
NE BROWNFIELDS	1
NE NPDES	14
NE AIRS	8
NE TIER 2	5
TRIBAL RECORDS	
INDIAN RESERV	0
INDIAN ODI	0
INDIAN LUST	0
INDIAN UST	0
INDIAN VCP	0
EDR PROPRIETARY RECORDS	
EDR MGP	0
EDR US Hist Auto Stat	34
EDR US Hist Cleaners	6
NE RGA HWS	0
NE RGA LUST	3

NOTES:

Sites may be listed in more than one database

1 **GENERAL DYNAMICS**
4300 INDUSTRIAL AVENUE
LINCOLN, NE 68504

CORRACTS **1000321223**
RCRA-TSDF **NED043534635**
RCRA-LQG
US ENG CONTROLS
FINDS
US AIRS
2020 COR ACTION

CORRACTS:

EPA ID: NED043534635
EPA Region: 07
Area Name: ENTIRE FACILITY
Actual Date: 19971001
Action: CA001
NAICS Code(s): 336415 336413
Guided Missile and Space Vehicle Propulsion Unit and Propulsion Unit Parts Manufacturing
Other Aircraft Parts and Auxiliary Equipment Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: NED043534635
EPA Region: 07
Area Name: ENTIRE FACILITY
Actual Date: 19920203
Action: CA300 - CMS Workplan Approved
NAICS Code(s): 336415 336413
Guided Missile and Space Vehicle Propulsion Unit and Propulsion Unit Parts Manufacturing
Other Aircraft Parts and Auxiliary Equipment Manufacturing
Original schedule date: 19911031
Schedule end date: Not reported

EPA ID: NED043534635
EPA Region: 07
Area Name: ENTIRE FACILITY
Actual Date: 19920203
Action: CA150 - RFI Workplan Approved
NAICS Code(s): 336415 336413
Guided Missile and Space Vehicle Propulsion Unit and Propulsion Unit Parts Manufacturing
Other Aircraft Parts and Auxiliary Equipment Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: NED043534635
EPA Region: 07
Area Name: ENTIRE FACILITY
Actual Date: 19920205
Action: CA225NR - Stabilization Measures Evaluation, This facility is, not amenable to stabilization activity at the, present time for reasons other than (1) it appears to be technically, infeasible or inappropriate (NF) or (2) there is a lack of technical, information (IN). Reasons for this conclusion may be the status of, closure at the facility, the degree of risk, timing considerations, the status of corrective action work at the facility, or other, administrative considerations
NAICS Code(s): 336415 336413

GENERAL DYNAMICS (Continued) **1000321223**

Guided Missile and Space Vehicle Propulsion Unit and Propulsion Unit Parts Manufacturing
Other Aircraft Parts and Auxiliary Equipment Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: NED043534635
EPA Region: 07
Area Name: ENTIRE FACILITY
Actual Date: 19870815
Action: CA050RF - RFA Completed, Assessment was an RFA
NAICS Code(s): 336415 336413
Guided Missile and Space Vehicle Propulsion Unit and Propulsion Unit Parts Manufacturing
Other Aircraft Parts and Auxiliary Equipment Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: NED043534635
EPA Region: 07
Area Name: ENTIRE FACILITY
Actual Date: 19870815
Action: CA070YE - RFA Determination Of Need For An RFI, RFI is Necessary
NAICS Code(s): 336415 336413
Guided Missile and Space Vehicle Propulsion Unit and Propulsion Unit Parts Manufacturing
Other Aircraft Parts and Auxiliary Equipment Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: NED043534635
EPA Region: 07
Area Name: ENTIRE FACILITY
Actual Date: 20030620
Action: CA750YE - Migration of Contaminated Groundwater under Control, Yes, Migration of Contaminated Groundwater Under Control has been verified
NAICS Code(s): 336415 336413
Guided Missile and Space Vehicle Propulsion Unit and Propulsion Unit Parts Manufacturing
Other Aircraft Parts and Auxiliary Equipment Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: NED043534635
EPA Region: 07
Area Name: ENTIRE FACILITY
Actual Date: 19941021
Action: CA075HI - CA Prioritization, Facility or area was assigned a high corrective action priority
NAICS Code(s): 336415 336413
Guided Missile and Space Vehicle Propulsion Unit and Propulsion Unit Parts Manufacturing
Other Aircraft Parts and Auxiliary Equipment Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: NED043534635

GENERAL DYNAMICS (Continued) **1000321223**

EPA Region: 07
Area Name: ENTIRE FACILITY
Actual Date: 19910923
Action: CA600SR - Stabilization Measures Implemented, Primary measure is source removal and/or treatment
NAICS Code(s): 336415 336413
Guided Missile and Space Vehicle Propulsion Unit and Propulsion Unit Parts Manufacturing
Other Aircraft Parts and Auxiliary Equipment Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: NED043534635
EPA Region: 07
Area Name: ENTIRE FACILITY
Actual Date: 20020828
Action: CA725YE - Current Human Exposures Under Control, Yes, Current Human Exposures Under Control has been verified
NAICS Code(s): 336415 336413
Guided Missile and Space Vehicle Propulsion Unit and Propulsion Unit Parts Manufacturing
Other Aircraft Parts and Auxiliary Equipment Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: NED043534635
EPA Region: 07
Area Name: ENTIRE FACILITY
Actual Date: 19920128
Action: CA075ME - CA Prioritization, Facility or area was assigned a medium corrective action priority
NAICS Code(s): 336415 336413
Guided Missile and Space Vehicle Propulsion Unit and Propulsion Unit Parts Manufacturing
Other Aircraft Parts and Auxiliary Equipment Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: NED043534635
EPA Region: 07
Area Name: ENTIRE FACILITY
Actual Date: 19980630
Action: CA350 - CMS Approved
NAICS Code(s): 336415 336413
Guided Missile and Space Vehicle Propulsion Unit and Propulsion Unit Parts Manufacturing
Other Aircraft Parts and Auxiliary Equipment Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: NED043534635
EPA Region: 07
Area Name: ENTIRE FACILITY
Actual Date: 19980630
Action: CA400 - Date For Remedy Selection (CM Imposed)
NAICS Code(s): 336415 336413
Guided Missile and Space Vehicle Propulsion Unit and Propulsion Unit

GENERAL DYNAMICS (Continued) **1000321223**

Parts Manufacturing
Other Aircraft Parts and Auxiliary Equipment Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: NED043534635
EPA Region: 07
Area Name: ENTIRE FACILITY
Actual Date: 19980630
Action: CA550 - Certification Of Remedy Completion Or Construction Completion
NAICS Code(s): 336415 336413
Guided Missile and Space Vehicle Propulsion Unit and Propulsion Unit Parts Manufacturing
Other Aircraft Parts and Auxiliary Equipment Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: NED043534635
EPA Region: 07
Area Name: ENTIRE FACILITY
Actual Date: 19980630
Action: CA200 - RFI Approved
NAICS Code(s): 336415 336413
Guided Missile and Space Vehicle Propulsion Unit and Propulsion Unit Parts Manufacturing
Other Aircraft Parts and Auxiliary Equipment Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: NED043534635
EPA Region: 07
Area Name: ENTIRE FACILITY
Actual Date: 19980630
Action: CA770GW
NAICS Code(s): 336415 336413
Guided Missile and Space Vehicle Propulsion Unit and Propulsion Unit Parts Manufacturing
Other Aircraft Parts and Auxiliary Equipment Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: NED043534635
EPA Region: 07
Area Name: ENTIRE FACILITY
Actual Date: 20020530
Action: CA725IN - Current Human Exposures Under Control, More information is needed to make a determination
NAICS Code(s): 336415 336413
Guided Missile and Space Vehicle Propulsion Unit and Propulsion Unit Parts Manufacturing
Other Aircraft Parts and Auxiliary Equipment Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: NED043534635
EPA Region: 07
Area Name: ENTIRE FACILITY

GENERAL DYNAMICS (Continued) **1000321223**

Actual Date: 20020530
Action: CA750IN - Migration of Contaminated Groundwater under Control, More information is needed to make a determination
NAICS Code(s): 336415 336413
Guided Missile and Space Vehicle Propulsion Unit and Propulsion Unit Parts Manufacturing
Other Aircraft Parts and Auxiliary Equipment Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: NED043534635
EPA Region: 07
Area Name: ENTIRE FACILITY
Actual Date: 19870930
Action: CA100 - RFI Imposition
NAICS Code(s): 336415 336413
Guided Missile and Space Vehicle Propulsion Unit and Propulsion Unit Parts Manufacturing
Other Aircraft Parts and Auxiliary Equipment Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: NED043534635
EPA Region: 07
Area Name: ENTIRE FACILITY
Actual Date: 19960930
Action: CA750IN - Migration of Contaminated Groundwater under Control, More information is needed to make a determination
NAICS Code(s): 336415 336413
Guided Missile and Space Vehicle Propulsion Unit and Propulsion Unit Parts Manufacturing
Other Aircraft Parts and Auxiliary Equipment Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: NED043534635
EPA Region: 07
Area Name: ENTIRE FACILITY
Actual Date: 19960930
Action: CA725IN - Current Human Exposures Under Control, More information is needed to make a determination
NAICS Code(s): 336415 336413
Guided Missile and Space Vehicle Propulsion Unit and Propulsion Unit Parts Manufacturing
Other Aircraft Parts and Auxiliary Equipment Manufacturing
Original schedule date: Not reported
Schedule end date: Not reported

RCRA-TSDF:
Date form received by agency: 05/27/2014
Facility name: GENERAL DYNAMICS - OTS, INC.
Facility address: 4300 INDUSTRIAL AVENUE
LINCOLN, NE 68504
EPA ID: NED043534635
Mailing address: INDUSTRIAL AVENUE
LINCOLN, NE 68504
Contact: JOHN A HAZUKA

GENERAL DYNAMICS (Continued) **1000321223**

Contact address:	INDUSTRIAL AVENUE LINCOLN, NE 68504
Contact country:	Not reported
Contact telephone:	(402) 464-8211
Telephone ext.:	6532
Contact email:	JOHN.HAZUKA@GD-OTS.COM
EPA Region:	07
Land type:	Private
Classification:	TSDF
Description:	Handler is engaged in the treatment, storage or disposal of hazardous waste
Classification:	Large Quantity Generator
Description:	Handler: generates 1,000 kg or more of hazardous waste during any calendar month; or generates more than 1 kg of acutely hazardous waste during any calendar month; or generates more than 100 kg of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month; or generates 1 kg or less of acutely hazardous waste during any calendar month, and accumulates more than 1 kg of acutely hazardous waste at any time; or generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates more than 100 kg of that material at any time

Owner/Operator Summary:

Owner/operator name:	GENERAL DYNAMICS ATP INC
Owner/operator address:	LAKEPOINT PLAZA 2118 WATER RID GE PARKWAY CHARLOTTE, NC 28217
Owner/operator country:	Not reported
Owner/operator telephone:	(704) 714-8000
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	06/14/2002
Owner/Op end date:	Not reported

Owner/operator name:	GENERAL DYNAMICS ATP INC
Owner/operator address:	Not reported Not reported
Owner/operator country:	US
Owner/operator telephone:	Not reported
Legal status:	Private
Owner/Operator Type:	Operator
Owner/Op start date:	06/14/2002
Owner/Op end date:	Not reported

Owner/operator name:	GENERAL DYNAMICS ATP INC
Owner/operator address:	WATER RIDGE PARKWAY FOUR LAKEPOINTE PLAZA CHARLOTTE, NC 28217
Owner/operator country:	US
Owner/operator telephone:	Not reported
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	06/14/2002
Owner/Op end date:	Not reported

Owner/operator name:	GENERAL DYNAMICS ATP INC

GENERAL DYNAMICS (Continued) **1000321223**

Owner/operator address: Not reported
NE
Owner/operator country: US
Owner/operator telephone: Not reported
Legal status: Private
Owner/Operator Type: Operator
Owner/Op start date: 06/14/2002
Owner/Op end date: Not reported

Handler Activities Summary:
U.S. importer of hazardous waste: No
Mixed waste (haz. and radioactive): No
Recycler of hazardous waste: No
Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

Historical Generators:
Date form received by agency: 10/01/2013
Site name: GENERAL DYNAMICS-OTS INC LINCOLN OPERATIONS
Classification: Large Quantity Generator

Date form received by agency: 05/10/2013
Site name: GENERAL DYNAMICS ATP INC LINCOLN OPERATIONS
Classification: Large Quantity Generator

Date form received by agency: 03/01/2012
Site name: GENERAL DYNAMICS ATP INC LINCOLN OPERATIONS
Classification: Large Quantity Generator

Date form received by agency: 03/01/2010
Site name: GENERAL DYNAMICS ATP INC - LINCOLN OPERATIONS
Classification: Large Quantity Generator

Date form received by agency: 03/03/2008
Site name: GENERAL DYNAMICS ATP INC LINCOLN OP
Classification: Large Quantity Generator

Date form received by agency: 05/21/2007
Site name: GENERAL DYNAMICS ATP INC LINCOLN OPER
Classification: Large Quantity Generator

Date form received by agency: 02/27/2006
Site name: GENERAL DYNAMICS LINCOLN OPERATIONS
Classification: Large Quantity Generator

Date form received by agency: 02/25/2004

GENERAL DYNAMICS (Continued) **1000321223**

Site name: GENERAL DYNAMICS MAIN PLANT
Classification: Large Quantity Generator

Date form received by agency: 07/17/2002
Site name: GENERAL DYNAMICS ATP
Classification: Large Quantity Generator

Date form received by agency: 02/26/2002
Site name: LINCOLN COMPOSITES MAIN PLANT
Classification: Large Quantity Generator

Date form received by agency: 02/25/2000
Site name: ADVANCED TECH. PROD INC LIN COMP MN PLT
Classification: Large Quantity Generator

Date form received by agency: 02/27/1998
Site name: TECHNICAL PRODUCTS GROUP INC MAIN PLANT
Classification: Large Quantity Generator

Date form received by agency: 02/27/1998
Site name: GENERAL DYNAMICS (SEE COMMENTS)
Classification: Large Quantity Generator

Date form received by agency: 02/26/1996
Site name: TECHNICAL PRODUCTS GROUP INC
Classification: Large Quantity Generator

Date form received by agency: 11/06/1995
Site name: GENERAL DYNAMICS (SEE COMMENTS)
Classification: Not a generator, verified

Date form received by agency: 02/28/1994
Site name: BRUNSWICK - MAIN PLANT
Classification: Large Quantity Generator

Date form received by agency: 02/25/1992
Site name: BRUNSWICK - MAIN PLANT
Classification: Large Quantity Generator

Date form received by agency: 03/29/1990
Site name: BRUNSWICK-MAIN PLANT
Classification: Large Quantity Generator

Date form received by agency: 01/01/1979
Site name: GENERAL DYNAMICS (SEE COMMENTS)
Classification: Large Quantity Generator

Date form received by agency: 01/01/1979
Site name: GENERAL DYNAMICS (SEE COMMENTS)
Classification: Large Quantity Generator

Hazardous Waste Summary:
Waste code: D000
Waste name: Not Defined

Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF

GENERAL DYNAMICS (Continued) **1000321223**

LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Waste code: D002
Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

Waste code: D007
Waste name: CHROMIUM

Waste code: F001
Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS USED IN DEGREASING: TETRACHLOROETHYLENE, TRICHLOROETHYLENE, METHYLENE CHLORIDE, 1,1,1-TRICHLOROETHANE, CARBON TETRACHLORIDE, AND CHLORINATED FLUOROCARBONS; ALL SPENT SOLVENT MIXTURES/BLENDS USED IN DEGREASING CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F002
Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2-TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE LISTED IN F001, F004, OR F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F003
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F005
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF

GENERAL DYNAMICS (Continued) **1000321223**

ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Waste code: D002
Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

Waste code: D005
Waste name: BARIUM

Waste code: D007
Waste name: CHROMIUM

Waste code: D008
Waste name: LEAD

Waste code: D035
Waste name: METHYL ETHYL KETONE

Waste code: D040
Waste name: TRICHLOROETHYLENE

Waste code: F001
Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS USED IN DEGREASING: TETRACHLOROETHYLENE, TRICHLOROETHYLENE, METHYLENE CHLORIDE, 1,1,1-TRICHLOROETHANE, CARBON TETRACHLORIDE, AND CHLORINATED FLUOROCARBONS; ALL SPENT SOLVENT MIXTURES/BLENDS USED IN DEGREASING CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F002
Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2-TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE LISTED IN F001, F004, OR F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

GENERAL DYNAMICS (Continued) **1000321223**

Waste code: F003
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F005
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Waste code: D002
Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

Waste code: D005
Waste name: BARIUM

Waste code: D007
Waste name: CHROMIUM

Waste code: D008
Waste name: LEAD

Waste code: D035
Waste name: METHYL ETHYL KETONE

Waste code: F001
Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS USED IN DEGREASING: TETRACHLOROETHYLENE, TRICHLOROETHYLENE, METHYLENE CHLORIDE, 1,1,1-TRICHLOROETHANE, CARBON TETRACHLORIDE, AND CHLORINATED FLUOROCARBONS; ALL SPENT SOLVENT MIXTURES/BLENDS USED IN DEGREASING CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF

GENERAL DYNAMICS (Continued) 1000321223

ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F002
Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2-TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE LISTED IN F001, F004, OR F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F003
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F005
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Waste code: D002
Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

Waste code: D003
Waste name: A MATERIAL IS CONSIDERED TO BE A REACTIVE HAZARDOUS WASTE IF IT IS NORMALLY UNSTABLE, REACTS VIOLENTLY WITH WATER, GENERATES TOXIC GASES

GENERAL DYNAMICS (Continued) 1000321223

WHEN EXPOSED TO WATER OR CORROSIVE MATERIALS, OR IF IT IS CAPABLE OF DETONATION OR EXPLOSION WHEN EXPOSED TO HEAT OR A FLAME. ONE EXAMPLE OF SUCH WASTE WOULD BY WASTE GUNPOWDER.

Waste code: D007
Waste name: CHROMIUM

Waste code: D008
Waste name: LEAD

Waste code: D009
Waste name: MERCURY

Waste code: D035
Waste name: METHYL ETHYL KETONE

Waste code: F001
Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS USED IN DEGREASING: TETRACHLOROETHYLENE, TRICHLOROETHYLENE, METHYLENE CHLORIDE, 1,1,1-TRICHLOROETHANE, CARBON TETRACHLORIDE, AND CHLORINATED FLUOROCARBONS; ALL SPENT SOLVENT MIXTURES/BLENDS USED IN DEGREASING CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F002
Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2-TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE LISTED IN F001, F004, OR F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F003
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F005
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

GENERAL DYNAMICS (Continued) **1000321223**

Waste code: F019
Waste name: WASTEWATER TREATMENT SLUDGES FROM THE CHEMICAL CONVERSION COATING OF ALUMINUM EXCEPT FROM ZIRCONIUM PHOSPHATING IN ALUMINUM CAN WASHING WHEN SUCH PHOSPHATING IS AN EXCLUSIVE CONVERSION COATING PROCESS.

Waste code: U160
Waste name: 2-BUTANONE, PEROXIDE (R,T)

Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Waste code: D002
Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

Waste code: D005
Waste name: BARIUM

Waste code: D007
Waste name: CHROMIUM

Waste code: D008
Waste name: LEAD

Waste code: D035
Waste name: METHYL ETHYL KETONE

Waste code: F001
Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS USED IN DEGREASING: TETRACHLOROETHYLENE, TRICHLOROETHYLENE, METHYLENE CHLORIDE, 1,1,1-TRICHLOROETHANE, CARBON TETRACHLORIDE, AND CHLORINATED FLUOROCARBONS; ALL SPENT SOLVENT MIXTURES/BLENDS USED IN DEGREASING CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F002
Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2-TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE LISTED IN F001, F004, OR F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND

GENERAL DYNAMICS (Continued) **1000321223**

SPENT SOLVENT MIXTURES.

Waste code: F003
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F005
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Waste code: D002
Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

Waste code: D005
Waste name: BARIUM

Waste code: D007
Waste name: CHROMIUM

Waste code: D008
Waste name: LEAD

Waste code: D035
Waste name: METHYL ETHYL KETONE

Waste code: F001
Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS USED IN DEGREASING: TETRACHLOROETHYLENE, TRICHLOROETHYLENE, METHYLENE CHLORIDE, 1,1,1-TRICHLOROETHANE, CARBON TETRACHLORIDE, AND CHLORINATED

GENERAL DYNAMICS (Continued) 1000321223

FLUOROCARBONS; ALL SPENT SOLVENT MIXTURES/BLENDS USED IN DEGREASING CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F002
Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2-TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE LISTED IN F001, F004, OR F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F003
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F005
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Waste code: D002
Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

Waste code: D007

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Waste name: CHROMIUM

Waste code: D008
Waste name: LEAD

Waste code: D035
Waste name: METHYL ETHYL KETONE

Waste code: D040
Waste name: TRICHLOROETHYLENE

Waste code: F001
Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS USED IN DEGREASING: TETRACHLOROETHYLENE, TRICHLOROETHYLENE, METHYLENE CHLORIDE, 1,1,1-TRICHLOROETHANE, CARBON TETRACHLORIDE, AND CHLORINATED FLUOROCARBONS; ALL SPENT SOLVENT MIXTURES/BLENDS USED IN DEGREASING CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F002
Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2-TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE LISTED IN F001, F004, OR F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F003
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F005
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F019
Waste name: WASTEWATER TREATMENT SLUDGES FROM THE CHEMICAL CONVERSION COATING OF ALUMINUM EXCEPT FROM ZIRCONIUM PHOSPHATING IN ALUMINUM CAN WASHING WHEN SUCH PHOSPHATING IS AN EXCLUSIVE CONVERSION COATING PROCESS.

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Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Waste code: D002
Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

Waste code: D007
Waste name: CHROMIUM

Waste code: D008
Waste name: LEAD

Waste code: D035
Waste name: METHYL ETHYL KETONE

Waste code: D040
Waste name: TRICHLOROETHYLENE

Waste code: F001
Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS USED IN DEGREASING: TETRACHLOROETHYLENE, TRICHLOROETHYLENE, METHYLENE CHLORIDE, 1,1,1-TRICHLOROETHANE, CARBON TETRACHLORIDE, AND CHLORINATED FLUOROCARBONS; ALL SPENT SOLVENT MIXTURES/BLENDS USED IN DEGREASING CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F002
Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2-TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE LISTED IN F001, F004, OR F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F003
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS

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CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F005
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Waste code: D002
Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

Waste code: D007
Waste name: CHROMIUM

Waste code: D008
Waste name: LEAD

Waste code: D035
Waste name: METHYL ETHYL KETONE

Waste code: D040
Waste name: TRICHLOROETHYLENE

Waste code: F001
Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS USED IN DEGREASING: TETRACHLOROETHYLENE, TRICHLOROETHYLENE, METHYLENE CHLORIDE, 1,1,1-TRICHLOROETHANE, CARBON TETRACHLORIDE, AND CHLORINATED FLUOROCARBONS; ALL SPENT SOLVENT MIXTURES/BLENDS USED IN DEGREASING CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F002
Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE,

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METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2-TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE LISTED IN F001, F004, OR F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F003
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F005
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Waste code: D002
Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

Waste code: D007
Waste name: CHROMIUM

Waste code: D008
Waste name: LEAD

Waste code: D035
Waste name: METHYL ETHYL KETONE

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Waste code: D040
Waste name: TRICHLOROETHYLENE

Waste code: F001
Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS USED IN DEGREASING: TETRACHLOROETHYLENE, TRICHLOROETHYLENE, METHYLENE CHLORIDE, 1,1,1-TRICHLOROETHANE, CARBON TETRACHLORIDE, AND CHLORINATED FLUOROCARBONS; ALL SPENT SOLVENT MIXTURES/BLENDS USED IN DEGREASING CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F002
Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2-TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE LISTED IN F001, F004, OR F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F003
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F005
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Waste code: D002
Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A

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CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

Waste code: D007
Waste name: CHROMIUM

Waste code: D008
Waste name: LEAD

Waste code: D035
Waste name: METHYL ETHYL KETONE

Waste code: D040
Waste name: TRICHLOROETHYLENE

Waste code: F001
Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS USED IN DEGREASING: TETRACHLOROETHYLENE, TRICHLOROETHYLENE, METHYLENE CHLORIDE, 1,1,1-TRICHLOROETHANE, CARBON TETRACHLORIDE, AND CHLORINATED FLUOROCARBONS; ALL SPENT SOLVENT MIXTURES/BLENDS USED IN DEGREASING CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F002
Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2-TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE LISTED IN F001, F004, OR F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F003
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F005
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS OR THOSE SOLVENTS

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LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Biennial Reports:

Last Biennial Reporting Year: 2013

Annual Waste Handled:

Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.
Amount (Lbs): 7892

Waste code: D002
Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.
Amount (Lbs): 41896

Waste code: D004
Waste name: ARSENIC
Amount (Lbs): 852

Waste code: D005
Waste name: BARIUM
Amount (Lbs): 65

Waste code: D007
Waste name: CHROMIUM
Amount (Lbs): 49473

Waste code: D008
Waste name: LEAD
Amount (Lbs): 7797

Waste code: D035
Waste name: METHYL ETHYL KETONE
Amount (Lbs): 7797

Waste code: F001
Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS USED IN DEGREASING: TETRACHLOROETHYLENE, TRICHLOROETHYLENE, METHYLENE CHLORIDE, 1,1,1-TRICHLOROETHANE, CARBON TETRACHLORIDE, AND CHLORINATED FLUOROCARBONS; ALL SPENT SOLVENT MIXTURES/BLENDS USED IN DEGREASING CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.
Amount (Lbs): 6710

GENERAL DYNAMICS (Continued) **1000321223**

Waste code: F002
Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2-TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE LISTED IN F001, F004, OR F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.
Amount (Lbs): 7797

Waste code: F003
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.
Amount (Lbs): 7010

Waste code: F005
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.
Amount (Lbs): 7862

Corrective Action Summary:

Event date: 08/15/1987
Event: RFA Completed, Assessment was an RFA.

Event date: 08/15/1987
Event: RFA Determination Of Need For An RFI, RFI is Necessary;

Event date: 09/30/1987
Event: RFI Imposition

Event date: 09/23/1991
Event: Stabilization Measures Implemented, Primary measure is source removal and/or treatment (e.g., soil or waste excavation, in-situ soil treatment, off-site treatment).

Event date: 01/28/1992
Event: CA Prioritization, Facility or area was assigned a medium corrective action priority.

Event date: 02/03/1992
Event: RFI Workplan Approved

GENERAL DYNAMICS (Continued) **1000321223**

Event date: 02/03/1992
Event: CMS Workplan Approved

Event date: 02/05/1992
Event: Stabilization Measures Evaluation,This facility is not amenable to stabilization activity at the present time for reasons other than 1- it appears to be technically infeasible or inappropriate (NF) or 2- there is a lack of technical information (IN). Reasons for this conclusion may be the status of closure at the facility, the degree of risk, timing considerations, the status of corrective action work at the facility, or other administrative considerations.

Event date: 10/21/1994
Event: CA Prioritization, Facility or area was assigned a high corrective action priority.

Event date: 09/30/1996
Event: Igration of Contaminated Groundwater under Control, More information is needed to make a determination.

Event date: 09/30/1996
Event: Current Human Exposures under Control, More information is needed to make a determination.

Event date: 10/01/1997
Event: CA001

Event date: 06/30/1998
Event: Certification Of Remedy Completion Or Construction Completion

Event date: 06/30/1998
Event: CMS Approved

Event date: 06/30/1998
Event: RFI Approved

Event date: 06/30/1998
Event: Date For Remedy Selection (CM Imposed)

Event date: 06/30/1998
Event: CA770GW

Event date: 05/30/2002
Event: Current Human Exposures under Control, More information is needed to make a determination.

Event date: 05/30/2002
Event: Igration of Contaminated Groundwater under Control, More information is needed to make a determination.

Event date: 08/28/2002
Event: Current Human Exposures under Control, Yes, Current Human Exposures Under Control has been verified. Based on a review of information contained in the EI determination, current human exposures are expected to be under control at the facility under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant

GENERAL DYNAMICS (Continued) **1000321223**

changes at the facility.

Event date:	06/20/2003
Event:	Igration of Contaminated Groundwater under Control, Yes, Migration of Contaminated Groundwater Under Control has been verified. Based on a review of information contained in the EI determination, it has been determined that migration of contaminated groundwater is under control at the facility. Specifically, this determination indicates that the migration of contaminated groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the existing area of contaminated groundwater. This determination will be re-evaluated when the Agency becomes aware of significant changes at the facility.

Facility Has Received Notices of Violations:

Regulation violated:	Not reported
Area of violation:	TSD - Releases from SWMUs
Date violation determined:	05/09/2013
Date achieved compliance:	05/31/2013
Violation lead agency:	State
Enforcement action:	WRITTEN INFORMAL
Enforcement action date:	05/09/2013
Enf. disposition status:	Not reported
Enf. disp. status date:	Not reported
Enforcement lead agency:	State
Proposed penalty amount:	Not reported
Final penalty amount:	Not reported
Paid penalty amount:	Not reported

Regulation violated:	Not reported
Area of violation:	TSD - Releases from SWMUs
Date violation determined:	05/09/2013
Date achieved compliance:	06/03/2013
Violation lead agency:	State
Enforcement action:	WRITTEN INFORMAL
Enforcement action date:	05/09/2013
Enf. disposition status:	Not reported
Enf. disp. status date:	Not reported
Enforcement lead agency:	State
Proposed penalty amount:	Not reported
Final penalty amount:	Not reported
Paid penalty amount:	Not reported

Regulation violated:	Not reported
Area of violation:	TSD - Releases from SWMUs
Date violation determined:	05/09/2013
Date achieved compliance:	Not reported
Violation lead agency:	State
Enforcement action:	WRITTEN INFORMAL
Enforcement action date:	05/09/2013
Enf. disposition status:	Not reported
Enf. disp. status date:	Not reported
Enforcement lead agency:	State
Proposed penalty amount:	Not reported
Final penalty amount:	Not reported
Paid penalty amount:	Not reported

GENERAL DYNAMICS (Continued) **1000321223**

Regulation violated: Not reported
Area of violation: Universal Waste - Small Quantity Handlers
Date violation determined: 03/09/2011
Date achieved compliance: 06/01/2011
Violation lead agency: EPA
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 03/09/2011
Enf. disposition status: Action Satisfied (Case Closed)
Enf. disp. status date: 06/06/2011
Enforcement lead agency: EPA
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: TSD IS-Contingency Plan and Emergency Procedures
Date violation determined: 03/09/2011
Date achieved compliance: 06/01/2011
Violation lead agency: EPA
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 03/09/2011
Enf. disposition status: Action Satisfied (Case Closed)
Enf. disp. status date: 06/06/2011
Enforcement lead agency: EPA
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: Generators - Pre-transport
Date violation determined: 03/09/2011
Date achieved compliance: 06/01/2011
Violation lead agency: EPA
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 03/09/2011
Enf. disposition status: Action Satisfied (Case Closed)
Enf. disp. status date: 06/06/2011
Enforcement lead agency: EPA
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: Universal Waste - Small Quantity Handlers
Date violation determined: 03/09/2011
Date achieved compliance: 03/23/2011
Violation lead agency: EPA
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 03/09/2011
Enf. disposition status: Action Satisfied (Case Closed)
Enf. disp. status date: 06/06/2011
Enforcement lead agency: EPA
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported

GENERAL DYNAMICS (Continued) **1000321223**

Area of violation: Generators - Pre-transport
Date violation determined: 04/17/2008
Date achieved compliance: 04/22/2008
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 04/17/2008
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: TSD IS-Contingency Plan and Emergency Procedures
Date violation determined: 04/19/2007
Date achieved compliance: 05/18/2007
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 04/19/2007
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: State Statute or Regulation
Date violation determined: 04/19/2007
Date achieved compliance: 05/18/2007
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 04/19/2007
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: TSD - Releases from SWMUs
Date violation determined: 06/26/2006
Date achieved compliance: 01/16/2007
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 07/07/2006
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: TSD - Releases from SWMUs

GENERAL DYNAMICS (Continued) 1000321223

Date violation determined: 06/26/2006
Date achieved compliance: 07/10/2006
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 07/07/2006
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: TSD - Releases from SWMUs
Date violation determined: 06/26/2006
Date achieved compliance: 10/11/2006
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 07/07/2006
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: SR - T128, Ch17, 004
Area of violation: Generators - General
Date violation determined: 03/11/2004
Date achieved compliance: 04/12/2004
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 03/11/2004
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: SR - T128, Ch1, 005.01B
Area of violation: Generators - Pre-transport
Date violation determined: 03/11/2004
Date achieved compliance: 04/12/2004
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 03/11/2004
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: SR - T128, Ch10, 009.01B
Area of violation: Generators - Pre-transport
Date violation determined: 03/11/2004

GENERAL DYNAMICS (Continued) **1000321223**

Date achieved compliance: 04/12/2004
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 03/11/2004
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: SR - T128, Ch16, 002.01B
Area of violation: Generators - Pre-transport
Date violation determined: 03/11/2004
Date achieved compliance: 04/12/2004
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 03/11/2004
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: SR - T128, Ch17, 003.01
Area of violation: Generators - Pre-transport
Date violation determined: 03/11/2004
Date achieved compliance: 04/12/2004
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 03/11/2004
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: SR - T128, Ch19, 003
Area of violation: Generators - Pre-transport
Date violation determined: 03/11/2004
Date achieved compliance: 04/12/2004
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 03/11/2004
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: SR - T128, Ch4, 002
Area of violation: Generators - General
Date violation determined: 03/11/2004
Date achieved compliance: 04/12/2004

GENERAL DYNAMICS (Continued) **1000321223**

Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 03/11/2004
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: LDR - General
Date violation determined: 08/23/1990
Date achieved compliance: 10/22/1990
Violation lead agency: State
Enforcement action: Not reported
Enforcement action date: Not reported
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: Not reported
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: TSD - General
Date violation determined: 08/23/1990
Date achieved compliance: 10/22/1990
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 09/24/1990
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: TSD - General
Date violation determined: 06/26/1989
Date achieved compliance: 06/15/1990
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 11/03/1989
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: TSD - Financial Requirements
Date violation determined: 05/25/1989
Date achieved compliance: 06/05/1989
Violation lead agency: State

GENERAL DYNAMICS (Continued) **1000321223**

Enforcement action: WRITTEN INFORMAL
Enforcement action date: 05/26/1989
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: LDR - General
Date violation determined: 10/29/1987
Date achieved compliance: 10/22/1990
Violation lead agency: EPA
Enforcement action: Not reported
Enforcement action date: Not reported
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: Not reported
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: TSD - Financial Requirements
Date violation determined: 07/07/1987
Date achieved compliance: 04/01/1988
Violation lead agency: State
Enforcement action: FINAL 3008(A) COMPLIANCE ORDER
Enforcement action date: 07/15/1987
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: TSD - General
Date violation determined: 05/21/1987
Date achieved compliance: 12/11/1987
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 11/16/1987
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: TSD - General
Date violation determined: 05/21/1987
Date achieved compliance: 12/11/1987
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL

GENERAL DYNAMICS (Continued) **1000321223**

Enforcement action date: 09/08/1987
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: TSD - General
Date violation determined: 02/10/1986
Date achieved compliance: 04/08/1986
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 03/10/1986
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: TSD - General
Date violation determined: 10/03/1984
Date achieved compliance: 03/08/1986
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 11/06/1984
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: TSD - General
Date violation determined: 10/03/1984
Date achieved compliance: 11/03/1984
Violation lead agency: EPA
Enforcement action: Not reported
Enforcement action date: Not reported
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: Not reported
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: TSD - General
Date violation determined: 06/11/1984
Date achieved compliance: 06/22/1984
Violation lead agency: EPA
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 06/11/1984

GENERAL DYNAMICS (Continued) **1000321223**

Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: EPA
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Evaluation Action Summary:

Evaluation date: 05/09/2013
Evaluation: OPERATION AND MAINTENANCE INSPECTION
Area of violation: TSD - Releases from SWMUs
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 05/09/2013
Evaluation: OPERATION AND MAINTENANCE INSPECTION
Area of violation: TSD - Releases from SWMUs
Date achieved compliance: 05/31/2013
Evaluation lead agency: State

Evaluation date: 05/09/2013
Evaluation: OPERATION AND MAINTENANCE INSPECTION
Area of violation: TSD - Releases from SWMUs
Date achieved compliance: 06/03/2013
Evaluation lead agency: State

Evaluation date: 03/08/2011
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Generators - Pre-transport
Date achieved compliance: 06/01/2011
Evaluation lead agency: EPA

Evaluation date: 03/08/2011
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Universal Waste - Small Quantity Handlers
Date achieved compliance: 03/23/2011
Evaluation lead agency: EPA

Evaluation date: 03/08/2011
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: TSD IS-Contingency Plan and Emergency Procedures
Date achieved compliance: 06/01/2011
Evaluation lead agency: EPA

Evaluation date: 03/08/2011
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Universal Waste - Small Quantity Handlers
Date achieved compliance: 06/01/2011
Evaluation lead agency: EPA

Evaluation date: 03/28/2008
Evaluation: FACILITY SELF DISCLOSURE
Area of violation: Generators - Pre-transport
Date achieved compliance: 04/22/2008
Evaluation lead agency: State

Evaluation date: 02/21/2007

GENERAL DYNAMICS (Continued) **1000321223**

Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: TSD IS-Contingency Plan and Emergency Procedures
Date achieved compliance: 05/18/2007
Evaluation lead agency: State

Evaluation date: 02/21/2007
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: State Statute or Regulation
Date achieved compliance: 05/18/2007
Evaluation lead agency: State

Evaluation date: 06/26/2006
Evaluation: OPERATION AND MAINTENANCE INSPECTION
Area of violation: TSD - Releases from SWMUs
Date achieved compliance: 01/16/2007
Evaluation lead agency: State Contractor/Grantee

Evaluation date: 06/26/2006
Evaluation: OPERATION AND MAINTENANCE INSPECTION
Area of violation: TSD - Releases from SWMUs
Date achieved compliance: 07/10/2006
Evaluation lead agency: State Contractor/Grantee

Evaluation date: 06/26/2006
Evaluation: OPERATION AND MAINTENANCE INSPECTION
Area of violation: TSD - Releases from SWMUs
Date achieved compliance: 10/11/2006
Evaluation lead agency: State Contractor/Grantee

Evaluation date: 08/25/2005
Evaluation: FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: EPA

Evaluation date: 04/28/2005
Evaluation: FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: EPA Contractor/Grantee

Evaluation date: 05/14/2004
Evaluation: FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: EPA

Evaluation date: 02/10/2004
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Generators - Pre-transport
Date achieved compliance: 04/12/2004
Evaluation lead agency: State

Evaluation date: 02/10/2004
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Generators - General
Date achieved compliance: 04/12/2004

GENERAL DYNAMICS (Continued) **1000321223**

Evaluation lead agency: State

Evaluation date: 05/08/2003
Evaluation: FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: EPA

Evaluation date: 01/14/2003
Evaluation: COMPLIANCE ASSISTANCE VISIT
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 05/20/2002
Evaluation: FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: EPA

Evaluation date: 07/26/2001
Evaluation: FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: EPA

Evaluation date: 03/30/2000
Evaluation: FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: EPA

Evaluation date: 03/31/1999
Evaluation: FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: EPA

Evaluation date: 11/25/1998
Evaluation: FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: EPA

Evaluation date: 10/02/1998
Evaluation: FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 01/29/1998
Evaluation: FOCUSED COMPLIANCE INSPECTION
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 07/07/1997

GENERAL DYNAMICS (Continued) **1000321223**

Evaluation:	FINANCIAL RECORD REVIEW
Area of violation:	Not reported
Date achieved compliance:	Not reported
Evaluation lead agency:	State
Evaluation date:	03/31/1997
Evaluation:	COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation:	Not reported
Date achieved compliance:	Not reported
Evaluation lead agency:	State
Evaluation date:	06/07/1996
Evaluation:	FINANCIAL RECORD REVIEW
Area of violation:	Not reported
Date achieved compliance:	Not reported
Evaluation lead agency:	State
Evaluation date:	08/03/1995
Evaluation:	FINANCIAL RECORD REVIEW
Area of violation:	Not reported
Date achieved compliance:	Not reported
Evaluation lead agency:	State
Evaluation date:	11/09/1994
Evaluation:	FINANCIAL RECORD REVIEW
Area of violation:	Not reported
Date achieved compliance:	Not reported
Evaluation lead agency:	State
Evaluation date:	09/22/1993
Evaluation:	COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation:	Not reported
Date achieved compliance:	Not reported
Evaluation lead agency:	State
Evaluation date:	04/06/1993
Evaluation:	FINANCIAL RECORD REVIEW
Area of violation:	Not reported
Date achieved compliance:	Not reported
Evaluation lead agency:	State
Evaluation date:	09/30/1992
Evaluation:	FOCUSED COMPLIANCE INSPECTION
Area of violation:	Not reported
Date achieved compliance:	Not reported
Evaluation lead agency:	State
Evaluation date:	07/17/1992
Evaluation:	FINANCIAL RECORD REVIEW
Area of violation:	Not reported
Date achieved compliance:	Not reported
Evaluation lead agency:	State
Evaluation date:	04/08/1992
Evaluation:	FINANCIAL RECORD REVIEW
Area of violation:	Not reported
Date achieved compliance:	Not reported

GENERAL DYNAMICS (Continued) **1000321223**

Evaluation lead agency: State

Evaluation date: 09/17/1991
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 04/12/1991
Evaluation: FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 08/23/1990
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: TSD - General
Date achieved compliance: 10/22/1990
Evaluation lead agency: State

Evaluation date: 08/23/1990
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: LDR - General
Date achieved compliance: 10/22/1990
Evaluation lead agency: State

Evaluation date: 06/26/1989
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: TSD - General
Date achieved compliance: 06/15/1990
Evaluation lead agency: State

Evaluation date: 05/25/1989
Evaluation: FINANCIAL RECORD REVIEW
Area of violation: TSD - Financial Requirements
Date achieved compliance: 06/05/1989
Evaluation lead agency: State

Evaluation date: 05/24/1989
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: EPA

Evaluation date: 05/12/1988
Evaluation: FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 11/16/1987
Evaluation: COMPLIANCE SCHEDULE EVALUATION
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 10/29/1987

GENERAL DYNAMICS (Continued) **1000321223**

Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: LDR - General
Date achieved compliance: 10/22/1990
Evaluation lead agency: EPA

Evaluation date: 07/07/1987
Evaluation: FINANCIAL RECORD REVIEW
Area of violation: TSD - Financial Requirements
Date achieved compliance: 04/01/1988
Evaluation lead agency: State

Evaluation date: 05/21/1987
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: TSD - General
Date achieved compliance: 12/11/1987
Evaluation lead agency: State

Evaluation date: 02/20/1987
Evaluation: FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 02/10/1986
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: TSD - General
Date achieved compliance: 04/08/1986
Evaluation lead agency: State

Evaluation date: 10/03/1984
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: TSD - General
Date achieved compliance: 03/08/1986
Evaluation lead agency: State

Evaluation date: 10/03/1984
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: TSD - General
Date achieved compliance: 11/03/1984
Evaluation lead agency: EPA-Initiated Oversight/Observation/Training Actions

Evaluation date: 06/11/1984
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: TSD - General
Date achieved compliance: 06/22/1984
Evaluation lead agency: EPA

Evaluation date: 03/12/1984
Evaluation: FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: EPA

US ENG CONTROLS:
EPA ID: NED043534635
Site ID: Not reported
Name: GENERAL DYNAMICS - OTS, INC.
Address: 4300 INDUSTRIAL AVENUE

GENERAL DYNAMICS (Continued) **1000321223**

LINCOLN, NE 68504
EPA Region: 07
County: LANCASTER
Event Code: CA770GW
Actual Date: 06/30/1998

Action ID: Not reported
Action Name: Not reported
Action Completion date: 01/01/1900
Operable Unit: Not reported
Contaminated Media : Not reported
Engineering Control: Not reported

FINDS:

Registry ID: 110059296159

Environmental Interest/Information System
OSHA ESTABLISHMENT

Registry ID: 110057888013

Environmental Interest/Information System
OSHA ESTABLISHMENT

AIRS (AFS):

Compliance and Violation Data Major Sources:
EPA plant ID: 110000615488
Plant name: GENERAL DYNAMICS
Plant address: 4300 INDUSTRIAL AVE
LINCOLN, NE 68504
County: LANCASTER
Region code: 07
Dunn & Bradst #: 050447812
Air quality cntrl region: 145
Sic code: 3728
Sic code desc: AIRCRAFT PARTS AND EQUIPMENT, NEC
North Am. industrial classf: 336415
NAIC code description: Guided Missile and Space Vehicle Propulsion Unit and Propulsion Unit Parts Manufacturing
Default compliance status: IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS
Default classification: POTENTIAL EMISSIONS ARE BELOW ALL APPLICABLE MAJOR SOURCE THRESHOLDS IF AND ONLY IF THE SOURCE COMPLIES WITH FEDERALLY ENFORCEABLE REGULATIONS OR LIMITATIONS.
Govt facility: ALL OTHER FACILITIES NOT OWNED OR OPERATED BY A FEDERAL, STATE, OR LOCAL GOVERNMENT
Current HPV: Not reported

2020 COR ACTION:
EPA ID: NED043534635
Region: 7

GENERAL DYNAMICS (Continued) **1000321223**

Action: Remedy Constructed

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1 **GENERAL DYNAMICS-OTS INC**
4300 INDUSTRIAL AVE
LINCOLN, NE 68504

NE LAST **S105241207**
NE SPILLS **N/A**
NE INST CONTROL
NE NPDES
NE AIRS
NE TIER 2

LAST:

File Number: 06079-BHI-1200
Owner/RP: BRUNSWICK
Facility Status: No Further Action
Incident Type: ABV GRND TNK
Line Num: 178
SFM Num: Not reported

NE SPILL:

File Number: 020593-DT-1555
Owner Name: BRUNSWICK
Facility Status: NFA
Incident Type: FIXED FACILITY
Line Num: 173
SFM Num: Not reported

File Number: 06079-BHI-1200
Owner Name: BRUNSWICK
Facility Status: NFA
Incident Type: ABV GRND TNK
Line Num: 178
SFM Num: Not reported

File Number: 110591-ML-1111
Owner Name: BRUNSWICK
Facility Status: NFA
Incident Type: FIXED FACILITY
Line Num: 180
SFM Num: Not reported

File Number: 030193-SM-1300
Owner Name: BRUNSWICK CORP
Facility Status: NFA
Incident Type: FIXED FACILITY
Line Num: 181
SFM Num: Not reported

File Number: 101592-EL-1445
Owner Name: BRUNSWICK CORPORAT
Facility Status: NFA
Incident Type: FIXED FACILITY
Line Num: 184
SFM Num: 4454

File Number: 020492-KM-1610
Owner Name: BRUNSWICK INC
Facility Status: NFA
Incident Type: FIXED FACILITY

GENERAL DYNAMICS-OTS INC (Continued) **S105241207**

Line Num: 186
SFM Num: Not reported

NE INSTUTIONAL CONTROL:

Lat/Long:	40.85527778 -96.67916667
Category:	Proprietary
Type:	Restrictive Covenant - UECA
Media:	GroundWater-YES, Soil-YES
Compliance Reporting:	Annual reporting by then-current simple fee owner
Geographic Area:	A tract of land in the North One-Half (N1/2) of the Northwest Quarter (NW1/4) of Section Seven (7), Township Ten (10) North, Range Seven (7) East of the 6th P.M., Lancaster County, Nebraska, more particularly described as beginning at a point forty (40) feet south from and seven hundred three (703) feet east of the Northwest Corner of said Section Seven (7) as the place of beginning, thence southerly seven hundred three (703) feet east from and parallel to the west line of said Northwest Quarter (NW1/4) a distance of five hundred and one-tenth feet (500.1), thence easterly on a line five hundred forty and one-tenth (540.1) feet southerly from and parallel to the North line of said Northwest Quarter (NW1/4) a distance of one thousand three hundred sixty and one tenth (1360.1) feet to intersect the westerly Chicago & Northwestern Railroad right-of-way line, thence in a northeasterly direction along said Chicago & Northwestern Railroad right-of-way line a distance of five hundred twelve and one tenth (512.1) feet to a point forty (40) feet Southerly from the north line of said Northwest Quarter (NW1/4), thence westerly on a line forty (40) feet southerly from and parallel to the north line of said Northwest Quarter (NW1/4) a distance of one thousand four hundred sixty-six and three tenths (1466.3) feet to the place of beginning, containing 16.22 acres. Also known as Lot 154 and Lot 155 of irregular tracts in the North One-Half of the Northwest Quarter of said Section 7. Description of Additional Land: Lot 22, Lincoln Industrial Addition, in the NW1/4 Section 7, Township 10 North Range 7 East, 6th P.M., Lincoln, Lancaster County, Nebraska. Described as follows: Beginning at the SW Corner Lot 94 I.T., NW1/4 said Section 7; thence easterly along south line said Lot 94 on an assumed bearing of N 89 -11 East, a distance of 1360.1 feet to a point on the west right-of-way line of the Chicago, North Western Railroad Track, 50 feet from the centerline said track, measured normally to same; thence S 11 -54 W, along said righ
Text:	a. The Property shall only be used for industrial or commercial purposes; provided, however, the Property specifically shall not be used for childcare, preschool, dormitory or nursing home facilities. b. Potable water supply wells are prohibited on any part of the property c.Except as allowed by this paragraph, no groundwater supply wells may be installed on the Property in or through the upper aquifer because there is a plume of contaminants in groundwater under the Property. Extraction and monitoring wells may be installed as part of the environmental response project, as approved by the Agency. A non-potable water supply well may be installed if it can be shown to the Agencys satisfaction that (i) the water supply well can be installed on the Property without impacting the contaminant plume in the upper aquifer, (ii) such water supply well will be constructed in a manner that will prevent human exposure to the plume contaminants, and (iii) the installation of such well is in accordance with local ordinances and state regulations. d.Areas of the Property where contamination may be encountered in soils, based

GENERAL DYNAMICS-OTS INC (Continued) **S105241207**

on historical results and as depicted on the cross-hatched area depicted on Figure 1, shall not be disturbed without compliance with OSHA and RCRA requirements and 30-day prior written notice to the Agency, except in the case of emergency utility repair activities or other subsurface work necessary for human health and safety. In these cases, Agency shall be notified within 10 working days after initiation of emergency work at the Property. e.To prevent or minimize exposure to soil gas vapors, any building or structure planned for human occupancy and that will be constructed in the future on the Property shall be constructed to include a vapor mitigation system. The vapor mitigation system shall generally conform to vapor mitigation systems described in The Vapor Intrusion Pathway: A Practical Guideline, dated January 2007 and prepared by the Interstate Technology & Regulatory Council. The Agency, upon request, shall be provided with a copy of the construction plans for the as-built vapor mitigation system. f.Vapor mitigation system in buildings constructed in the future on the Property shall be maintained so that they system continues to meet the intended function to protect human health from soil gas vapors. g.Removal/demolition of any existing building shall include appropriate protection for workers to account for potential unacceptable exposure to contamination in soil or groundwater as described in 4.d above. The foundation or other cover above the crosshatched area depicted in Figure 1 shall remain in place and shall not be disturbed without EPA approval, except in the case of emergency utility repair activities or other subsurface work necessary for human helath and safety. In these cases, the Agency shall be notified within 10 working days after initiation of emergency work on the foundation or other cover above the crosshatched area depicted in Figure 1, and the foundation or other cover above the crosshatched area depicted in Figure 1 shall be repaired. h.If it can be shown that he environmental contamination is no longer a threat and/or unacceptable exposures are eliminated to the Agencys satisfaction, the use restrictions and other obligations imposed by Section 4 may be rescinded upon written approval from the Agency.

Restrictions: Limit Ground Water Use Activities; Prohibit Potable Water Well Installation/ Construction; Limit Future Land Use; Prohibit Soil Disturbance or Excavation without Approval; Ensure Future Structures have Vapor Mitigation Systems that are Properly Maintained

NE NPDES:
- Facility ID: 31266
- Directions to Facility: SE Cnr Superior & Industrial, E of N 27 St
- Program Acronym: PCS

NE AIRS:
- Facility ID: 31266
- Directions to Facility: SE Cnr Superior & Industrial, E of N 27 St

TIER 2:
- Year: 2013
- Facility ID: 31266
- Location: SE Cnr Superior & Industrial, E of N 27 St
- SR No: 1082

GENERAL DYNAMICS-OTS INC (Continued) **S105241207**

Chemical:
Year: 2013
SR No: 1082
Case Number: 67-64-1
EHS: Not reported
Storage Location: Acetone Still, northeast part of property, Production Area
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 3251
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): Acetone
Year: 2013
SR No: 1082
Case Number: 7440-44-0
EHS: Not reported
Storage Location: storage ranks in production, stockrm @ resin room
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4706
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): CARBON ROVING
Year: 2013
SR No: 1082
Case Number: 74223-64-6
EHS: Not reported
Storage Location: MAIN PLNT STCKRM,RESIN RM& PROD AREA
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4515
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): FIBERGLASS ROVING
Year: 2013
SR No: 1082
Case Number: 7727-37-9
EHS: Not reported
Storage Location: bulk liquid storage northeast corner of building
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 2102
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): NITROGEN
Year: 2013
SR No: 1082
Case Number: 74-98-6
EHS: Not reported
Storage Location: propane storage tanks and stockroom
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4251
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): PROPANE
Year: 2013
SR No: 1082
Case Number: 14808-60-7
EHS: Not reported
Storage Location: sand storage area and sand washout area
Max. Amount: Not reported

GENERAL DYNAMICS-OTS INC (Continued) **S105241207**

Average Amount: Not reported
Chemical ID: 4642
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): SILICON DIOXIDE
Year: 2013
SR No: 1082
Case Number: 7664-93-9
EHS: Y
Storage Location: Process room, stockroom in tool storage
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4302
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): SULFURIC ACID

Year: 2012
Facility ID: 31266
Location: SE Cnr Superior & Industrial, E of N 27 St
SR No: 1048

Chemical:
Year: 2012
SR No: 1048
Case Number: 67-64-1
EHS: Not reported
Storage Location: Acetone Still, northeast part of property, Production Area
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 3251
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): Acetone
Year: 2012
SR No: 1048
Case Number: 7440-44-0
EHS: Not reported
Storage Location: storage ranks in production, stockrm @ resin room
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4706
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): CARBON ROVING
Year: 2012
SR No: 1048
Case Number: 74223-64-6
EHS: Not reported
Storage Location: MAIN PLNT STCKRM,RESIN RM& PROD AREA
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4515
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): FIBERGLASS ROVING
Year: 2012
SR No: 1048
Case Number: 7727-37-9
EHS: Not reported
Storage Location: bulk liquid storage northeast corner of building
Max. Amount: Not reported
Average Amount: Not reported

GENERAL DYNAMICS-OTS INC (Continued) **S105241207**

Chemical ID: 2102
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): NITROGEN
Year: 2012
SR No: 1048
Case Number: 74-98-6
EHS: Not reported
Storage Location: propane storage tanks and stockroom
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4251
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): PROPANE
Year: 2012
SR No: 1048
Case Number: 14808-60-7
EHS: Not reported
Storage Location: sand storage area and sand washout area
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4642
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): SILICON DIOXIDE
Year: 2012
SR No: 1048
Case Number: 7664-93-9
EHS: Y
Storage Location: Process room, stockroom in tool storage
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4302
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): SULFURIC ACID

Year: 2011
Facility ID: 31266
Location: SE Cnr Superior & Industrial, E of N 27 St
SR No: 1029

Chemical:
Year: 2011
SR No: 1029
Case Number: 67-64-1
EHS: Not reported
Storage Location: Acetone Still, northeast part of property, Production Area
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 3251
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): Acetone
Year: 2011
SR No: 1029
Case Number: 7440-44-0
EHS: Not reported
Storage Location: storage ranks in production, stockrm @ resin room
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4706

GENERAL DYNAMICS-OTS INC (Continued) **S105241207**

Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): CARBON ROVING
Year: 2011
SR No: 1029
Case Number: 74223-64-6
EHS: Not reported
Storage Location: MAIN PLNT STCKRM,RESIN RM& PROD AREA
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4515
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): FIBERGLASS ROVING
Year: 2011
SR No: 1029
Case Number: 7727-37-9
EHS: Not reported
Storage Location: bulk liquid storage northeast corner of building
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 2102
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): NITROGEN
Year: 2011
SR No: 1029
Case Number: 74-98-6
EHS: Not reported
Storage Location: propane storage tanks and stockroom
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4251
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): PROPANE
Year: 2011
SR No: 1029
Case Number: 14808-60-7
EHS: Not reported
Storage Location: sand storage area and sand washout area
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4642
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): SILICON DIOXIDE
Year: 2011
SR No: 1029
Case Number: 7664-93-9
EHS: Y
Storage Location: Process room, stockroom in tool storage
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4302
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): SULFURIC ACID

Year: 2010
Facility ID: 31266
Location: SE Cnr Superior & Industrial, E of N 27 St
SR No: 1071

GENERAL DYNAMICS-OTS INC (Continued) S105241207

Chemical:
Year: 2010
SR No: 1071
Case Number: 7440-44-0
EHS: Not reported
Storage Location: storage ranks in production, stockrm @ resin room
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4706
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): CARBON ROVING
Year: 2010
SR No: 1071
Case Number: 74223-64-6
EHS: Not reported
Storage Location: MAIN PLNT STCKRM,RESIN RM& PROD AREA
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4515
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): FIBERGLASS ROVING
Year: 2010
SR No: 1071
Case Number: 7727-37-9
EHS: Not reported
Storage Location: bulk liquid storage northeast corner of building
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 2102
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): NITROGEN
Year: 2010
SR No: 1071
Case Number: 74-98-6
EHS: Not reported
Storage Location: propane storage tanks and stockroom
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4251
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): PROPANE
Year: 2010
SR No: 1071
Case Number: 14808-60-7
EHS: Not reported
Storage Location: sand storage area and sand washout area
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4642
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): SILICON DIOXIDE
Year: 2010
SR No: 1071
Case Number: 7664-93-9
EHS: Y
Storage Location: Process room, stockroom in tool storage
Max. Amount: Not reported

GENERAL DYNAMICS-OTS INC (Continued) S105241207

Average Amount: Not reported
Chemical ID: 4302
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): SULFURIC ACID

Year: 2009
Facility ID: 31266
Location: SE Cnr Superior & Industrial, E of N 27 St
SR No: 1112

Chemical:
Year: 2009
SR No: 1112
Case Number: 7440-44-0
EHS: Not reported
Storage Location: storage ranks in production, stockrm @ resin room
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4706
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): CARBON ROVING
Year: 2009
SR No: 1112
Case Number: 65997-17-3
EHS: Not reported
Storage Location: MAIN PLNT STCKRM,RESIN RM& PROD AREA
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4515
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): FIBERGLASS ROVING
Year: 2009
SR No: 1112
Case Number: 7647-1-0
EHS: Not reported
Storage Location: process room & stockroom in tool storage
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 3869
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): hydrochloric acid
Year: 2009
SR No: 1112
Case Number: 7727-37-9
EHS: Not reported
Storage Location: bulk liquid storage northeast corner of building
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 2102
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): NITROGEN
Year: 2009
SR No: 1112
Case Number: 74-98-6
EHS: Not reported
Storage Location: propane storage tanks and stockroom
Max. Amount: Not reported
Average Amount: Not reported

GENERAL DYNAMICS-OTS INC (Continued) **S105241207**

Chemical ID: 4251
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): PROPANE
Year: 2009
SR No: 1112
Case Number: 14808-60-7
EHS: Not reported
Storage Location: sand storage area and sand washout area
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4642
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): SILICON DIOXIDE
Year: 2009
SR No: 1112
Case Number: 7664-93-9
EHS: Y
Storage Location: Process room, stockroom in tool storage
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4302
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): SULFURIC ACID

Year: 2008
Facility ID: 31266
Location: SE Cnr Superior & Industrial, E of N 27 St
SR No: 1051

Chemical:
Year: 2008
SR No: 1051
Case Number: 7440-44-0
EHS: Not reported
Storage Location: MAIN PLANT STOCKROOM; RESIN ROOM; PRODUCTION AREA
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4706
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): CARBON ROVING
Year: 2008
SR No: 1051
Case Number: Not reported
EHS: Not reported
Storage Location: MAIN PLANT STOCKROOM;RESIN ROOM; PRODUCTION AREA
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4593
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): FIBERGLASS ROVING
Year: 2008
SR No: 1051
Case Number: 7727-37-9
EHS: Not reported
Storage Location: CYLINDER STORAGE AREA AT MAIN PLANT
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 2102

GENERAL DYNAMICS-OTS INC (Continued) S105241207

Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): NITROGEN
Year: 2008
SR No: 1051
Case Number: 74-98-6
EHS: Not reported
Storage Location: CYLINDER STORAGE AREA
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4251
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): PROPANE
Year: 2008
SR No: 1051
Case Number: 14808-60-7
EHS: Not reported
Storage Location: MAIN PLANT SAND STORAGE AREA
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4642
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): SILICON DIOXIDE

Year: 2007
Facility ID: 31266
Location: SE Cnr Superior & Industrial, E of N 27 St
SR No: 1091

Chemical:
Year: 2007
SR No: 1091
Case Number: 7440-44-0
EHS: Not reported
Storage Location: MAIN PLANT STOCKROOM; RESIN ROOM; PRODUCTION AREA
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4706
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): CARBON ROVING
Year: 2007
SR No: 1091
Case Number: Not reported
EHS: Not reported
Storage Location: MAIN PLANT STOCKROOM;RESIN ROOM; PRODUCTION AREA
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4593
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): FIBERGLASS ROVING
Year: 2007
SR No: 1091
Case Number: 7727-37-9
EHS: Not reported
Storage Location: CYLINDER STORAGE AREA AT MAIN PLANT
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 2102
Chemical Reporting Name(Active Ingredient): Not reported

GENERAL DYNAMICS-OTS INC (Continued) **S105241207**

Chemical Reporting Name(Trade Name): NITROGEN
Year: 2007
SR No: 1091
Case Number: 74-98-6
EHS: Not reported
Storage Location: CYLINDER STORAGE AREA
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4251
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): PROPANE
Year: 2007
SR No: 1091
Case Number: 14808-60-7
EHS: Not reported
Storage Location: MAIN PLANT SAND STORAGE AREA
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4642
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): SILICON DIOXIDE

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2 **27TH & DAN COMMERCIAL CENTER** **NE LUST** **1005880536**
2700 DAN AVE **NE NPDES** **N/A**
LINCOLN, NE 68504

LUST:

Facility Status: No Further Action
Incident Type: LUST
File Number: 121792-CT-1350
Owner/RP: PRE CAST STEP
Line Num: 530
SFM Num: 1691

Facility Status: No Further Action
Incident Type: LUST
File Number: 08206-BHI-1000
Owner/RP: PRE-CAST STEP CO
Line Num: 531
SFM Num: 1691

NE NPDES:

Facility ID: 29385
Directions to Facility: NE cnr Dan Ave & N 27th St
Program Acronym: PCS

3 **SANFORD & SON LLC**
3900 INDUSTRIAL AVE
LINCOLN, NE 68504

NE SHWS **NE LAST** **NE SPILLS** **NE NPDES** **NE AIRS**

S105529115
N/A

SHWS:
DEQ ID: 30608
Program Acronym: SF
Directions to Facility: From 27th&Superior,Superior-E,Industrial-S to End

LAST:
File Number: 061102-GW-0817
Owner/RP: NORTHWESTERN METAL
Facility Status: Voluntary Remedial Action program
Incident Type: ABV GRND TNK
Line Num: 560
SFM Num: 1277

NE SPILL:
File Number: 061102-GW-0817
Owner Name: NORTHWESTERN METAL
Facility Status: VOL REM AC
Incident Type: ABV GRND TNK
Line Num: 560
SFM Num: 1277

NE NPDES:
Facility ID: 30608
Directions to Facility: From 27th&Superior,Superior-E,Industrial-S to End
Program Acronym: PCS

NE AIRS:
Facility ID: 30608
Directions to Facility:From 27th&Superior,Superior-E,Industrial-S to End

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3 **NORTHWEST METAL CO (FORMER)**
3900 INDUSTRIAL AVE
LINCOLN, NE 68504

NE UST

U004058078
N/A

UST:

Facility:
Facility ID: 1277
Owner Name: SANFORD & SON LLC
Owner Address: 6101 VILLAGE DRIVE SUITE 101
Owner City,St,Zip: LINCOLN, NE 68516
Tanks Currently In Use: 0
Tanks Temp Out Of Use: 0
Tanks Perm Out Of Use: 0
Tanks Closed In Place: 0
Tanks Removed: 1

Owner: SANFORD & SON LLC
Owner Address: 6101 VILLAGE DRIVE SUITE 101
Owner City,St,Zip: LINCOLN, NE 68516
Owner Phone: Not reported
Tank Id/Tank Status: 1 / Not Reported

NORTHWEST METAL CO (FORMER) (Continued) **U004058078**

Tank Contents: Not reported
Tank Size: Not reported
Tank Date Installed: Not reported
Tank Type: Not reported
Tank Construction: Not reported
Tank Internal Protection: Not reported
Tank External Protection: Not reported
Tank Secondary Containment: Not reported
Piping Construction Material: Not reported

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4 **SNYDER INDUSTRIES, INC.**
4700 FREMONT STREET
LINCOLN, NE 68504

CORRACTS **1000187896**
RCRA-SQG **NED007266992**
NE LUST
NE UST
NE HIST UST
NE NPDES
NE AIRS

CORRACTS:

EPA ID: NED007266992
EPA Region: 07
Area Name: ENTIRE FACILITY
Actual Date: 19920128
Action: CA075LO - CA Prioritization, Facility or area was assigned a low corrective action priority
NAICS Code(s): Not reported
Original schedule date: Not reported
Schedule end date: Not reported

RCRA-SQG:
Date form received by agency: 03/31/2000
Facility name: SNYDER INDUSTRIES, INC.
Facility address: 4700 FREMONT STREET
LINCOLN, NE 68504
EPA ID: NED007266992
Mailing address: P. O. BOX 4583
LINCOLN, NE 68504
Contact: STEPHEN M. HANSEN
Contact address: P. O. BOX 4583
LINCOLN, NE 68504
Contact country: US
Contact telephone: (402) 467-5221
Contact email: Not reported
EPA Region: 07
Land type: Private
Classification: Small Small Quantity Generator
Description: Handler: generates more than 100 and less than 1000 kg of hazardous waste during any calendar month and accumulates less than 6000 kg of hazardous waste at any time; or generates 100 kg or less of hazardous waste during any calendar month, and accumulates more than 1000 kg of hazardous waste at any time

Owner/Operator Summary:
Owner/operator name: SNYDER INDUSTRIES, INC.
Owner/operator address: 4700 FREMONT STREET

SNYDER INDUSTRIES, INC. (Continued) **1000187896**

	LINCOLN, NE 68504
Owner/operator country:	Not reported
Owner/operator telephone:	(402) 467-5221
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	Not reported
Owner/Op end date:	Not reported

Handler Activities Summary:

U.S. importer of hazardous waste:	No
Mixed waste (haz. and radioactive):	No
Recycler of hazardous waste:	No
Transporter of hazardous waste:	No
Treater, storer or disposer of HW:	No
Underground injection activity:	No
On-site burner exemption:	No
Furnace exemption:	No
Used oil fuel burner:	No
Used oil processor:	No
User oil refiner:	No
Used oil fuel marketer to burner:	No
Used oil Specification marketer:	No
Used oil transfer facility:	No
Used oil transporter:	No

Historical Generators:

Date form received by agency:	01/01/1986
Site name:	SNYDER INDUSTRIES, INC.
Classification:	Small Quantity Generator

Hazardous Waste Summary:

Waste code:	F003
Waste name:	THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Corrective Action Summary:

Event date:	01/28/1992
Event:	CA Prioritization, Facility or area was assigned a low corrective action priority.

Facility Has Received Notices of Violations:

Regulation violated:	Not reported
Area of violation:	TSD - General
Date violation determined:	10/24/1990
Date achieved compliance:	08/06/1990
Violation lead agency:	State
Enforcement action:	WRITTEN INFORMAL

SNYDER INDUSTRIES, INC. (Continued) **1000187896**

Enforcement action date:	11/07/1990
Enf. disposition status:	Not reported
Enf. disp. status date:	Not reported
Enforcement lead agency:	State
Proposed penalty amount:	Not reported
Final penalty amount:	Not reported
Paid penalty amount:	Not reported

Regulation violated:	Not reported
Area of violation:	TSD - General
Date violation determined:	10/24/1990
Date achieved compliance:	08/06/1990
Violation lead agency:	State
Enforcement action:	Not reported
Enforcement action date:	Not reported
Enf. disposition status:	Not reported
Enf. disp. status date:	Not reported
Enforcement lead agency:	Not reported
Proposed penalty amount:	Not reported
Final penalty amount:	Not reported
Paid penalty amount:	Not reported

Regulation violated:	Not reported
Area of violation:	TSD - Financial Requirements
Date violation determined:	11/01/1989
Date achieved compliance:	08/06/1990
Violation lead agency:	State
Enforcement action:	Not reported
Enforcement action date:	Not reported
Enf. disposition status:	Not reported
Enf. disp. status date:	Not reported
Enforcement lead agency:	Not reported
Proposed penalty amount:	Not reported
Final penalty amount:	Not reported
Paid penalty amount:	Not reported

Regulation violated:	Not reported
Area of violation:	TSD - Financial Requirements
Date violation determined:	11/01/1989
Date achieved compliance:	08/06/1990
Violation lead agency:	State
Enforcement action:	WRITTEN INFORMAL
Enforcement action date:	09/06/1990
Enf. disposition status:	Not reported
Enf. disp. status date:	Not reported
Enforcement lead agency:	State
Proposed penalty amount:	Not reported
Final penalty amount:	Not reported
Paid penalty amount:	Not reported

Regulation violated:	Not reported
Area of violation:	TSD - General
Date violation determined:	08/18/1989
Date achieved compliance:	07/25/1990
Violation lead agency:	State
Enforcement action:	FINAL CIVIL JUDICIAL ACTION FOR IMMINENT AND SUBSTANTIAL ENDANGERMENT
Enforcement action date:	07/25/1990

SNYDER INDUSTRIES, INC. (Continued) **1000187896**

Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: 15000
Final penalty amount: 15000
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: TSD - Closure/Post-Closure
Date violation determined: 08/18/1989
Date achieved compliance: 07/25/1990
Violation lead agency: State
Enforcement action: Not reported
Enforcement action date: Not reported
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: Not reported
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: TSD - General
Date violation determined: 08/18/1989
Date achieved compliance: 07/20/1990
Violation lead agency: State
Enforcement action: Not reported
Enforcement action date: Not reported
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: Not reported
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: TSD - Closure/Post-Closure
Date violation determined: 08/18/1989
Date achieved compliance: 07/25/1990
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 11/01/1989
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: TSD - Financial Requirements
Date violation determined: 08/18/1989
Date achieved compliance: 07/25/1990
Violation lead agency: State
Enforcement action: Not reported
Enforcement action date: Not reported
Enf. disposition status: Not reported

SNYDER INDUSTRIES, INC. (Continued) **1000187896**

Enf. disp. status date: Not reported
Enforcement lead agency: Not reported
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: TSD - General
Date violation determined: 08/18/1989
Date achieved compliance: 07/25/1990
Violation lead agency: State
Enforcement action: Not reported
Enforcement action date: Not reported
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: Not reported
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: TSD - General
Date violation determined: 08/18/1989
Date achieved compliance: 07/20/1990
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 11/01/1989
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: TSD - Financial Requirements
Date violation determined: 08/18/1989
Date achieved compliance: 07/25/1990
Violation lead agency: State
Enforcement action: FINAL CIVIL JUDICIAL ACTION FOR IMMINENT AND SUBSTANTIAL ENDANGERMENT
Enforcement action date: 07/25/1990
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: 15000
Final penalty amount: 15000
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: TSD - General
Date violation determined: 08/18/1989
Date achieved compliance: 07/25/1990
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 11/01/1989
Enf. disposition status: Not reported
Enf. disp. status date: Not reported

SNYDER INDUSTRIES, INC. (Continued) **1000187896**

Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: TSD - Closure/Post-Closure
Date violation determined: 08/18/1989
Date achieved compliance: 07/25/1990
Violation lead agency: State
Enforcement action: FINAL CIVIL JUDICIAL ACTION FOR IMMINENT AND SUBSTANTIAL ENDANGERMENT
Enforcement action date: 07/25/1990
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: 15000
Final penalty amount: 15000
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: TSD - Financial Requirements
Date violation determined: 08/18/1989
Date achieved compliance: 07/25/1990
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 11/01/1989
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Evaluation Action Summary:
Evaluation date: 04/28/1994
Evaluation: FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 03/26/1993
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 10/24/1990
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: TSD - General
Date achieved compliance: 08/06/1990
Evaluation lead agency: State

Evaluation date: 10/24/1990
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: EPA-Initiated Oversight/Observation/Training Actions

SNYDER INDUSTRIES, INC. (Continued) **1000187896**

Evaluation date:	09/06/1990
Evaluation:	FINANCIAL RECORD REVIEW
Area of violation:	TSD - Financial Requirements
Date achieved compliance:	08/06/1990
Evaluation lead agency:	State
Evaluation date:	08/18/1989
Evaluation:	COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation:	TSD - General
Date achieved compliance:	08/06/1990
Evaluation lead agency:	State
Evaluation date:	08/18/1989
Evaluation:	COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation:	TSD - Financial Requirements
Date achieved compliance:	08/06/1990
Evaluation lead agency:	State
Evaluation date:	08/18/1989
Evaluation:	COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation:	TSD - General
Date achieved compliance:	07/25/1990
Evaluation lead agency:	State
Evaluation date:	08/18/1989
Evaluation:	COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation:	TSD - Closure/Post-Closure
Date achieved compliance:	07/25/1990
Evaluation lead agency:	State
Evaluation date:	08/18/1989
Evaluation:	COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation:	TSD - General
Date achieved compliance:	07/20/1990
Evaluation lead agency:	State
Evaluation date:	08/18/1989
Evaluation:	COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation:	TSD - Financial Requirements
Date achieved compliance:	07/25/1990
Evaluation lead agency:	State

LUST:

Facility Status:	**No Further Action**
Incident Type:	LUST
File Number:	AP2827
Owner/RP:	SNYDER INDUSTRIES
Line Num:	175
SFM Num:	2827
Facility Status:	**No Further Action**
Incident Type:	LUST
File Number:	02050-DDB-1500
Owner/RP:	SNYDER INDUSTRIES
Line Num:	586
SFM Num:	2827

SNYDER INDUSTRIES, INC. (Continued) **1000187896**

UST:

Facility:
Facility ID: 2827
Owner Name: SNYDER INDUSTRIES INC
Owner Address: PO BOX 4583
Owner City,St,Zip: LINCOLN, NE 68504
Tanks Currently In Use: 0
Tanks Temp Out Of Use: 0
Tanks Perm Out Of Use: 0
Tanks Closed In Place: 0
Tanks Removed: 1

Owner: SNYDER INDUSTRIES INC
Owner Address: PO BOX 4583
Owner City,St,Zip: LINCOLN, NE 68504
Owner Phone: Not reported
Tank Id/Tank Status: 1 / Not Reported
Tank Contents: Not reported
Tank Size: Not reported
Tank Date Installed: Not reported
Tank Type: Not reported
Tank Construction: Not reported
Tank Internal Protection: Not reported
Tank External Protection: Not reported
Tank Secondary Containment: Not reported
Piping Construction Material: Not reported

HIST UST:
Facility ID: 2827
Owner: SNYDER INDUSTRIES INC
Owner Address: PO BOX 4583
Owner City,St,Zip: LINCOLN, NE 685040000
Tank Number: 1
Tank Usage Status: Currently in Use
Tank Size (Gal): 1000
Tank Construction Material: Steel
Tank Content(s): Gasoline
Tank Installed: 1990
Piping Construction Material(s): Not reported

NE NPDES:
Facility ID: 28870
Directions to Facility: W End Fremont,W Sd 48,S of Cornhusker,S Sd Bike Tr
Program Acronym: PCS

NE AIRS:
Facility ID: 28870
Directions to Facility: W End Fremont,W Sd 48,S of Cornhusker,S Sd Bike Tr

5 **LINCOLN ELECTRIC S** **NE LUST** **S103219660**
27 & FAIRFIELD SVC **N/A**
LINCOLN, NE

LUST:

Facility Status: **No Further Action**
Incident Type: LUST
File Number: 03155-TSK-1215
Owner/RP: LINCOLN ELECTRIC S
Line Num: 347
SFM Num: 2583

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6 **CAPITOL SIGN** **NE LUST** **1004331912**
3421 N 35TH ST **N/A**
LINCOLN, NE

LUST:

Facility Status: **No Further Action**
Incident Type: LUST
File Number: AP11261
Owner/RP: T & M CONSTRUCTION
Line Num: 28
SFM Num: 11261

Facility Status: **No Further Action**
Incident Type: LUST
File Number: 072496-99-0001
Owner/RP: T & M CONSTRUCTION
Line Num: 598
SFM Num: 11261

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6 **MUDLOCK SAND & GRA** **NE LUST** **S102616398**
3441 NORTH 35TH **N/A**
LINCOLN, NE

LUST:

Facility Status: **No Further Action**
Incident Type: LUST
File Number: 072497-99-0007
Owner/RP: MUDLOCK SAND & GRA
Line Num: 435
SFM Num: 11295

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6 **JIM OLSTON IMP. AU** **NE LUST** **S100348832**
3450 N. 35TH CIRCL **N/A**
LINCOLN, NE

LUST:

Facility Status: **No Further Action**
Incident Type: LUST
File Number: 120892-99-0000
Owner/RP: JIM OLSTON'S IMPOR
Line Num: 279
SFM Num: 7100

7 CATHER & SONS CONSTRUCTION CO INC — **NE UST** — **U004054798**
3400 N 27TH ST — **N/A**
LINCOLN, NE 68521

UST:

Facility:

Facility ID:	3162
Owner Name:	CATHER & SONS CONST CO INC
Owner Address:	PO BOX 29199
Owner City,St,Zip:	LINCOLN, NE 68529
Tanks Currently In Use:	0
Tanks Temp Out Of Use:	0
Tanks Perm Out Of Use:	0
Tanks Closed In Place:	0
Tanks Removed:	4

Owner:	CATHER & SONS CONST CO INC
Owner Address:	PO BOX 29199
Owner City,St,Zip:	LINCOLN, NE 68529
Owner Phone:	Not reported
Tank Id/Tank Status:	1 / Not Reported
Tank Contents:	Not reported
Tank Size:	Not reported
Tank Date Installed:	Not reported
Tank Type:	Not reported
Tank Construction:	Not reported
Tank Internal Protection:	Not reported
Tank External Protection:	Not reported
Tank Secondary Containment:	Not reported
Piping Construction Material:	Not reported

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7 28TH & CATHER SHOPPING CENTER — **NE LUST** — **S105689836**
3400 N 27TH ST — **NE NPDES** — **N/A**
LINCOLN, NE 68521

LUST:

Facility Status:	**No Further Action**
Incident Type:	LUST
File Number:	041195-CT-1105
Owner/RP:	CATHER & SONS CONS
Line Num:	110
SFM Num:	3162

NE NPDES:

Facility ID:	77973
Directions to Facility:	E Sd 27 at Cather Rd,Both Sds 29th,N of Cornhusker
Program Acronym:	PCS

Map ID
Direction
Distance
Distance (ft.)Site | Database(s) | EDR ID Number / EPA ID Number

7 | **EDR US Hist Auto Stat** | **1015438179**
3420 N 27TH ST | **N/A**
LINCOLN, NE 68521

EDR Historical Auto Stations:
Name: ACS QUALITY AUTO
Year: 2004
Address: 3420 N 27TH ST

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8 **MAPES PANELS LLC** | **NE NPDES** | **S107688554**
2929 CORNHUSKER HWY | **NE AIRS** | **N/A**
LINCOLN, NE 68504 | **NE TIER 2**

NE NPDES:
Facility ID: 58616
Directions to Facility: SE Cnr N 29th/State Fair Park Dr & Cornhusker Hwy
Program Acronym: PCS

NE AIRS:
Facility ID: 58616
Directions to Facility: SE Cnr N 29th/State Fair Park Dr & Cornhusker Hwy

TIER 2:
Year: 2013
Facility ID: 58616
Location: SE Cnr N 29th/State Fair Park Dr & Cornhusker Hwy
SR No: 1453

Chemical:
Year: 2013
SR No: 1453
Case Number: 67-64-1
EHS: Not reported
Storage Location: On site
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 3251
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): Acetone
Year: 2013
SR No: 1453
Case Number: 7664-93-9
EHS: Y
Storage Location: on site
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4302
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): Sulfuric Acid

8	**MAPES INDUSTRIES INC** **2929 CORNHUSKER HWY** **LINCOLN, NE 68504**	**RCRA-LQG** **FINDS** **US AIRS**	**1000221035** **NED007257363**

RCRA-LQG:

Date form received by agency: 02/28/2014
Facility name: MAPES PANELS LLC
Facility address: 2929 CORHUSKER HWY
LINCOLN, NE 68504
EPA ID: NED007257363
Mailing address: CORHUSKER HWY
LINCOLN, NE 68504
Contact: RICK B MORTON
Contact address: CORHUSKER HWY
LINCOLN, NE 68504
Contact country: Not reported
Contact telephone: (402) 466-1985
Contact email: RMORTON@MAPES.COM
EPA Region: 07
Land type: Private
Classification: Large Quantity Generator
Description: Handler: generates 1,000 kg or more of hazardous waste during any calendar month; or generates more than 1 kg of acutely hazardous waste during any calendar month; or generates more than 100 kg of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month; or generates 1 kg or less of acutely hazardous waste during any calendar month, and accumulates more than 1 kg of acutely hazardous waste at any time; or generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates more than 100 kg of that material at any time

Owner/Operator Summary:

Owner/operator name: WILLIAM CINTANI
Owner/operator address: PO BOX 80069
LINCOLN, NE 68501
Owner/operator country: US
Owner/operator telephone: Not reported
Legal status: Private
Owner/Operator Type: Owner
Owner/Op start date: 01/01/1988
Owner/Op end date: Not reported

Owner/operator name: RICK MORTON
Owner/operator address: Not reported
Not reported
Owner/operator country: US
Owner/operator telephone: Not reported
Legal status: Private
Owner/Operator Type: Operator
Owner/Op start date: 01/01/2003
Owner/Op end date: Not reported

Handler Activities Summary:

U.S. importer of hazardous waste: No
Mixed waste (haz. and radioactive): No

MAPES INDUSTRIES INC (Continued) **1000221035**

Recycler of hazardous waste: No
Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

Historical Generators:
Date form received by agency: 02/25/2014
Site name: MAPES PANELS LLC
Classification: Large Quantity Generator

Date form received by agency: 02/10/2012
Site name: MAPES PANELS LLC
Classification: Large Quantity Generator

Date form received by agency: 10/31/2011
Site name: MAPES PANELS LLC
Classification: Large Quantity Generator

Date form received by agency: 12/09/2010
Site name: MAPES PANELS LLC
Classification: Conditionally Exempt Small Quantity Generator

Date form received by agency: 10/25/2010
Site name: MAPES PANELS LLC
Classification: Conditionally Exempt Small Quantity Generator

Date form received by agency: 02/27/1996
Site name: MAPES INDUSTRIES
Classification: Small Quantity Generator

Hazardous Waste Summary:
Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Waste code: D002
Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE

MAPES INDUSTRIES INC (Continued) **1000221035**

DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

Waste code: D005
Waste name: BARIUM

Waste code: D006
Waste name: CADMIUM

Waste code: D007
Waste name: CHROMIUM

Waste code: D008
Waste name: LEAD

Waste code: F003
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Waste code: D002
Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

Waste code: D006
Waste name: CADMIUM

Waste code: D040
Waste name: TRICHLOROETHYLENE

Waste code: F002
Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2-TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE

MAPES INDUSTRIES INC (Continued) **1000221035**

OF THE ABOVE HALOGENATED SOLVENTS OR THOSE LISTED IN F001, F004, OR F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F003
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F005
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: D006
Waste name: CADMIUM

Waste code: D008
Waste name: LEAD

Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Waste code: D003
Waste name: A MATERIAL IS CONSIDERED TO BE A REACTIVE HAZARDOUS WASTE IF IT IS NORMALLY UNSTABLE, REACTS VIOLENTLY WITH WATER, GENERATES TOXIC GASES WHEN EXPOSED TO WATER OR CORROSIVE MATERIALS, OR IF IT IS CAPABLE OF DETONATION OR EXPLOSION WHEN EXPOSED TO HEAT OR A FLAME. ONE EXAMPLE OF SUCH WASTE WOULD BY WASTE GUNPOWDER.

Waste code: D040
Waste name: TRICHLOROETHYLENE

Waste code: F001
Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS USED IN DEGREASING: TETRACHLOROETHYLENE, TRICHLOROETHYLENE, METHYLENE CHLORIDE, 1,1,1-TRICHLOROETHANE, CARBON TETRACHLORIDE, AND CHLORINATED FLUOROCARBONS; ALL SPENT SOLVENT MIXTURES/BLENDS USED IN DEGREASING CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED

MAPES INDUSTRIES INC (Continued) **1000221035**

IN F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Waste code: D002
Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

Waste code: F003
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Waste code: D002
Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

Waste code: D005
Waste name: BARIUM

Waste code: D006
Waste name: CADMIUM

MAPES INDUSTRIES INC (Continued) **1000221035**

Waste code:	D007
Waste name:	CHROMIUM
Waste code:	D008
Waste name:	LEAD
Waste code:	F003
Waste name:	THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.
Waste code:	D001
Waste name:	IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.
Waste code:	D002
Waste name:	A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.
Waste code:	F003
Waste name:	THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Biennial Reports:

Last Biennial Reporting Year: 2013

Annual Waste Handled:

Waste code:	D005
Waste name:	BARIUM
Amount (Lbs):	11696

MAPES INDUSTRIES INC (Continued) **1000221035**

Facility Has Received Notices of Violations:

Regulation violated:	Not reported
Area of violation:	TSD IS-Contingency Plan and Emergency Procedures
Date violation determined:	12/03/2013
Date achieved compliance:	02/20/2014
Violation lead agency:	EPA
Enforcement action:	WRITTEN INFORMAL
Enforcement action date:	12/03/2013
Enf. disposition status:	Action Satisfied (Case Closed)
Enf. disp. status date:	03/19/2014
Enforcement lead agency:	EPA
Proposed penalty amount:	Not reported
Final penalty amount:	Not reported
Paid penalty amount:	Not reported

Regulation violated:	Not reported
Area of violation:	Generators - General
Date violation determined:	12/03/2013
Date achieved compliance:	02/20/2014
Violation lead agency:	EPA
Enforcement action:	WRITTEN INFORMAL
Enforcement action date:	12/03/2013
Enf. disposition status:	Action Satisfied (Case Closed)
Enf. disp. status date:	03/19/2014
Enforcement lead agency:	EPA
Proposed penalty amount:	Not reported
Final penalty amount:	Not reported
Paid penalty amount:	Not reported

Regulation violated:	Not reported
Area of violation:	TSD IS-Preparedness and Prevention
Date violation determined:	12/03/2013
Date achieved compliance:	02/20/2014
Violation lead agency:	EPA
Enforcement action:	WRITTEN INFORMAL
Enforcement action date:	01/24/2014
Enf. disposition status:	Action Satisfied (Case Closed)
Enf. disp. status date:	03/19/2014
Enforcement lead agency:	EPA
Proposed penalty amount:	Not reported
Final penalty amount:	Not reported
Paid penalty amount:	Not reported

Regulation violated:	Not reported
Area of violation:	TSD IS-Preparedness and Prevention
Date violation determined:	12/03/2013
Date achieved compliance:	12/20/2013
Violation lead agency:	EPA
Enforcement action:	WRITTEN INFORMAL
Enforcement action date:	12/03/2013
Enf. disposition status:	Action Satisfied (Case Closed)
Enf. disp. status date:	03/19/2014
Enforcement lead agency:	EPA
Proposed penalty amount:	Not reported
Final penalty amount:	Not reported
Paid penalty amount:	Not reported

MAPES INDUSTRIES INC (Continued) **1000221035**

Regulation violated: Not reported
Area of violation: TSD IS-General Facility Standards
Date violation determined: 12/03/2013
Date achieved compliance: 02/20/2014
Violation lead agency: EPA
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 12/03/2013
Enf. disposition status: Action Satisfied (Case Closed)
Enf. disp. status date: 03/19/2014
Enforcement lead agency: EPA
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: Generators - General
Date violation determined: 12/03/2013
Date achieved compliance: 02/20/2014
Violation lead agency: EPA
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 01/24/2014
Enf. disposition status: Action Satisfied (Case Closed)
Enf. disp. status date: 03/19/2014
Enforcement lead agency: EPA
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: TSD IS-Preparedness and Prevention
Date violation determined: 12/03/2013
Date achieved compliance: 12/20/2013
Violation lead agency: EPA
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 01/24/2014
Enf. disposition status: Action Satisfied (Case Closed)
Enf. disp. status date: 03/19/2014
Enforcement lead agency: EPA
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: TSD IS-General Facility Standards
Date violation determined: 12/03/2013
Date achieved compliance: 02/20/2014
Violation lead agency: EPA
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 01/24/2014
Enf. disposition status: Action Satisfied (Case Closed)
Enf. disp. status date: 03/19/2014
Enforcement lead agency: EPA
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported

MAPES INDUSTRIES INC (Continued) **1000221035**

Area of violation: TSD IS-Contingency Plan and Emergency Procedures
Date violation determined: 12/03/2013
Date achieved compliance: 02/20/2014
Violation lead agency: EPA
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 01/24/2014
Enf. disposition status: Action Satisfied (Case Closed)
Enf. disp. status date: 03/19/2014
Enforcement lead agency: EPA
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: TSD IS-Preparedness and Prevention
Date violation determined: 12/03/2013
Date achieved compliance: 02/20/2014
Violation lead agency: EPA
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 12/03/2013
Enf. disposition status: Action Satisfied (Case Closed)
Enf. disp. status date: 03/19/2014
Enforcement lead agency: EPA
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: TSD IS-Preparedness and Prevention
Date violation determined: 09/24/2010
Date achieved compliance: 10/21/2010
Violation lead agency: State
Enforcement action: Notice of Violation
Enforcement action date: 09/24/2010
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: State Statute or Regulation
Date violation determined: 09/24/2010
Date achieved compliance: 10/21/2010
Violation lead agency: State
Enforcement action: Notice of Violation
Enforcement action date: 09/24/2010
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: Generators - General

MAPES INDUSTRIES INC (Continued) **1000221035**

Date violation determined: 09/24/2010
Date achieved compliance: 10/21/2010
Violation lead agency: State
Enforcement action: Notice of Violation
Enforcement action date: 09/24/2010
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: Generators - Pre-transport
Date violation determined: 09/24/2010
Date achieved compliance: 10/21/2010
Violation lead agency: State
Enforcement action: Notice of Violation
Enforcement action date: 09/24/2010
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Evaluation Action Summary:

Evaluation date: 12/03/2013
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: TSD IS-General Facility Standards
Date achieved compliance: 02/20/2014
Evaluation lead agency: EPA

Evaluation date: 12/03/2013
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: TSD IS-Preparedness and Prevention
Date achieved compliance: 02/20/2014
Evaluation lead agency: EPA

Evaluation date: 12/03/2013
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: TSD IS-Contingency Plan and Emergency Procedures
Date achieved compliance: 02/20/2014
Evaluation lead agency: EPA

Evaluation date: 12/03/2013
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Generators - General
Date achieved compliance: 02/20/2014
Evaluation lead agency: EPA

Evaluation date: 12/03/2013
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: TSD IS-Preparedness and Prevention
Date achieved compliance: 12/20/2013
Evaluation lead agency: EPA

MAPES INDUSTRIES INC (Continued) **1000221035**

Evaluation date: 08/25/2010
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: State Statute or Regulation
Date achieved compliance: 10/21/2010
Evaluation lead agency: State

Evaluation date: 08/25/2010
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: TSD IS-Preparedness and Prevention
Date achieved compliance: 10/21/2010
Evaluation lead agency: State

Evaluation date: 08/25/2010
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Generators - General
Date achieved compliance: 10/21/2010
Evaluation lead agency: State

Evaluation date: 08/25/2010
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Generators - Pre-transport
Date achieved compliance: 10/21/2010
Evaluation lead agency: State

Evaluation date: 04/16/1993
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

FINDS:

Registry ID: 110001515138

Environmental Interest/Information System

AFS (Aerometric Information Retrieval System (AIRS) Facility Subsystem) replaces the former Compliance Data System (CDS), the National Emission Data System (NEDS), and the Storage and Retrieval of Aerometric Data (SAROAD). AIRS is the national repository for information concerning airborne pollution in the United States. AFS is used to track emissions and compliance data from industrial plants. AFS data are utilized by states to prepare State Implementation Plans to comply with regulatory programs and by EPA as an input for the estimation of total national emissions. AFS is undergoing a major redesign to support facility operating permits required under Title V of the Clean Air Act.

CRITERIA AND HAZARDOUS AIR POLLUTANT INVENTORY

AIRS (AFS):

Compliance and Violation Data Major Sources:
EPA plant ID: 110001515138
Plant name: MAPES INDUSTRIES INC
Plant address: 2929 CORNHUSKER HWY
LINCOLN, NE 68504
County: LANCASTER

MAPES INDUSTRIES INC (Continued) **1000221035**

Region code:	07
Dunn & Bradst #:	Not reported
Air quality cntrl region:	145
Sic code:	9999
Sic code desc:	NONCLASSIFIABLE ESTABLISHMENTS
North Am. industrial classf:	331319
NAIC code description:	Other Aluminum Rolling and Drawing
Default compliance status:	IN VIOLATION WITH REGARD TO PROCEDURAL COMPLIANCE
Default classification:	ACTUAL OR POTENTIAL EMISSIONS ARE ABOVE THE APPLICABLE MAJOR SOURCE THRESHOLDS
Govt facility:	ALL OTHER FACILITIES NOT OWNED OR OPERATED BY A FEDERAL, STATE, OR LOCAL GOVERNMENT
Current HPV:	Not reported

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8 **HINKLE MACHINE SHOP INC** — **FINDS** **1005824347**
2939 CORNHUSKER HWY — **NE NPDES** **N/A**
LINCOLN, NE 68504

FINDS:

Registry ID: 110006587103

Environmental Interest/Information System
STATE MASTER

NE NPDES:

Facility ID:	29335
Directions to Facility:	S & E of SE Cnr Cornhusker Hwy&State Fair Park Dr
Program Acronym:	PCS

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8 **WENTZ PLUMBING & H** — **NE RGA LUST** **S115147264**
2949 CORNHUSKER HW — **N/A**
LINCOLN, NE

RGA LUST:

2012	WENTZ PLUMBING & H	2949 CORNHUSKER HW
2011	WENTZ PLUMBING & H	2949 CORNHUSKER HW
2010	WENTZ PLUMBING & H	2949 CORNHUSKER HW
2009	WENTZ PLUMBING & H	2949 CORNHUSKER HW
2008	WENTZ PLUMBING & H	2949 CORNHUSKER HW
2007	WENTZ PLUMBING & H	2949 CORNHUSKER HW
2006	WENTZ PLUMBING & H	2949 CORNHUSKER HW

8 WENTZ PLUMBING & HEA | **NE RGA LUST** | **S115147265**
2949 CORNHUSKER HWY | **N/A**
LINCOLN, NE

RGA LUST:

2005	WENTZ PLUMBING & HEA	2949 CORNHUSKER HWY
2004	WENTZ PLUMBING & HEA	2949 CORNHUSKER HWY
2003	WENTZ PLUMBING & HEA	2949 CORNHUSKER HWY
2002	WENTZ PLUMBING & HEA	2949 CORNHUSKER HWY
2001	WENTZ PLUMBING & HEA	2949 CORNHUSKER HWY
2000	WENTZ PLUMBING & HEA	2949 CORNHUSKER HWY
1999	WENTZ PLUMBING & HEA	2949 CORNHUSKER HWY

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8 WENTZ PLUMBING & H | **NE LUST** | **S102420441**
2949 CORNHUSKER HW | **N/A**
LINCOLN, NE

LUST:
Facility Status: Risk Based Corrective Action Investigation
Incident Type: LUST
File Number: 032796-GW-0845
Owner/RP: WENTZ PLUMBING & H
Line Num: 716
SFM Num: 3101

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8 WENTZ PLUMBING & HEATING CO | **NE UST** | **U004059978**
2949 CORNHUSKER HWY | **N/A**
LINCOLN, NE 68506

UST:

Facility:
Facility ID: 3101
Owner Name: WENTZ PLBG & HTG CO
Owner Address: PO BOX 30205
Owner City,St,Zip: LINCOLN, NE 68506
Tanks Currently In Use: 0
Tanks Temp Out Of Use: 0
Tanks Perm Out Of Use: 0
Tanks Closed In Place: 0
Tanks Removed: 1

Owner: WENTZ PLBG & HTG CO
Owner Address: PO BOX 30205
Owner City,St,Zip: LINCOLN, NE 68506
Owner Phone: Not reported
Tank Id/Tank Status: 1 / Not Reported
Tank Contents: Not reported
Tank Size: Not reported
Tank Date Installed: Not reported
Tank Type: Not reported
Tank Construction: Not reported
Tank Internal Protection: Not reported

WENTZ PLUMBING & HEATING CO (Continued) **U004059978**

Tank External Protection: Not reported
Tank Secondary Containment: Not reported
Piping Construction Material: Not reported

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8 **JOHN HENRY'S PLUMBING HEATING** **FINDS** **1015823306**
2949 CORNHUSKER HWY **N/A**
LINCOLN, NE 68504

FINDS:

Registry ID: 110045777833

Environmental Interest/Information System
STATE MASTER

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8 **CORNHUSKER INTERNATIONAL TRUCKS** **NE UST** **U004055192**
3131 CORNHUSKER HWY **N/A**
LINCOLN, NE 68504

UST:

Facility:
Facility ID: 2805
Owner Name: CORNHUSKER INTL TRUCKS
Owner Address: 3131 CORNHUSKER HWY
Owner City,St,Zip: LINCOLN, NE 68504
Tanks Currently In Use: 0
Tanks Temp Out Of Use: 0
Tanks Perm Out Of Use: 0
Tanks Closed In Place: 0
Tanks Removed: 0

Owner: CORNHUSKER INTL TRUCKS
Owner Address: 3131 CORNHUSKER HWY
Owner City,St,Zip: LINCOLN, NE 68504
Owner Phone: Not reported
Tank Id/Tank Status: 1 / Not Reported
Tank Contents: Not reported
Tank Size: Not reported
Tank Date Installed: Not reported
Tank Type: Not reported
Tank Construction: Not reported
Tank Internal Protection: Not reported
Tank External Protection: Not reported
Tank Secondary Containment: Not reported
Piping Construction Material: Not reported

8 **CORNHUSKER INTERNATIONAL** — **NE LUST** **S107689991**
3131 CORNHUSKER HWY — **NE TIER 2** **N/A**
LINCOLN, NE

LUST:
Facility Status: **No Further Action**
Incident Type: LUST
File Number: 103191-CT-1240
Owner/RP: CORNHUSKER INTERNA
Line Num: 160
SFM Num: 2805

TIER 2:
Year: 2013
Facility ID: 30558
Location: S of Cornhusker Hwy, W of 33rd St
SR No: 659

Chemical:
Year: 2013
SR No: 659
Case Number: Not reported
EHS: Not reported
Storage Location: WEST SIDE OF BUILDING
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4147
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): WASTE OIL

Year: 2012
Facility ID: 30558
Location: S of Cornhusker Hwy, W of 33rd St
SR No: 638

Chemical:
Year: 2012
SR No: 638
Case Number: Not reported
EHS: Not reported
Storage Location: WEST SIDE OF BUILDING
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4147
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): WASTE OIL

Year: 2010
Facility ID: 30558
Location: S of Cornhusker Hwy, W of 33rd St
SR No: 650

Chemical:
Year: 2010
SR No: 650
Case Number: Not reported
EHS: Not reported
Storage Location: WEST SIDE OF BUILDING
Max. Amount: Not reported
Average Amount: Not reported

CORNHUSKER INTERNATIONAL (Continued) **S107689991**

Chemical ID: 4147
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): WASTE OIL

Year: 2009
Facility ID: 30558
Location: S of Cornhusker Hwy, W of 33rd St
SR No: 676

Chemical:
Year: 2009
SR No: 676
Case Number: Not reported
EHS: Not reported
Storage Location: WEST SIDE OF BUILDING
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4147
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): WASTE OIL

Year: 2008
Facility ID: 30558
Location: S of Cornhusker Hwy, W of 33rd St
SR No: 607

Chemical:
Year: 2008
SR No: 607
Case Number: Not reported
EHS: Not reported
Storage Location: WEST SIDE OF BUILDING
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4147
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): WASTE OIL

Year: 2007
Facility ID: 30558
Location: S of Cornhusker Hwy, W of 33rd St
SR No: 660

Chemical:
Year: 2007
SR No: 660
Case Number: Not reported
EHS: Not reported
Storage Location: WEST SIDE OF BUILDING
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4147
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): WASTE OIL

Year: 2006
Facility ID: 30558
Location: Not reported
SR No: Not reported

8	**CORNHUSKER INTERNATIONAL TRUCK** **3131 CORNHUSKER HWY** **LINCOLN, NE 68504**	**RCRA-CESQG**	**1000315495** **NED003934759**

RCRA-CESQG:

Date form received by agency:	04/18/2000
Facility name:	CORNHUSKER INTERNATIONAL TRUCK
Facility address:	3131 CORNHUSKER HWY LINCOLN, NE 68504
EPA ID:	NED003934759
Mailing address:	CORNHUSKER HWY LINCOLN, NE 68504
Contact:	HARRY SWENSON
Contact address:	3131 CORNHUSKER HWY LINCOLN, NE 68504
Contact country:	US
Contact telephone:	(402) 466-8461
Contact email:	Not reported
EPA Region:	07
Land type:	Private
Classification:	Conditionally Exempt Small Quantity Generator
Description:	Handler: generates 100 kg or less of hazardous waste per calendar month, and accumulates 1000 kg or less of hazardous waste at any time; or generates 1 kg or less of acutely hazardous waste per calendar month, and accumulates at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste; or generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste

Owner/Operator Summary:

Owner/operator name:	JOHN PLAGMAN
Owner/operator address:	P O BOX 2987 OMAHA, NE 68103
Owner/operator country:	Not reported
Owner/operator telephone:	(402) 466-8461
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	Not reported
Owner/Op end date:	Not reported

Handler Activities Summary:

U.S. importer of hazardous waste:	No
Mixed waste (haz. and radioactive):	No
Recycler of hazardous waste:	No
Transporter of hazardous waste:	No
Treater, storer or disposer of HW:	No
Underground injection activity:	No
On-site burner exemption:	No
Furnace exemption:	No
Used oil fuel burner:	No
Used oil processor:	No

CORNHUSKER INTERNATIONAL TRUCK (Continued) **1000315495**

User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

Hazardous Waste Summary:
Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Waste code: F002
Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2-TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE LISTED IN F001, F004, OR F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Facility Has Received Notices of Violations:
Regulation violated: SS - sr
Area of violation: Generators - General
Date violation determined: 03/30/2000
Date achieved compliance: 04/18/2000
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 03/30/2000
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Evaluation Action Summary:
Evaluation date: 02/23/2000
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Generators - General
Date achieved compliance: 04/18/2000
Evaluation lead agency: State

8 **AUTO CORRAL** **NE LUST** **U003880979**
3301 CORNHUSKER HWY **NE UST** **N/A**
LINCOLN, NE 68504

LUST:

Facility Status: **No Further Action**
Incident Type: LUST
File Number: 01077-RRV-1030
Owner/RP: JONES OIL CO
Line Num: 282
SFM Num: 1128

UST:

Facility:

Facility ID: 1128
Owner Name: JONES OIL CO INC
Owner Address: 2930 N 33RD ST
Owner City,St,Zip: LINCOLN, NE 68504
Tanks Currently In Use: 0
Tanks Temp Out Of Use: 0
Tanks Perm Out Of Use: 0
Tanks Closed In Place: 0
Tanks Removed: 0

Owner: JONES OIL CO INC
Owner Address: 2930 N 33RD ST
Owner City,St,Zip: LINCOLN, NE 68504
Owner Phone: Not reported
Tank Id/Tank Status: 1 / Not Reported
Tank Contents: Not reported
Tank Size: Not reported
Tank Date Installed: Not reported
Tank Type: Not reported
Tank Construction: Not reported
Tank Internal Protection: Not reported
Tank External Protection: Not reported
Tank Secondary Containment: Not reported
Piping Construction Material: Not reported

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8 **EDR US Hist Auto Stat** **1015430127**
3301 CORNHUSKER HWY **N/A**
LINCOLN, NE 68504

EDR Historical Auto Stations:

Name: LETHANH AUTO SERVICE
Year: 1999
Address: 3301 CORNHUSKER HWY

Name: LETHANH AUTO SERVICE
Year: 2000
Address: 3301 CORNHUSKER HWY

Name: LETHANH AUTO SERVICE
Year: 2001
Address: 3301 CORNHUSKER HWY

8 **LINCOLN GRAIN INC** — **NE UST** — **U004057271** / **N/A**
31ST & CORNHUSKER HWY
LINCOLN, NE 68504

UST:

Facility:

Facility ID:	5914
Owner Name:	LINCOLN GRAIN INC
Owner Address:	PO BOX 80269
Owner City,St,Zip:	LINCOLN, NE 68501
Tanks Currently In Use:	0
Tanks Temp Out Of Use:	0
Tanks Perm Out Of Use:	0
Tanks Closed In Place:	0
Tanks Removed:	0

Owner:	LINCOLN GRAIN INC
Owner Address:	PO BOX 80269
Owner City,St,Zip:	LINCOLN, NE 68501
Owner Phone:	Not reported
Tank Id/Tank Status:	1 / Not Reported
Tank Contents:	Not reported
Tank Size:	Not reported
Tank Date Installed:	Not reported
Tank Type:	Not reported
Tank Construction:	Not reported
Tank Internal Protection:	Not reported
Tank External Protection:	Not reported
Tank Secondary Containment:	Not reported
Piping Construction Material:	Not reported

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8 — **EDR US Hist Auto Stat** — **1015394114** / **N/A**
2920 CORNHUSKER HWY
LINCOLN, NE 68504

EDR Historical Auto Stations:

Name:	HOUSE OF MUFFLERS & BRAKES
Year:	2001
Address:	2920 CORNHUSKER HWY

Name:	HOUSE OF MUFFLERS & BRAKES
Year:	2003
Address:	2920 CORNHUSKER HWY

Name:	HOUSE OF MUFFLERS & BRAKES
Year:	2010
Address:	2920 CORNHUSKER HWY

Name:	HOUSE OF MUFFLERS & BRAKES
Year:	2011
Address:	2920 CORNHUSKER HWY

Name:	HOUSE OF MUFFLERS & BRAKES
Year:	2012
Address:	2920 CORNHUSKER HWY

8 YAMAHA MOTORSPORTS SALES **FINDS** **1016647664**
2940 CORNHUSKER HWY **N/A**
LINCOLN, NE 68504

FINDS:

Registry ID: 110004078783

Environmental Interest/Information System
RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

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8 YAMAHA MOTORSPORTS SALES **RCRA NonGen / NLR** **1000146358**
2940 CORNHUSKER HWY **NED981507452**
LINCOLN, NE 68504

RCRA NonGen / NLR:

Date form received by agency:	07/25/1986
Facility name:	YAMAHA MOTORSPORTS SALES
Facility address:	2940 CORNHUSKER HWY LINCOLN, NE 68504
EPA ID:	NED981507452
Mailing address:	CORNHUSKER HWY LINCOLN, NE 68504
Contact:	DENNIS JANES
Contact address:	2940 CORNHUSKER HWY LINCOLN, NE 68504
Contact country:	US
Contact telephone:	(402) 464-3603
Contact email:	Not reported
EPA Region:	07
Classification:	Non-Generator
Description:	Handler: Non-Generators do not presently generate hazardous waste

Owner/Operator Summary:

Owner/operator name:	DENNIS JANES
Owner/operator address:	Not reported Not reported
Owner/operator country:	Not reported
Owner/operator telephone:	Not reported
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	Not reported
Owner/Op end date:	Not reported

Handler Activities Summary:

U.S. importer of hazardous waste:	No
Mixed waste (haz. and radioactive):	No
Recycler of hazardous waste:	No
Transporter of hazardous waste:	No
Treater, storer or disposer of HW:	No
Underground injection activity:	No
On-site burner exemption:	No
Furnace exemption:	No

YAMAHA MOTORSPORTS SALES (Continued) **1000146358**

Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

Hazardous Waste Summary:

Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Waste code: F002
Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2-TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE LISTED IN F001, F004, OR F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Violation Status: No violations found

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8 **EDR US Hist Auto Stat** **1015395308**
2940 CORNHUSKER HWY **N/A**
LINCOLN, NE 68504

EDR Historical Auto Stations:

Name: IH STEPS AUTO
Year: 2005
Address: 2940 CORNHUSKER HWY

Name: IH STEPS AUTO
Year: 2006
Address: 2940 CORNHUSKER HWY

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8 **EDR US Hist Auto Stat** **1015400691**
3000 CORNHUSKER HWY **N/A**
LINCOLN, NE 68504

EDR Historical Auto Stations:

Name: VALERO ENERGY CORP
Year: 2005
Address: 3000 CORNHUSKER HWY

8 CASEYS GENERAL STORE #2706 | **NE UST** | **U004124503**
3010 CORNHUSKER HWY | | **N/A**
LINCOLN, NE 68504

UST:

Facility:

Facility ID:	1049
Owner Name:	CASEYS RETAIL CO
Owner Address:	PO BOX 3001
Owner City,St,Zip:	ANKENY, IA 50021-8045
Tanks Currently In Use:	0
Tanks Temp Out Of Use:	0
Tanks Perm Out Of Use:	0
Tanks Closed In Place:	0
Tanks Removed:	3

Owner:	CASEYS RETAIL CO
Owner Address:	PO BOX 3001
Owner City,St,Zip:	ANKENY, IA 50021-8045
Owner Phone:	Not reported
Tank Id/Tank Status:	1 / Not Reported
Tank Contents:	Not reported
Tank Size:	Not reported
Tank Date Installed:	Not reported
Tank Type:	Not reported
Tank Construction:	Not reported
Tank Internal Protection:	Not reported
Tank External Protection:	Not reported
Tank Secondary Containment:	Not reported
Piping Construction Material:	Not reported

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8 GAS N SHOP | **NE LUST** | **U001130177**
3010 CORNHUSKER HWY | **NE HIST UST** | **N/A**
LINCOLN, NE 68504

LUST:

Facility Status:	**Voluntary Remedial Action program**
Incident Type:	LUST
File Number:	092007-TH-0935
Owner/RP:	CASEYS GENERAL STO
Line Num:	105
SFM Num:	1049

Facility Status:	**No Further Action**
Incident Type:	LUST
File Number:	120991-NM-1137
Owner/RP:	GAS N SHOP INC.
Line Num:	217
SFM Num:	1049

HIST UST:

Facility ID:	1049
Owner:	GAS N SHOP INC
Owner Address:	PO BOX 81463
Owner City,St,Zip:	LINCOLN, NE 685010000
Tank Number:	1
Tank Usage Status:	**Currently in Use**
Tank Size (Gal):	8000
Tank Construction Material:	Fiberglass Reinforced Plastic

GAS N SHOP (Continued) **U001130177**

Tank Content(s):	Gasoline
Tank Installed:	1991
Piping Construction Material(s):	Fiberglass Reinforced Plastic

Facility ID:	1049
Owner:	GAS N SHOP INC
Owner Address:	PO BOX 81463
Owner City,St,Zip:	LINCOLN, NE 685010000
Tank Number:	2
Tank Usage Status:	**Currently in Use**
Tank Size (Gal):	8000
Tank Construction Material:	Fiberglass Reinforced Plastic
Tank Content(s):	Gasoline
Tank Installed:	1991
Piping Construction Material(s):	Fiberglass Reinforced Plastic

Facility ID:	1049
Owner:	GAS N SHOP INC
Owner Address:	PO BOX 81463
Owner City,St,Zip:	LINCOLN, NE 685010000
Tank Number:	3
Tank Usage Status:	**Currently in Use**
Tank Size (Gal):	4000
Tank Construction Material:	Fiberglass Reinforced Plastic
Tank Content(s):	#2 Diesel
Tank Installed:	1991
Piping Construction Material(s):	Fiberglass Reinforced Plastic

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8 **EDR US Hist Auto Stat** **1015416314**
3130 CORNHUSKER HWY **N/A**
LINCOLN, NE 68504

EDR Historical Auto Stations:

Name:	CICHORACKI AUTO TECH
Year:	2003
Address:	3130 CORNHUSKER HWY
Name:	CICHORACKI AUTO TECH
Year:	2004
Address:	3130 CORNHUSKER HWY
Name:	CICHORACKI MOTOR CO
Year:	2005
Address:	3130 CORNHUSKER HWY
Name:	CICHORACKI AUTO TECH
Year:	2006
Address:	3130 CORNHUSKER HWY
Name:	CICHORACKI AUTO TECH
Year:	2007
Address:	3130 CORNHUSKER HWY
Name:	CICHORACKI MOTOR CO 24 HR AUTO REP
Year:	2008
Address:	3130 CORNHUSKER HWY
Name:	CICHORACKI MOTOR CO

(Continued) **1015416314**

Year: 2009
Address: 3130 CORNHUSKER HWY

Name: 24 HOUR AUTO REPAIR
Year: 2010
Address: 3130 CORNHUSKER HWY

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8 **PITTMAN AUTO REPAI**
3248 CORNHUSKER HW
LINCOLN, NE

NE LUST **S101291985**
N/A

LUST:

Facility Status: **High-risk site, currently in active investigation or remediation**
Incident Type: LUST
File Number: 09098-BTB-1200
Owner/RP: WHITEHEAD OIL CO
Line Num: 742
SFM Num: 2952

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8 **PITTMANS 66 SERVICE**
3248 CORNHUSKER HWY
LINCOLN, NE 68503

NE UST **U004058431**
N/A

UST:

Facility:

Facility ID: 2952
Owner Name: WHITEHEAD OIL CO
Owner Address: PO BOX 30211
Owner City,St,Zip: LINCOLN, NE 68510
Tanks Currently In Use: 0
Tanks Temp Out Of Use: 0
Tanks Perm Out Of Use: 0
Tanks Closed In Place: 0
Tanks Removed: 0

Owner: WHITEHEAD OIL CO
Owner Address: PO BOX 30211
Owner City,St,Zip: LINCOLN, NE 68510
Owner Phone: Not reported
Tank Id/Tank Status: 1 / Not Reported
Tank Contents: Not reported
Tank Size: Not reported
Tank Date Installed: Not reported
Tank Type: Not reported
Tank Construction: Not reported
Tank Internal Protection: Not reported
Tank External Protection: Not reported
Tank Secondary Containment: Not reported
Piping Construction Material: Not reported

8 **U STOP**
3244 CORNHUSKER HWY
LINCOLN, NE 68504

NE UST **U002107193**
NE HIST UST **N/A**

UST:

Facility:
Facility ID: 11307
Owner Name: WHITEHEAD OIL CO
Owner Address: PO BOX 30211
Owner City,St,Zip: LINCOLN, NE 68510
Tanks Currently In Use: 4
Tanks Temp Out Of Use: 0
Tanks Perm Out Of Use: 0
Tanks Closed In Place: 0
Tanks Removed: 0

Owner: WHITEHEAD OIL CO
Owner Address: PO BOX 30211
Owner City,St,Zip: LINCOLN, NE 68510
Owner Phone: 402-435-3509
Tank Id/Tank Status: 1 / Currently in Use
Tank Contents: Gasoline
Tank Size: 12000
Tank Date Installed: 1994
Tank Type: Federally Regulated
Tank Construction: Fiberglass Reinforced Plastic
Tank Internal Protection: None
Tank External Protection: None
Tank Secondary Containment: Not reported
Piping Construction Material: Fiberglass Reinforced Plastic

Tank Id/Tank Status: 2 / Currently in Use
Tank Contents: Gasoline
Tank Size: 12000
Tank Date Installed: 1994
Tank Type: Federally Regulated
Tank Construction: Fiberglass Reinforced Plastic
Tank Internal Protection: None
Tank External Protection: None
Tank Secondary Containment: Not reported
Piping Construction Material: Fiberglass Reinforced Plastic

Tank Id/Tank Status: 3 / Currently in Use
Tank Contents: Gasoline
Tank Size: 6000
Tank Date Installed: 1994
Tank Type: Federally Regulated
Tank Construction: Fiberglass Reinforced Plastic
Tank Internal Protection: None
Tank External Protection: None
Tank Secondary Containment: Not reported
Piping Construction Material: Fiberglass Reinforced Plastic

Tank Id/Tank Status: 4 / Currently in Use
Tank Contents: Gasoline
Tank Size: 6000
Tank Date Installed: 1994
Tank Type: Federally Regulated
Tank Construction: Fiberglass Reinforced Plastic

U STOP (Continued) **U002107193**

Tank Internal Protection: None
Tank External Protection: None
Tank Secondary Containment: Not reported
Piping Construction Material: Fiberglass Reinforced Plastic

HIST UST:
Facility ID: 11307
Owner: WHITEHEAD OIL CO
Owner Address: PO BOX 30211
Owner City,St,Zip: LINCOLN, NE 685100000
Tank Number: 1
Tank Usage Status: **Currently in Use**
Tank Size (Gal): 12000
Tank Construction Material: Fiberglass Reinforced Plastic
Tank Content(s): Gasoline
Tank Installed: 1994
Piping Construction Material(s): Fiberglass Reinforced Plastic

Facility ID: 11307
Owner: WHITEHEAD OIL CO
Owner Address: PO BOX 30211
Owner City,St,Zip: LINCOLN, NE 685100000
Tank Number: 2
Tank Usage Status: **Currently in Use**
Tank Size (Gal): 12000
Tank Construction Material: Fiberglass Reinforced Plastic
Tank Content(s): Gasoline
Tank Installed: 1994
Piping Construction Material(s): Fiberglass Reinforced Plastic

Facility ID: 11307
Owner: WHITEHEAD OIL CO
Owner Address: PO BOX 30211
Owner City,St,Zip: LINCOLN, NE 685100000
Tank Number: 3
Tank Usage Status: **Currently in Use**
Tank Size (Gal): 6000
Tank Construction Material: Fiberglass Reinforced Plastic
Tank Content(s): Gasoline
Tank Installed: 1994
Piping Construction Material(s): Fiberglass Reinforced Plastic

Facility ID: 11307
Owner: WHITEHEAD OIL CO
Owner Address: PO BOX 30211
Owner City,St,Zip: LINCOLN, NE 685100000
Tank Number: 4
Tank Usage Status: **Currently in Use**
Tank Size (Gal): 6000
Tank Construction Material: Fiberglass Reinforced Plastic
Tank Content(s): Gasoline
Tank Installed: 1994
Piping Construction Material(s): Fiberglass Reinforced Plastic

8 **JONES OIL CO INC** **NE UST** **U004056837**
2930 N 33RD ST **N/A**
LINCOLN, NE 68504

UST:

Facility:

Facility ID:	1132
Owner Name:	JONES OIL CO INC
Owner Address:	2930 N 33RD ST
Owner City,St,Zip:	LINCOLN, NE 68504
Tanks Currently In Use:	0
Tanks Temp Out Of Use:	0
Tanks Perm Out Of Use:	0
Tanks Closed In Place:	0
Tanks Removed:	2

Owner:	JONES OIL CO INC
Owner Address:	2930 N 33RD ST
Owner City,St,Zip:	LINCOLN, NE 68504
Owner Phone:	Not reported
Tank Id/Tank Status:	1 / Not Reported
Tank Contents:	Not reported
Tank Size:	Not reported
Tank Date Installed:	Not reported
Tank Type:	Not reported
Tank Construction:	Not reported
Tank Internal Protection:	Not reported
Tank External Protection:	Not reported
Tank Secondary Containment:	Not reported
Piping Construction Material:	Not reported

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8 **JONES ENVIRONMENTAL COMPANY** **RCRA NonGen / NLR** **1000221275**
2930 N 33RD ST **NED020182796**
LINCOLN, NE 68503

RCRA NonGen / NLR:

Date form received by agency:	08/31/1990
Facility name:	JONES ENVIRONMENTAL COMPANY
Facility address:	2930 N 33RD ST LINCOLN, NE 68503
EPA ID:	NED020182796
Mailing address:	PO BOX 30225 LINCOLN, NE 68503
Contact:	REX FISCHER
Contact address:	PO BOX 30225 LINCOLN, NE 68503
Contact country:	US
Contact telephone:	(402) 467-5432
Contact email:	Not reported
EPA Region:	07
Classification:	Non-Generator
Description:	Handler: Non-Generators do not presently generate hazardous waste

Owner/Operator Summary:

Owner/operator name:	JONES ENVIRONMETAL INC.
Owner/operator address:	Not reported Not reported
Owner/operator country:	Not reported
Owner/operator telephone:	Not reported

JONES ENVIRONMENTAL COMPANY (Continued) **1000221275**

Legal status: Private
Owner/Operator Type: Owner
Owner/Op start date: Not reported
Owner/Op end date: Not reported

Handler Activities Summary:
U.S. importer of hazardous waste: No
Mixed waste (haz. and radioactive): No
Recycler of hazardous waste: No
Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

Violation Status: No violations found

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8 **JONES OIL CO** **NE LUST** **S101094594**
2930 N 33RD ST **NE NPDES** **N/A**
LINCOLN, NE 68504

LUST:
Facility Status: No Further Action
Incident Type: LUST
File Number: 062294-99-0000
Owner/RP: JONES OIL CO
Line Num: 283
SFM Num: 1132

NE NPDES:
Facility ID: 63715
Directions to Facility: SE 33&Cornhusker,E Sd Jct w/Adams&E Sd Steak House
Program Acronym: PCS

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8 **EDR US Hist Auto Stat** **1015405815**
3030 N 33RD ST **N/A**
LINCOLN, NE 68504

EDR Historical Auto Stations:
Name: PRO AUTOMOTIVE
Year: 2001
Address: 3030 N 33RD ST

Name: WATSON AUTO SERVICE
Year: 2009
Address: 3030 N 33RD ST

Name: WATSON AUTO SVC
Year: 2010

(Continued) **1015405815**

Address: 3030 N 33RD ST

Name: WATSON AUTO SERVICE
Year: 2011
Address: 3030 N 33RD ST

Name: WATSON AUTO SERVICE
Year: 2012
Address: 3030 N 33RD ST

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8 **UNITED PARCEL SERVICE** — **NE LUST** — **U001130172**
3133 N 33RD ST — **NE UST** — **N/A**
LINCOLN, NE 68504 — **NE HIST UST**

LUST:

Facility Status: **No Further Action**
Incident Type: LUST
File Number: 090993-99-0001
Owner/RP: UPS
Line Num: 705
SFM Num: 7896

UST:

Facility:
Facility ID: 7896
Owner Name: UNITED PARCEL SERVICE % PLANT ENGINEERING
Owner Address: 2535 EDWARD BABE GOMEZ AVE
Owner City,St,Zip: OMAHA, NE 68107-4431
Tanks Currently In Use: 1
Tanks Temp Out Of Use: 0
Tanks Perm Out Of Use: 0
Tanks Closed In Place: 0
Tanks Removed: 0

Owner: UNITED PARCEL SERVICE % PLANT ENGINEERING
Owner Address: 2535 EDWARD BABE GOMEZ AVE
Owner City,St,Zip: OMAHA, NE 68107-4431
Owner Phone: 402-293-6406
Tank Id/Tank Status: 1 / Currently in Use
Tank Contents: Gasoline
Tank Size: 20000
Tank Date Installed: 1987
Tank Type: Federally Regulated
Tank Construction: Fiberglass Reinforced Plastic
Tank Internal Protection: None
Tank External Protection: None
Tank Secondary Containment: Not reported
Piping Construction Material: Fiberglass Reinforced Plastic

HIST UST:
Facility ID: 7896
Owner: UNITED PARCEL SERVICE
Owner Address: PLANT ENGINEERING 2535 GOMEZ AVE
Owner City,St,Zip: OMAHA, NE 681070000
Tank Number: 1
Tank Usage Status: **Currently in Use**

UNITED PARCEL SERVICE (Continued) **U001130172**

Tank Size (Gal): 20000
Tank Construction Material: Fiberglass Reinforced Plastic
Tank Content(s): Gasoline
Tank Installed: 1987
Piping Construction Material(s): Fiberglass Reinforced Plastic

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8 **UNITED PARCEL SERVICE**
3133 N 33RD ST
LINCOLN, NE 68504

FINDS **1005825056**
NE LUST **N/A**
NE NPDES
NE TIER 2

FINDS:

Registry ID: 110006578569

Environmental Interest/Information System
STATE MASTER

LUST:
Facility Status: No Further Action
Incident Type: LUST
File Number: 102213-NH-2030
Owner/RP: UPS
Line Num: 703
SFM Num: Not reported

NE NPDES:
Facility ID: 59728
Directions to Facility: 3100 Adams St,1 lot N of N 33rd St &Cornhusker Hwy
Program Acronym: PCS

TIER 2:
Year: 2013
Facility ID: 59728
Location: 3100 Adams St,1 lot N of N 33rd St &Cornhusker Hwy
SR No: 2451

Chemical:
Year: 2013
SR No: 2451
Case Number: 68334-30-5
EHS: Not reported
Storage Location: Northwest End of Paving
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4527
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): Diesel Fuel

Year: 2012
Facility ID: 59728
Location: 3100 Adams St,1 lot N of N 33rd St &Cornhusker Hwy
SR No: 2389

Chemical:
Year: 2012

UNITED PARCEL SERVICE (Continued) **1005825056**

SR No: 2389
Case Number: 68334-30-5
EHS: Not reported
Storage Location: Northwest End of Paving
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4527
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): Diesel Fuel

Year: 2011
Facility ID: 59728
Location: 3100 Adams St,1 lot N of N 33rd St &Cornhusker Hwy
SR No: 2254

Chemical:
Year: 2011
SR No: 2254
Case Number: 68334-30-5
EHS: Not reported
Storage Location: Northwest End of Paving
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4527
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): Diesel Fuel

Year: 2010
Facility ID: 59728
Location: 3100 Adams St,1 lot N of N 33rd St &Cornhusker Hwy
SR No: 2367

Chemical:
Year: 2010
SR No: 2367
Case Number: 68334-30-5
EHS: Not reported
Storage Location: Not reported
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4527
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): Diesel Fuel

Year: 2009
Facility ID: 59728
Location: 3100 Adams St,1 lot N of N 33rd St &Cornhusker Hwy
SR No: 2409

Chemical:
Year: 2009
SR No: 2409
Case Number: 8006-61-9
EHS: Not reported
Storage Location: NORTHWEST END OF PAVING
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 3850
Chemical Reporting Name(Active Ingredient): Not reported

UNITED PARCEL SERVICE (Continued) **1005825056**

Chemical Reporting Name(Trade Name): GASOLINE

Year: 2008
Facility ID: 59728
Location: 3100 Adams St,1 lot N of N 33rd St &Cornhusker Hwy
SR No: 2278

Chemical:
Year: 2008
SR No: 2278
Case Number: 8006-61-9
EHS: Not reported
Storage Location: NORTHWEST END OF PAVING
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 3850
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): GASOLINE

Year: 2007
Facility ID: 59728
Location: 3100 Adams St,1 lot N of N 33rd St &Cornhusker Hwy
SR No: 2361

Chemical:
Year: 2007
SR No: 2361
Case Number: 8006-61-9
EHS: Not reported
Storage Location: NORTHWEST END OF PAVING
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 3850
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): GASOLINE

Year: 2006
Facility ID: 59728
Location: Not reported
SR No: Not reported

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8 **WEESNER AUTO REPAIR** **RCRA NonGen / NLR** **1000383495**
3140 N 33RD **NED981507940**
LINCOLN, NE 68504

RCRA NonGen / NLR:
Date form received by agency: 08/23/2002
Facility name: WEESNER AUTO REPAIR
Facility address: 3140 N 33RD
LINCOLN, NE 68504
EPA ID: NED981507940
Mailing address: N 33RD
LINCOLN, NE 68504
Contact: BILL WEESNER
Contact address: 3140 N 33RD
LINCOLN, NE 68504
Contact country: US
Contact telephone: (402) 474-2079
Contact email: Not reported

WEESNER AUTO REPAIR (Continued) **1000383495**

EPA Region: 07
Classification: Non-Generator
Description: Handler: Non-Generators do not presently generate hazardous waste

Owner/Operator Summary:
Owner/operator name: BILL WEESNER
Owner/operator address: Not reported
Not reported
Owner/operator country: Not reported
Owner/operator telephone: Not reported
Legal status: Private
Owner/Operator Type: Owner
Owner/Op start date: 01/01/0001
Owner/Op end date: Not reported

Handler Activities Summary:
U.S. importer of hazardous waste: No
Mixed waste (haz. and radioactive): No
Recycler of hazardous waste: No
Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

Historical Generators:
Date form received by agency: 07/14/1986
Site name: WEESNER AUTO REPAIR
Classification: Not a generator, verified

Violation Status: No violations found

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8 **EDR US Hist Auto Stat** **1015417178**
3140 N 33RD ST **N/A**
LINCOLN, NE 68504

EDR Historical Auto Stations:
Name: JIMS AUTO SERVICE
Year: 1999
Address: 3140 N 33RD ST

Name: JIMS AUTO SERVICE
Year: 2000
Address: 3140 N 33RD ST

Name: HCJ AUTOMOTIVE
Year: 2006
Address: 3140 N 33RD ST

Name: HCJ AUTOMOTIVE

(Continued) **1015417178**

Year: 2010
Address: 3140 N 33RD ST

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8 **EDR US Hist Auto Stat** **1015422148**
3200 N 33RD ST **N/A**
LINCOLN, NE 68504

EDR Historical Auto Stations:
Name: DIXON AUTO SERVICE
Year: 1999
Address: 3200 N 33RD ST

Name: DIXON AUTO SERVICE
Year: 2000
Address: 3200 N 33RD ST

Name: DIXON AUTO SERVICE
Year: 2001
Address: 3200 N 33RD ST

Name: DIXON AUTO SERVICE
Year: 2002
Address: 3200 N 33RD ST

Name: DIXON AUTO SERVICE
Year: 2003
Address: 3200 N 33RD ST

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8 **EDR US Hist Auto Stat** **1015425501**
3235 N 33RD ST **N/A**
LINCOLN, NE 68504

EDR Historical Auto Stations:
Name: KEYSTONE AUTOMOTIVE INDUSTRIES
Year: 2009
Address: 3235 N 33RD ST

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8 **KWIK SHOP** **NE LUST** **S108479256**
3301 N 33RD ST **N/A**
LINCOLN, NE

LUST:
Facility Status: **No Further Action**
Incident Type: LUST
File Number: 122906-QK-1410
Owner/RP: KWIK SHOP
Line Num: 96
SFM Num: 651

9 **PENSKE AUTO CENTER** **RCRA NonGen / NLR** **1004748188**
3300 N 27TH ST **NER000000828**
LINCOLN, NE 68521

RCRA NonGen / NLR:

Date form received by agency:	04/09/2002
Facility name:	PENSKE AUTO CENTER
Facility address:	3300 N 27TH ST SECTION B LINCOLN, NE 68521
EPA ID:	NER000000828
Mailing address:	W BIG BEAVER RD TROY, MI 480843163
Contact:	DAVID TATUM
Contact address:	2170 W BIG BEAVER RD TROY, MI 480843163
Contact country:	US
Contact telephone:	(810) 643-5171
Contact email:	Not reported
EPA Region:	07
Classification:	Non-Generator
Description:	Handler: Non-Generators do not presently generate hazardous waste

Owner/Operator Summary:

Owner/operator name:	PENSKE AUTO CENTER INC
Owner/operator address:	3270 W BIG BEAVER RD TROY, MI 48084
Owner/operator country:	Not reported
Owner/operator telephone:	(810) 614-1116
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	01/01/0001
Owner/Op end date:	Not reported

Handler Activities Summary:

U.S. importer of hazardous waste:	No
Mixed waste (haz. and radioactive):	No
Recycler of hazardous waste:	No
Transporter of hazardous waste:	No
Treater, storer or disposer of HW:	No
Underground injection activity:	No
On-site burner exemption:	No
Furnace exemption:	No
Used oil fuel burner:	No
Used oil processor:	No
User oil refiner:	No
Used oil fuel marketer to burner:	No
Used oil Specification marketer:	No
Used oil transfer facility:	No
Used oil transporter:	No

Historical Generators:

Date form received by agency:	12/07/1995
Site name:	PENSKE AUTO CENTER
Classification:	Conditionally Exempt Small Quantity Generator

Violation Status:	No violations found

9 | **EDR US Hist Auto Stat** | **1015430013**
3300 N 27TH ST | **N/A**
LINCOLN, NE 68521

EDR Historical Auto Stations:

Name:	PENSKE AUTO CENTERS
Year:	1999
Address:	3300 N 27TH ST
Name:	PENSKE AUTO CENTERS
Year:	2000
Address:	3300 N 27TH ST

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9 **HOME DEPOT USA INC HD3209** | **RCRA-SQG** | **1007448959**
3300 N 27TH STREET | **NER000502435**
LINCOLN, NE 68521

RCRA-SQG:

Date form received by agency:	11/14/2007
Facility name:	HOME DEPOT USA INC HD3209
Facility address:	3300 N 27TH STREET LINCOLN, NE 68521
EPA ID:	NER000502435
Mailing address:	ASTON AVE #100 CARLSBAD, CA 92008
Contact:	BECKY WILBANKS
Contact address:	ASTON AVE #100 CARLSBAD, CA 92008
Contact country:	US
Contact telephone:	(760) 602-8743
Contact email:	BWILBANKS@3ECOMPANY.COM
EPA Region:	07
Land type:	Private
Classification:	Small Small Quantity Generator
Description:	Handler: generates more than 100 and less than 1000 kg of hazardous waste during any calendar month and accumulates less than 6000 kg of hazardous waste at any time; or generates 100 kg or less of hazardous waste during any calendar month, and accumulates more than 1000 kg of hazardous waste at any time

Owner/Operator Summary:

Owner/operator name:	HOME DEPOT USA
Owner/operator address:	Not reported Not reported
Owner/operator country:	US
Owner/operator telephone:	Not reported
Legal status:	Private
Owner/Operator Type:	Operator
Owner/Op start date:	02/05/2004
Owner/Op end date:	Not reported
Owner/operator name:	HOME DEPOT USA
Owner/operator address:	PACES FERRY RD ATLANTA, GA 30339
Owner/operator country:	US
Owner/operator telephone:	Not reported
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	02/05/2004

HOME DEPOT USA INC HD3209 (Continued) **1007448959**

Owner/Op end date: Not reported

Handler Activities Summary:
U.S. importer of hazardous waste: No
Mixed waste (haz. and radioactive): No
Recycler of hazardous waste: No
Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

Historical Generators:
Date form received by agency: 06/27/2005
Site name: HOME DEPOT USA INC HD3209
Classification: Conditionally Exempt Small Quantity Generator

Date form received by agency: 08/09/2004
Site name: HOME DEPOT 3209
Classification: Conditionally Exempt Small Quantity Generator

Hazardous Waste Summary:
Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Waste code: D002
Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

Waste code: D009
Waste name: MERCURY

Waste code: D016
Waste name: 2,4-D

Waste code: D018
Waste name: BENZENE

HOME DEPOT USA INC HD3209 (Continued) **1007448959**

Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Waste code: D002
Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

Waste code: D009
Waste name: MERCURY

Waste code: D016
Waste name: 2,4-D

Waste code: D018
Waste name: BENZENE

Waste code: D035
Waste name: METHYL ETHYL KETONE

Waste code: F003
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F005
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE

HOME DEPOT USA INC HD3209 (Continued) **1007448959**

MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Waste code: D002
Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

Waste code: D009
Waste name: MERCURY

Waste code: D016
Waste name: 2,4-D

Waste code: D018
Waste name: BENZENE

Waste code: D035
Waste name: METHYL ETHYL KETONE

Violation Status: No violations found

Evaluation Action Summary:
Evaluation date: 09/20/2012
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

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9 **PENSKE AUTO CENTER** — **NE LAST** **S105238526**
3300 N 27TH STREET — **NE SPILLS** **N/A**
LINCOLN, NE

LAST:
File Number: 011000-SM-0024
Owner/RP: PENSKE AUTO CENTER
Facility Status: No Further Action
Incident Type: ABV GRND TNK
Line Num: 576
SFM Num: Not reported

NE SPILL:
File Number: 011000-SM-0024
Owner Name: PENSKE AUTO CENTER
Facility Status: NFA
Incident Type: ABV GRND TNK
Line Num: 576
SFM Num: Not reported

10 **HANK BUIS CONSTRUC** — **NE LUST** — **S105528570** / **N/A**
3110 N 40TH ST
LINCOLN, NE

LUST:

Facility Status:	**Additional work needed, DEQ has not yet directed the work to begin**
Incident Type:	LUST
File Number:	011397-TH-1351
Owner/RP:	HANK BUIS CONSTRUC
Line Num:	240
SFM Num:	2913

---

11 **F & F OIL COMPANY** — **NE LUST** — **S104072756** / **N/A**
4000 ADAMS, N SIDE
LINCOLN, NE

LUST:

Facility Status:	**Additional work needed, DEQ has not yet directed the work to begin**
Incident Type:	LUST
File Number:	121698-JF-0825
Owner/RP:	F & F OIL CO
Line Num:	190
SFM Num:	4427

---

11 **WHEELER TRANSPORT** — **NE LAST**, **NE SPILLS** — **S105241504** / **N/A**
40 & ADAMS
LINCOLN, NE

LAST:

File Number:	03295-CCC-1640
Owner/RP:	WHEELER TRANSPORT
Facility Status:	**No Further Action**
Incident Type:	ABV GRND TNK
Line Num:	775
SFM Num:	4427

NE SPILL:

File Number:	03295-CCC-1640
Owner Name:	WHEELER TRANSPORT
Facility Status:	**NFA**
Incident Type:	ABV GRND TNK
Line Num:	775
SFM Num:	4427

---

11 **CASEYS GENERAL STO** — **NE LUST** — **S111990048** / **N/A**
4002 ADAMS
LINCOLN, NE

LUST:

Facility Status:	**No Further Action**
Incident Type:	LUST
File Number:	061812-TH-1515
Owner/RP:	CASEYS GENERAL STO
Line Num:	107
SFM Num:	4427

12 **KWIK SHOP #619**
2302 CORNHUSKER HWY
LINCOLN, NE 68521

NE LUST **U003944827**
NE UST **N/A**
NE HIST UST

LUST:

Facility Status:	**No Further Action**
Incident Type:	LUST
File Number:	032413-NH-1315
Owner/RP:	KWIK SH0P INC
Line Num:	327
SFM Num:	12250

UST:

Facility:

Facility ID:	12250
Owner Name:	KWIK SHOP INC ATTN ARLIS NEUFELD
Owner Address:	PO BOX 1927
Owner City,St,Zip:	HUTCHINSON, KS 67504-1927
Tanks Currently In Use:	4
Tanks Temp Out Of Use:	0
Tanks Perm Out Of Use:	0
Tanks Closed In Place:	0
Tanks Removed:	0

Owner:	KWIK SHOP INC ATTN ARLIS NEUFELD
Owner Address:	PO BOX 1927
Owner City,St,Zip:	HUTCHINSON, KS 67504-1927
Owner Phone:	620-669-8504
Tank Id/Tank Status:	1 / Currently in Use
Tank Contents:	Gasoline
Tank Size:	10000
Tank Date Installed:	2003
Tank Type:	Federally Regulated
Tank Construction:	Fiberglass Reinforced Plastic
Tank Internal Protection:	None
Tank External Protection:	None
Tank Secondary Containment:	Double Walled
Piping Construction Material:	Plastic

Tank Id/Tank Status:	2 / Currently in Use
Tank Contents:	Gasoline
Tank Size:	5000
Tank Date Installed:	2003
Tank Type:	Federally Regulated
Tank Construction:	Fiberglass Reinforced Plastic
Tank Internal Protection:	None
Tank External Protection:	None
Tank Secondary Containment:	Double Walled
Piping Construction Material:	Plastic

Tank Id/Tank Status:	3 / Currently in Use
Tank Contents:	Gasoline
Tank Size:	10000
Tank Date Installed:	2003
Tank Type:	Federally Regulated
Tank Construction:	Fiberglass Reinforced Plastic
Tank Internal Protection:	None
Tank External Protection:	None

KWIK SHOP #619 (Continued) **U003944827**

Tank Secondary Containment: Double Walled
Piping Construction Material: Plastic

Tank Id/Tank Status: 4 / Currently in Use
Tank Contents: #1 Diesel
Tank Size: 5000
Tank Date Installed: 2003
Tank Type: Federally Regulated
Tank Construction: Fiberglass Reinforced Plastic
Tank Internal Protection: None
Tank External Protection: None
Tank Secondary Containment: Double Walled
Piping Construction Material: Plastic

HIST UST:
Facility ID: 12250
Owner: Kwik Shop
Owner Address: 734 E 4th Street PO Box 1927
Owner City,St,Zip: Hutchinson, KS 675041927
Tank Number: 1
Tank Usage Status: Currently in Use
Tank Size (Gal): 10000
Tank Construction Material: Fiberglass Reinforced Plastic
Tank Content(s): Gasoline
Tank Installed: 2003
Piping Construction Material(s): Plastic

Facility ID: 12250
Owner: Kwik Shop
Owner Address: 734 E 4th Street PO Box 1927
Owner City,St,Zip: Hutchinson, KS 675041927
Tank Number: 2
Tank Usage Status: Currently In Use
Tank Size (Gal): 5000
Tank Construction Material: Fiberglass Reinforced Plastic
Tank Content(s): Gasoline
Tank Installed: 2003
Piping Construction Material(s): Plastic

Facility ID: 12250
Owner: Kwik Shop
Owner Address: 734 E 4th Street PO Box 1927
Owner City,St,Zip: Hutchinson, KS 675041927
Tank Number: 3
Tank Usage Status: Currently in Use
Tank Size (Gal): 10000
Tank Construction Material: Fiberglass Reinforced Plastic
Tank Content(s): Gasoline
Tank Installed: 2003
Piping Construction Material(s): Plastic

Facility ID: 12250
Owner: Kwik Shop
Owner Address: 734 E 4th Street PO Box 1927
Owner City,St,Zip: Hutchinson, KS 675041927
Tank Number: 4
Tank Usage Status: Currently in Use

KWIK SHOP #619 (Continued) **U003944827**

Tank Size (Gal):	5000
Tank Construction Material:	Fiberglass Reinforced Plastic
Tank Content(s):	#1 Diesel
Tank Installed:	2003
Piping Construction Material(s):	Plastic

---

13 **EDR US Hist Auto Stat** **1015392523**
2901 N 27TH ST **N/A**
LINCOLN, NE 68521

EDR Historical Auto Stations:

Name:	AUTO TINT
Year:	2009
Address:	2901 N 27TH ST

---

13 **K-MART** **NE UST** **U004056865**
27TH & CORNHUSKER HWY **N/A**
LINCOLN, NE 68521

UST:

Facility:

Facility ID:	11076
Owner Name:	27TH ST ASSOC LTD
Owner Address:	1125 S 103RD ST STE 780
Owner City,St,Zip:	OMAHA, NE 68124
Tanks Currently In Use:	0
Tanks Temp Out Of Use:	0
Tanks Perm Out Of Use:	0
Tanks Closed In Place:	0
Tanks Removed:	3

Owner:	27TH ST ASSOC LTD
Owner Address:	1125 S 103RD ST STE 780
Owner City,St,Zip:	OMAHA, NE 68124
Owner Phone:	Not reported
Tank Id/Tank Status:	1 / Not Reported
Tank Contents:	Not reported
Tank Size:	Not reported
Tank Date Installed:	Not reported
Tank Type:	Not reported
Tank Construction:	Not reported
Tank Internal Protection:	Not reported
Tank External Protection:	Not reported
Tank Secondary Containment:	Not reported
Piping Construction Material:	Not reported

13 **27TH ST ASSN TANK** **NE LUST** **S102420455**
3000 N 27TH **N/A**
LINCOLN, NE

LUST:

Facility Status:	**Priority List for orphan sites (Responsible Party not viable)**
Incident Type:	LUST
File Number:	111397-NM-0800
Owner/RP:	UNKNOWN
Line Num:	679
SFM Num:	11076

---

13 **SUPER STOP** **NE UST** **U004059246**
2710 CORNHUSKER HWY **N/A**
LINCOLN, NE 68501

UST:

Facility:

Facility ID:	964
Owner Name:	HR JACOBS TRUST & ANN MATISON
Owner Address:	PO BOX 81008
Owner City,St,Zip:	LINCOLN, NE 68501
Tanks Currently In Use:	0
Tanks Temp Out Of Use:	0
Tanks Perm Out Of Use:	0
Tanks Closed In Place:	0
Tanks Removed:	4

Owner:	HR JACOBS TRUST & ANN MATISON
Owner Address:	PO BOX 81008
Owner City,St,Zip:	LINCOLN, NE 68501
Owner Phone:	Not reported
Tank Id/Tank Status:	1 / Not Reported
Tank Contents:	Not reported
Tank Size:	Not reported
Tank Date Installed:	Not reported
Tank Type:	Not reported
Tank Construction:	Not reported
Tank Internal Protection:	Not reported
Tank External Protection:	Not reported
Tank Secondary Containment:	Not reported
Piping Construction Material:	Not reported

---

14 **LINCOLN FOOD BANK** **NE LUST** **S101291844**
3645 ADAMS STREET **N/A**
LINCOLN, NE

LUST:

Facility Status:	**High-risk site, currently in active investigation or remediation**
Incident Type:	LUST
File Number:	08277-BHI-0900
Owner/RP:	CITY OF LINCOLN
Line Num:	128
SFM Num:	1082

15 **HUNTINGTON ELEMENT** **NE LUST** **S105173229**
4601 ADAMS **N/A**
LINCOLN, NE

LUST:

Facility Status:	**No Further Action**
Incident Type:	LUST-EXEMPT TK
File Number:	AP8642
Owner/RP:	LINCOLN PUBLIC SCH
Line Num:	84
SFM Num:	8642

---

16 **ADAMS STREET CONOC** **NE LUST** **S103443651**
2958 N 48TH ST **N/A**
LINCOLN, NE

LUST:

Facility Status:	**No Further Action**
Incident Type:	LUST
File Number:	100798-TH-1155
Owner/RP:	ADAMS STREET CONOC
Line Num:	30
SFM Num:	67

---

17 **EDR US Hist Auto Stat** **1015386171**
2801 N 35TH ST **N/A**
LINCOLN, NE 68504

EDR Historical Auto Stations:

Name:	ARIZONA AUTO REPAIR
Year:	2004
Address:	2801 N 35TH ST

---

17 **EDR US Hist Auto Stat** **1015389779**
2851 N 35TH ST **N/A**
LINCOLN, NE 68504

EDR Historical Auto Stations:

Name:	BALDWINS AUTOMOTIVE
Year:	1999
Address:	2851 N 35TH ST
Name:	BALDWINS AUTOMOTIVE
Year:	2000
Address:	2851 N 35TH ST
Name:	BALDWINS AUTOMOTIVE
Year:	2001
Address:	2851 N 35TH ST
Name:	BALDWINS AUTOMOTIVE INC
Year:	2002
Address:	2851 N 35TH ST
Name:	BALDWINS AUTOMOTIVE
Year:	2003
Address:	2851 N 35TH ST

(Continued) **1015389779**

Name: BALDWINS AUTOMOTIVE INC
Year: 2005
Address: 2851 N 35TH ST

Name: BALDWINS AUTOMOTIVE INC
Year: 2007
Address: 2851 N 35TH ST

Name: BALDWINS AUTOMOTIVE INC
Year: 2008
Address: 2851 N 35TH ST

Name: BALDWINS AUTOMOTIVE INC
Year: 2009
Address: 2851 N 35TH ST

Name: BALDWINS AUTOMOTIVE
Year: 2010
Address: 2851 N 35TH ST

Name: BALDWINS AUTOMOTIVE
Year: 2011
Address: 2851 N 35TH ST

Name: BALDWINS AUTOMOTIVE
Year: 2012
Address: 2851 N 35TH ST

---

17 **EDR US Hist Auto Stat** **1015438125**
3420 CLEVELAND AVE **N/A**
LINCOLN, NE 68504

EDR Historical Auto Stations:
Name: BRETTS AUTOMOTIVE
Year: 2002
Address: 3420 CLEVELAND AVE

Name: BRETTS AUTOMOTIVE
Year: 2003
Address: 3420 CLEVELAND AVE

Name: PHP AUTOMOTIVE
Year: 2004
Address: 3420 CLEVELAND AVE

---

17 **EDR US Hist Auto Stat** **1015444922**
3530 CLEVELAND AVE **N/A**
LINCOLN, NE 68504

EDR Historical Auto Stations:
Name: SIDELINE AUTO
Year: 2003
Address: 3530 CLEVELAND AVE

Name: SIDELINE AUTO
Year: 2007

(Continued) **1015444922**

Address: 3530 CLEVELAND AVE

Name: AUTOTECK
Year: 2009
Address: 3530 CLEVELAND AVE

---

17 **EDR US Hist Auto Stat** **1015445907**
3550 CLEVELAND AVE **N/A**
LINCOLN, NE 68504

EDR Historical Auto Stations:

Name: ED GO EZ MOTORS INC
Year: 2001
Address: 3550 CLEVELAND AVE

Name: ED GO EZ MOTOR INC
Year: 2002
Address: 3550 CLEVELAND AVE

Name: ED GO EZ MOTOR INC
Year: 2003
Address: 3550 CLEVELAND AVE

Name: ED GO EZ MOTOR INC
Year: 2004
Address: 3550 CLEVELAND AVE

---

17 **EDR US Hist Auto Stat** **1015445428**
3540 CLEVELAND AVE **N/A**
LINCOLN, NE 68504

EDR Historical Auto Stations:

Name: DIVERSIFIED AUTOMOTIVE
Year: 2002
Address: 3540 CLEVELAND AVE

Name: DIVERSIFIED AUTOMOTIVE
Year: 2004
Address: 3540 CLEVELAND AVE

Name: DIVERSIFIED AUTOMOTIVE
Year: 2005
Address: 3540 CLEVELAND AVE

Name: DIVERSIFIED AUTOMOTIVE
Year: 2006
Address: 3540 CLEVELAND AVE

Name: DIVERSIFIED AUTOMOTIVE
Year: 2007
Address: 3540 CLEVELAND AVE

Name: DIVERSIFIED AUTOMOTIVE
Year: 2008
Address: 3540 CLEVELAND AVE

(Continued) **1015445428**

Name: DIVERSIFIED AUTOMOTIVE
Year: 2009
Address: 3540 CLEVELAND AVE

Name: DIVERSIFIED AUTOMOTIVE
Year: 2010
Address: 3540 CLEVELAND AVE

Name: A & S AUTO TRUCK REPAIR
Year: 2011
Address: 3540 CLEVELAND AVE

Name: DIVERSIFIED AUTOMOTIVE
Year: 2012
Address: 3540 CLEVELAND AVE

---

17 **EDR US Hist Auto Stat** **1015431809**
3320 CLEVELAND AVE **N/A**
LINCOLN, NE 68504

EDR Historical Auto Stations:
Name: CARYS RADIATOR SHOP
Year: 1999
Address: 3320 CLEVELAND AVE

Name: CARYS RADIATOR SHOP
Year: 2000
Address: 3320 CLEVELAND AVE

---

18 **EDR US Hist Auto Stat** **1015379036**
2701 N 27TH ST **N/A**
LINCOLN, NE 68521

EDR Historical Auto Stations:
Name: ACCU-LINE SUSPENSION & BRAKES
Year: 1999
Address: 2701 N 27TH ST

Name: ACCU-LINE SUSPENSION & BRAKES
Year: 2000
Address: 2701 N 27TH ST

Name: ZIGS LINCOLN DISCOUNT MUFFLER
Year: 2011
Address: 2701 N 27TH ST

Name: MR AUTO REPAIR
Year: 2012
Address: 2701 N 27TH ST

18 **INTERSTATE BRANDS CORP** **NE UST** **U004056640**
2711 N 27TH ST **N/A**
LINCOLN, NE 68508

UST:

Facility:

Facility ID:	1099
Owner Name:	INTERSTATE BRANDS CORP
Owner Address:	PO BOX 4656 1108 EAST 30TH ST
Owner City,St,Zip:	KANSAS CITY, MO 64109
Tanks Currently In Use:	0
Tanks Temp Out Of Use:	0
Tanks Perm Out Of Use:	0
Tanks Closed In Place:	0
Tanks Removed:	1

Owner:	INTERSTATE BRANDS CORP
Owner Address:	PO BOX 4656 1108 EAST 30TH ST
Owner City,St,Zip:	KANSAS CITY, MO 64109
Owner Phone:	Not reported
Tank Id/Tank Status:	1 / Not Reported
Tank Contents:	Not reported
Tank Size:	Not reported
Tank Date Installed:	Not reported
Tank Type:	Not reported
Tank Construction:	Not reported
Tank Internal Protection:	Not reported
Tank External Protection:	Not reported
Tank Secondary Containment:	Not reported
Piping Construction Material:	Not reported

---

18 **HARDING GLASS IND INC** **NE UST** **U004056359**
2740 N 27TH ST **N/A**
LINCOLN, NE 68521

UST:

Facility:

Facility ID:	1829
Owner Name:	HARDING GLASS IND INC
Owner Address:	2740 N 27TH ST
Owner City,St,Zip:	LINCOLN, NE 68521
Tanks Currently In Use:	0
Tanks Temp Out Of Use:	0
Tanks Perm Out Of Use:	0
Tanks Closed In Place:	0
Tanks Removed:	0

Owner:	HARDING GLASS IND INC
Owner Address:	2740 N 27TH ST
Owner City,St,Zip:	LINCOLN, NE 68521
Owner Phone:	Not reported
Tank Id/Tank Status:	1 / Not Reported
Tank Contents:	Not reported
Tank Size:	Not reported
Tank Date Installed:	Not reported
Tank Type:	Not reported
Tank Construction:	Not reported
Tank Internal Protection:	Not reported
Tank External Protection:	Not reported

HARDING GLASS IND INC (Continued) **U004056359**

Tank Secondary Containment: Not reported
Piping Construction Material: Not reported

---

18 **HARDING GLASS** **NE LUST** **S101291785**
2740 N 27TH ST **N/A**
LINCOLN, NE

LUST:

Facility Status: **No Further Action**
Incident Type: LUST
File Number: 06187-SMS-1340
Owner/RP: HARDING GLASS
Line Num: 242
SFM Num: 1829

---

18 **ROGGE ENGINEERING INC** **NE UST** **U004058747**
2800 N 27TH ST **N/A**
LINCOLN, NE 68521

UST:

Facility:
Facility ID: 3750
Owner Name: ROGGE ENGINEERING INC
Owner Address: 2800 N 27TH ST
Owner City,St,Zip: LINCOLN, NE 68521
Tanks Currently In Use: 0
Tanks Temp Out Of Use: 0
Tanks Perm Out Of Use: 0
Tanks Closed In Place: 0
Tanks Removed: 2

Owner: ROGGE ENGINEERING INC
Owner Address: 2800 N 27TH ST
Owner City,St,Zip: LINCOLN, NE 68521
Owner Phone: Not reported
Tank Id/Tank Status: 1 / Not Reported
Tank Contents: Not reported
Tank Size: Not reported
Tank Date Installed: Not reported
Tank Type: Not reported
Tank Construction: Not reported
Tank Internal Protection: Not reported
Tank External Protection: Not reported
Tank Secondary Containment: Not reported
Piping Construction Material: Not reported

18 **ROGGE ENGINEERING** **NE LUST** **U000914851**
2800 NORTH 27TH ST **N/A**
LINCOLN, NE

LUST:
- **Facility Status:** **No Further Action**
- Incident Type: LUST
- File Number: AP3750
- Owner/RP: MILTON ROGGE
- Line Num: 163
- SFM Num: 3750

---

18 **INTERSTATE BRANDS** **NE LUST** **U003052383**
2711 N 27TH **N/A**
LINCOLN, NE

LUST:
- **Facility Status:** **No Further Action**
- Incident Type: LUST
- File Number: 112695-GW-1015
- Owner/RP: INTERSTATE BRANDS
- Line Num: 271
- SFM Num: 1099

---

19 **KWIK SHOP #641** **NE LUST** **U001130182**
2811 N 48TH ST **NE UST** **N/A**
LINCOLN, NE 68504 **NE HIST UST**

LUST:
- **Facility Status:** **No Further Action**
- Incident Type: LUST
- File Number: 112995-99-0000
- Owner/RP: KWIK SHOP
- Line Num: 315
- SFM Num: 649

UST:

Facility:
- Facility ID: 649
- Owner Name: KWIK SHOP INC ATTN ARLIS NEUFELD
- Owner Address: PO BOX 1927
- Owner City,St,Zip: HUTCHINSON, KS 67504-1927
- Tanks Currently In Use: 2
- Tanks Temp Out Of Use: 0
- Tanks Perm Out Of Use: 0
- Tanks Closed In Place: 0
- Tanks Removed: 0

- Owner: KWIK SHOP INC ATTN ARLIS NEUFELD
- Owner Address: PO BOX 1927
- Owner City,St,Zip: HUTCHINSON, KS 67504-1927
- Owner Phone: 620-699-8504
- Tank Id/Tank Status: 1 / Currently in Use
- Tank Contents: Gasoline
- Tank Size: 10000
- Tank Date Installed: 1981
- Tank Type: Federally Regulated

KWIK SHOP #641 (Continued) **U001130182**

Tank Construction: Steel
Tank Internal Protection: Internal Lining(e.g., epoxy resins)
Tank External Protection: Impressed Current Cathodic Protection
Tank Secondary Containment: Not reported
Piping Construction Material: Plastic

Tank Id/Tank Status: 2 / Currently in Use
Tank Contents: Gasoline
Tank Size: 10000
Tank Date Installed: 1981
Tank Type: Federally Regulated
Tank Construction: Steel
Tank Internal Protection: Internal Lining(e.g., epoxy resins)
Tank External Protection: Impressed Current Cathodic Protection
Tank Secondary Containment: Not reported
Piping Construction Material: Plastic

HIST UST:
Facility ID: 649
Owner: Kwik Shop Inc Attn: Arlis Neufeld
Owner Address: PO Box 1927
Owner City,St,Zip: Hutchinson, KS 675041927
Tank Number: 1
Tank Usage Status: Currently In Use
Tank Size (Gal): 10000
Tank Construction Material: Steel
Tank Content(s): Gasoline
Tank Installed: 1981
Piping Construction Material(s): Plastic

Facility ID: 649
Owner: Kwik Shop Inc Attn: Arlis Neufeld
Owner Address: PO Box 1927
Owner City,St,Zip: Hutchinson, KS 675041927
Tank Number: 2
Tank Usage Status: Currently in Use
Tank Size (Gal): 10000
Tank Construction Material: Steel
Tank Content(s): Gasoline
Tank Installed: 1981
Piping Construction Material(s): Plastic

---

20 **STAR CITY AUTO SALVAGE** **FINDS** **1005823079**
2705 N 33RD ST **NE NPDES** **N/A**
LINCOLN, NE 68504

FINDS:

Registry ID: 110006601285

Environmental Interest/Information System
STATE MASTER

NE NPDES:
Facility ID: 29403
Directions to Facility: W Sd N 33,N of Baldwin,S of Madison,W End St Paul

STAR CITY AUTO SALVAGE (Continued) **1005823079**

Program Acronym: PCS

---

20 | EDR US Hist Auto Stat | **1015431538**
3318 MADISON AVE **N/A**
LINCOLN, NE 68504

EDR Historical Auto Stations:

Name: MIDWEST DENT & BODY SHOP
Year: 1999
Address: 3318 MADISON AVE

Name: MIDWEST DENT & BODY SHOP
Year: 2000
Address: 3318 MADISON AVE

Name: MIDWEST DENT & BODY SHOP
Year: 2001
Address: 3318 MADISON AVE

Name: MIDWEST DENT & BODY SHOP
Year: 2002
Address: 3318 MADISON AVE

Name: MIDWEST DENT & BODY SHOP
Year: 2003
Address: 3318 MADISON AVE

---

20 | EDR US Hist Auto Stat | **1015431228**
3312 MADISON AVE **N/A**
LINCOLN, NE 68504

EDR Historical Auto Stations:

Name: RPM AUTO REPAIR SVC
Year: 2010
Address: 3312 MADISON AVE

---

21 | EDR US Hist Cleaners | **1015055547**
4030 SAINT PAUL AVE **N/A**
LINCOLN, NE 68504

EDR Historical Cleaners:

Name: SUNKIST CLEANERS
Year: 2002
Address: 4030 SAINT PAUL AVE

22 **NE WESLEYAN UNIVER**
50 & ST. PAUL
LINCOLN, NE

NE LUST **S100066392** **N/A**

LUST:

Facility Status: **No Further Action**
Incident Type: LUST
File Number: 03067-BHI-1000
Owner/RP: NE WESLEYAN UNIVER
Line Num: 464
SFM Num: 1225

Facility Status: **No Further Action**
Incident Type: LUST
File Number: 031799-99-0012
Owner/RP: NE WESLEYAN UNIVER
Line Num: 465
SFM Num: 1225

Facility Status: **No Further Action**
Incident Type: LUST-EXEMPT TK
File Number: 112999-99-0002
Owner/RP: NEBRASKA WESLEYAN
Line Num: 496
SFM Num: 1225

---

23 **CITY OF LINCOLN/WATER POLLUTION PLANT**
2400 THERESA ST
LINCOLN, NE 68521

NE UST **U003882608**
NE HIST UST **N/A**

UST:

Facility:
Facility ID: 8428
Owner Name: CITY OF LINCOLN WASTEWATER DIVISION
Owner Address: 2400 THERESA ST
Owner City,St,Zip: LINCOLN, NE 68521
Tanks Currently In Use: 2
Tanks Temp Out Of Use: 0
Tanks Perm Out Of Use: 0
Tanks Closed In Place: 0
Tanks Removed: 0

Owner: CITY OF LINCOLN WASTEWATER DIVISION
Owner Address: 2400 THERESA ST
Owner City,St,Zip: LINCOLN, NE 68521
Owner Phone: 402-471-7961
Tank Id/Tank Status: 1 / Currently in Use
Tank Contents: Used Oil
Tank Size: 1000
Tank Date Installed: 1992
Tank Type: Federally Regulated
Tank Construction: Fiberglass Reinforced Plastic
Tank Internal Protection: None
Tank External Protection: None
Tank Secondary Containment: Not reported
Piping Construction Material: Fiberglass Reinforced Plastic

Tank Id/Tank Status: 2 / Currently in Use
Tank Contents: New Oil

CITY OF LINCOLN/WATER POLLUTION PLANT (Continued) **U003882608**

Tank Size:	1000
Tank Date Installed:	1992
Tank Type:	Federally Regulated
Tank Construction:	Fiberglass Reinforced Plastic
Tank Internal Protection:	None
Tank External Protection:	None
Tank Secondary Containment:	Not reported
Piping Construction Material:	Fiberglass Reinforced Plastic

HIST UST:

Facility ID:	8428
Owner:	CITY OF LINCOLN WASTEWATER DIVISION
Owner Address:	2400 THERESA ST
Owner City,St,Zip:	LINCOLN, NE 685210000
Tank Number:	1
Tank Usage Status:	**Currently in Use**
Tank Size (Gal):	1000
Tank Construction Material:	Fiberglass Reinforced Plastic
Tank Content(s):	Used Oil
Tank Installed:	1992
Piping Construction Material(s):	Fiberglass Reinforced Plastic

Facility ID:	8428
Owner:	CITY OF LINCOLN WASTEWATER DIVISION
Owner Address:	2400 THERESA ST
Owner City,St,Zip:	LINCOLN, NE 685210000
Tank Number:	2
Tank Usage Status:	**Currently In Use**
Tank Size (Gal):	1000
Tank Construction Material:	Fiberglass Reinforced Plastic
Tank Content(s):	Other->NEW MOTOR OIL
Tank Installed:	1992
Piping Construction Material(s):	Fiberglass Reinforced Plastic

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Map ID	Site	Database(s)	EDR ID Number / EPA ID Number
23	**LINCOLN THERESA ST WASTEWATER** **2400 THERESA ST** **LINCOLN, NE 68521**	**NE BROWNFIELDS** **NE NPDES** **NE AIRS**	**S107688500** **N/A**

BROWNFIELDS:

Facility ID:	32246
Facility Location Desc:	W Sd 27,S of Cornhusker&Salt Ck,E&N of State Fair
Program Acronym:	BF

NE NPDES:

Facility ID:	32246
Directions to Facility:	W Sd 27,S of Cornhusker&Salt Ck,E&N of State Fair
Program Acronym:	PCS

NE AIRS:

Facility ID:	32246
Directions to Facility:	W Sd 27,S of Cornhusker&Salt Ck,E&N of State Fair

23 CITY OF LINCOLN WASTEWATER TRMT | **RCRA-CESQG** | **1000440501**
2400 THERESA ST | **US AIRS** | **NED981712417**
LINCOLN, NE 68521

RCRA-CESQG:

Date form received by agency:	10/15/1998
Facility name:	CITY OF LINCOLN WASTEWATER TRMT
Facility address:	2400 THERESA ST LINCOLN, NE 68521
EPA ID:	NED981712417
Mailing address:	THERESA ST LINCOLN, NE 68521
Contact:	JORGE SAMAYOA
Contact address:	2400 THERESA ST LINCOLN, NE 68521
Contact country:	US
Contact telephone:	(402) 441-7961
Contact email:	Not reported
EPA Region:	07
Land type:	Municipal
Classification:	Conditionally Exempt Small Quantity Generator
Description:	Handler: generates 100 kg or less of hazardous waste per calendar month, and accumulates 1000 kg or less of hazardous waste at any time; or generates 1 kg or less of acutely hazardous waste per calendar month, and accumulates at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste; or generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste

Owner/Operator Summary:

Owner/operator name:	CITY OF LINCOLN
Owner/operator address:	Not reported Not reported
Owner/operator country:	Not reported
Owner/operator telephone:	Not reported
Legal status:	Municipal
Owner/Operator Type:	Owner
Owner/Op start date:	Not reported
Owner/Op end date:	Not reported

Handler Activities Summary:

U.S. importer of hazardous waste:	No
Mixed waste (haz. and radioactive):	No
Recycler of hazardous waste:	No
Transporter of hazardous waste:	No
Treater, storer or disposer of HW:	No
Underground injection activity:	No
On-site burner exemption:	No
Furnace exemption:	No
Used oil fuel burner:	No
Used oil processor:	No

CITY OF LINCOLN WASTEWATER TRMT (Continued) **1000440501**

User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

Historical Generators:
Date form received by agency: 02/13/1996
Site name: CITY OF LINCOLN WASTEWATER TRMT
Classification: Small Quantity Generator

Hazardous Waste Summary:
Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Violation Status: No violations found

Evaluation Action Summary:
Evaluation date: 10/15/1998
Evaluation: COMPLIANCE ASSISTANCE VISIT
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

AIRS (AFS):

Compliance and Violation Data Major Sources:
EPA plant ID: 110000555195
Plant name: THERESA STREET PLANT
Plant address: 2400 THERESA ST
LINCOLN, NE 68521
County: LANCASTER
Region code: 07
Dunn & Bradst #: Not reported
Air quality cntrl region: 145
Sic code: 9999
Sic code desc: NONCLASSIFIABLE ESTABLISHMENTS
North Am. industrial classf: 924110
NAIC code description: Administration of Air and Water Resource and Solid Waste Management Programs
Default compliance status: UNKNOWN COMPLIANCE STATUS
Default classification: ACTUAL OR POTENTIAL EMISSIONS ARE ABOVE THE APPLICABLE MAJOR SOURCE

CITY OF LINCOLN WASTEWATER TRMT (Continued) **1000440501**

	THRESHOLDS
Govt facility:	SOURCE OWNED OR OPERATED BY THE MUNICIPALITY
Current HPV:	Not reported

Airs Minor Details:

EPA plant ID:	110013326846
Plant name:	CITY OF LINCOLN
Plant address:	2400 THERESA STREET LINCOLN, NE 68521
County:	LANCASTER
Region code:	07
Dunn & Bradst #:	Not reported
Air quality cntrl region:	145
Sic code:	5093
Sic code desc:	SCRAP AND WASTE MATERIALS
North Am. industrial classf:	Not reported
NAIC code description:	Not reported
Default compliance status:	IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS
Default classification:	POTENTIAL UNCONTROLLED EMISSIONS < 100 TONS/YEAR
Govt facility:	ALL OTHER FACILITIES NOT OWNED OR OPERATED BY A FEDERAL, STATE, OR LOCAL GOVERNMENT
Current HPV:	Not reported

Historical Compliance Minor Sources:

State compliance status:	IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS
Hist compliance date:	1403
Air prog code hist file:	CFC TRACKING
State compliance status:	IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS
Hist compliance date:	1401
Air prog code hist file:	CFC TRACKING
State compliance status:	IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS
Hist compliance date:	1303
Air prog code hist file:	CFC TRACKING
State compliance status:	IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS
Hist compliance date:	1302
Air prog code hist file:	CFC TRACKING
State compliance status:	IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS
Hist compliance date:	1204
Air prog code hist file:	CFC TRACKING
State compliance status:	IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS
Hist compliance date:	1202
Air prog code hist file:	CFC TRACKING
State compliance status:	IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS
Hist compliance date:	1201
Air prog code hist file:	CFC TRACKING
State compliance status:	IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS
Hist compliance date:	1402

CITY OF LINCOLN WASTEWATER TRMT (Continued) **1000440501**

Air prog code hist file: CFC TRACKING

State compliance status: IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS
Hist compliance date: 1304
Air prog code hist file: CFC TRACKING

State compliance status: IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS
Hist compliance date: 1301
Air prog code hist file: CFC TRACKING

State compliance status: IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS
Hist compliance date: 1203
Air prog code hist file: CFC TRACKING

State compliance status: IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS
Hist compliance date: 1104
Air prog code hist file: CFC TRACKING

Compliance & Violation Data by Minor Sources:
Air program code: CFC TRACKING
Plant air program pollutant: CHLOROFLUOROCARBONS
Default pollutant classification: POTENTIAL UNCONTROLLED EMISSIONS < 100 TONS/YEAR
Def. poll. compliance status: IN COMPLIANCE WITH PROCEDURAL REQUIREMENTS
Def. attainment/non attnmnt: Not reported
Repeat violator date: Not reported
Turnover compliance: Not reported

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24 **LINCOLN MANOR** **NE LUST** **S105173248**
2626 N 49TH **N/A**
LINCOLN, NE

LUST:
Facility Status: **No Further Action**
Incident Type: LUST-EXEMPT TK
File Number: AP8926
Owner/RP: LINCOLN MANOR
Line Num: 109
SFM Num: 8926

---

25 **STREET MAINTENANCE OPERATIONS** **FINDS** **1015952893**
3200 BALDWIN AVE **N/A**
LINCOLN, NE 68504

FINDS:

Registry ID: 110045915042

Environmental Interest/Information System
STATE MASTER

25 **CITY OF LINCOLN MAINT DIV** **NE LUST** **U003880782**
3200 BALDWIN **NE UST** **N/A**
LINCOLN, NE 68504 **NE HIST UST**

LUST:

Facility Status: **Additional work needed, DEQ has not yet directed the work to begin**
Incident Type: LUST
File Number: 061094-CT-1305
Owner/RP: CITY OF LINCOLN
Line Num: 121
SFM Num: 1072

UST:

Facility:
Facility ID: 1072
Owner Name: CITY OF LINCOLN EQUIP MGMT
Owner Address: 901 N 6TH ST
Owner City,St,Zip: LINCOLN, NE 68508
Tanks Currently In Use: 4
Tanks Temp Out Of Use: 0
Tanks Perm Out Of Use: 0
Tanks Closed In Place: 0
Tanks Removed: 0

Owner: CITY OF LINCOLN EQUIP MGMT
Owner Address: 901 N 6TH ST
Owner City,St,Zip: LINCOLN, NE 68508
Owner Phone: 402-441-7705
Tank Id/Tank Status: 1 / Currently in Use
Tank Contents: Gasoline
Tank Size: 9728
Tank Date Installed: 1984
Tank Type: Federally Regulated
Tank Construction: Fiberglass Reinforced Plastic
Tank Internal Protection: None
Tank External Protection: None
Tank Secondary Containment: Not reported
Piping Construction Material: Fiberglass Reinforced Plastic

Tank Id/Tank Status: 2 / Currently in Use
Tank Contents: Gasoline
Tank Size: 19807
Tank Date Installed: 1984
Tank Type: Federally Regulated
Tank Construction: Fiberglass Reinforced Plastic
Tank Internal Protection: None
Tank External Protection: None
Tank Secondary Containment: Not reported
Piping Construction Material: Fiberglass Reinforced Plastic

Tank Id/Tank Status: 3 / Currently in Use
Tank Contents: #2 Diesel
Tank Size: 19807
Tank Date Installed: 1984
Tank Type: Federally Regulated
Tank Construction: Fiberglass Reinforced Plastic
Tank Internal Protection: None
Tank External Protection: None

CITY OF LINCOLN MAINT DIV (Continued) **U003880782**

Tank Secondary Containment: Not reported
Piping Construction Material: Fiberglass Reinforced Plastic

Tank Id/Tank Status: 4 / Currently in Use
Tank Contents: #2 Diesel
Tank Size: 9728
Tank Date Installed: 1984
Tank Type: Federally Regulated
Tank Construction: Fiberglass Reinforced Plastic
Tank Internal Protection: None
Tank External Protection: None
Tank Secondary Containment: Not reported
Piping Construction Material: Fiberglass Reinforced Plastic

HIST UST:

Facility ID: 1072
Owner: CITY OF LINCOLN
Owner Address: EQUIPMENT MANAGEMENT 901 N 6TH ST
Owner City,St,Zip: LINCOLN, NE 685080000
Tank Number: 1
Tank Usage Status: **Currently in Use**
Tank Size (Gal): 9728
Tank Construction Material: Fiberglass Reinforced Plastic
Tank Content(s): Gasoline
Tank Installed: 1984
Piping Construction Material(s): Fiberglass Reinforced Plastic

Facility ID: 1072
Owner: CITY OF LINCOLN
Owner Address: EQUIPMENT MANAGEMENT 901 N 6TH ST
Owner City,St,Zip: LINCOLN, NE 685080000
Tank Number: 2
Tank Usage Status: **Currently In Use**
Tank Size (Gal): 19807
Tank Construction Material: Fiberglass Reinforced Plastic
Tank Content(s): Gasoline
Tank Installed: 1984
Piping Construction Material(s): Fiberglass Reinforced Plastic

Facility ID: 1072
Owner: CITY OF LINCOLN
Owner Address: EQUIPMENT MANAGEMENT 901 N 6TH ST
Owner City,St,Zip: LINCOLN, NE 685080000
Tank Number: 3
Tank Usage Status: **Currently in Use**
Tank Size (Gal): 19807
Tank Construction Material: Fiberglass Reinforced Plastic
Tank Content(s): #2 Diesel
Tank Installed: 1984
Piping Construction Material(s): Fiberglass Reinforced Plastic

Facility ID: 1072
Owner: CITY OF LINCOLN
Owner Address: EQUIPMENT MANAGEMENT 901 N 6TH ST
Owner City,St,Zip: LINCOLN, NE 685080000
Tank Number: 4
Tank Usage Status: **Currently in Use**

CITY OF LINCOLN MAINT DIV (Continued) **U003880782**

Tank Size (Gal): 9728
Tank Construction Material: Fiberglass Reinforced Plastic
Tank Content(s): #2 Diesel
Tank Installed: 1984
Piping Construction Material(s): Fiberglass Reinforced Plastic

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26 **RAUSCH ENTERPRISES** **NE LUST** **S105114071**
2304 N 48TH (48TH **N/A**
LINCOLN, NE

LUST:
Facility Status: No Further Action
Incident Type: LUST
File Number: 110689-99-0012
Owner/RP: RAUSCH ENTERPRISES
Line Num: 540
SFM Num: 1520

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26 **EDR US Hist Auto Stat** **1015345082**
2304 N 48TH ST **N/A**
LINCOLN, NE 68504

EDR Historical Auto Stations:
Name: BUGGY BATH CAR WASH
Year: 1999
Address: 2304 N 48TH ST

Name: BUGGY BATH CAR WASH
Year: 2000
Address: 2304 N 48TH ST

---

26 **UNI 66 SERVICE** **NE UST** **U004059495**
2304 N 48TH ST **N/A**
LINCOLN, NE 68504

UST:

Facility:
Facility ID: 1520
Owner Name: RAASCH ENT INC
Owner Address: 3301 PIONEERS BLVD
Owner City,St,Zip: LINCOLN, NE 68516
Tanks Currently In Use: 0
Tanks Temp Out Of Use: 0
Tanks Perm Out Of Use: 0
Tanks Closed In Place: 0
Tanks Removed: 0

Owner: RAASCH ENT INC
Owner Address: 3301 PIONEERS BLVD
Owner City,St,Zip: LINCOLN, NE 68516
Owner Phone: Not reported
Tank Id/Tank Status: 1 / Not Reported
Tank Contents: Not reported
Tank Size: Not reported

UNI 66 SERVICE (Continued) **U004059495**

Tank Date Installed:	Not reported
Tank Type:	Not reported
Tank Construction:	Not reported
Tank Internal Protection:	Not reported
Tank External Protection:	Not reported
Tank Secondary Containment:	Not reported
Piping Construction Material:	Not reported

---

26 **TREASURE CITY STAT** **NE LUST** **S110993314**
NW CRNR 48 & LEIGH **N/A**
LINCOLN, NE

LUST:

Facility Status:	**Priority List for orphan sites (Responsible Party not viable)**
Incident Type:	LUST
File Number:	05259-SMS-1430
Owner/RP:	UNK, 48 & LEIGHTON
Line Num:	660
SFM Num:	NONE

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26 **EDR US Hist Auto Stat** **1015348680**
2335 N 49TH ST **N/A**
LINCOLN, NE 68504

EDR Historical Auto Stations:

Name:	RONS AUTOMOTIVE
Year:	2001
Address:	2335 N 49TH ST
Name:	RONS AUTOMOTIVE
Year:	2002
Address:	2335 N 49TH ST
Name:	RONS AUTOMOTIVE
Year:	2003
Address:	2335 N 49TH ST
Name:	RONS AUTOMOTIVE
Year:	2004
Address:	2335 N 49TH ST
Name:	RONS AUTOMOTIVE
Year:	2008
Address:	2335 N 49TH ST
Name:	RONS AUTOMOTIVE
Year:	2009
Address:	2335 N 49TH ST
Name:	RONS AUTOMOTIVE
Year:	2010
Address:	2335 N 49TH ST
Name:	RONS AUTOMOTIVE
Year:	2011
Address:	2335 N 49TH ST

(Continued) **1015348680**

Name: RONS AUTOMOTIVE
Year: 2012
Address: 2335 N 49TH ST

---

26 **WINDSTREAM NEBRASKA WALKER CENTRAL OFFICE** **NE UST** **U004108018**
4848 WALKER AVE **N/A**
LINCOLN, NE 68504

UST:

Facility:

Facility ID:	7189
Owner Name:	WINDSTREAM NEBRASKA INC
Owner Address:	4001 RODNEY PARHAM 1170B1-F03-28B
Owner City,St,Zip:	LITTLE ROCK, AR 72212
Tanks Currently In Use:	1
Tanks Temp Out Of Use:	0
Tanks Perm Out Of Use:	0
Tanks Closed In Place:	0
Tanks Removed:	0

Owner:	WINDSTREAM NEBRASKA INC
Owner Address:	4001 RODNEY PARHAM 1170B1-F03-28B
Owner City,St,Zip:	LITTLE ROCK, AR 72212
Owner Phone:	501-748-5765
Tank Id/Tank Status:	1 / Currently in Use
Tank Contents:	#2 Diesel
Tank Size:	500
Tank Date Installed:	1982
Tank Type:	Federally Regulated
Tank Construction:	Fiberglass Reinforced Plastic
Tank Internal Protection:	None
Tank External Protection:	Fiberglass Reinforced Plastic Coated
Tank Secondary Containment:	Not reported
Piping Construction Material:	Fiberglass Reinforced Plastic

---

26 **WINDSTREAM COMMUNICATIONS** **FINDS** **1005825066**
4848 WALKER AVE **NE LUST** **N/A**
LINCOLN, NE 68504 **NE HIST UST**
NE TIER 2

FINDS:

Registry ID: 110006578676

Environmental Interest/Information System
STATE MASTER

LUST:

Facility Status:	**No Further Action**
Incident Type:	LUST
File Number:	100199-99-0008
Owner/RP:	LINCOLN TELEPHONE
Line Num:	402
SFM Num:	7189

WINDSTREAM COMMUNICATIONS (Continued) **1005825066**

HIST UST:
Facility ID: 7189
Owner: ALLTEL
Owner Address: PO BOX 81309
Owner City,St,Zip: LINCOLN, NE 685011309
Tank Number: 1
Tank Usage Status: **Currently in Use**
Tank Size (Gal): 500
Tank Construction Material: Fiberglass Reinforced Plastic
Tank Content(s): #2 Diesel
Tank Installed: 1982
Piping Construction Material(s): Fiberglass Reinforced Plastic

TIER 2:
Year: 2013
Facility ID: 59682
Location: NW cnr Walker Ave & N 49th St
SR No: 2583

Chemical:
Year: 2013
SR No: 2583
Case Number: 7664-93-9
EHS: Y
Storage Location: Basement
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4302
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): Sulfuric Acid (Battery Electrolyte)

Year: 2012
Facility ID: 59682
Location: NW cnr Walker Ave & N 49th St
SR No: 2503

Chemical:
Year: 2012
SR No: 2503
Case Number: 7664-93-9
EHS: Y
Storage Location: Basement
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4302
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): Sulfuric Acid (Battery Electrolyte)

Year: 2011
Facility ID: 59682
Location: NW cnr Walker Ave & N 49th St
SR No: 2363

Chemical:
Year: 2011
SR No: 2363
Case Number: 7664-93-9
EHS: Y

WINDSTREAM COMMUNICATIONS (Continued) **1005825066**

Storage Location: Basement
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4302
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): Sulfuric Acid (Battery Electrolyte)

Year: 2010
Facility ID: 59682
Location: NW cnr Walker Ave & N 49th St
SR No: 2493

Chemical:
Year: 2010
SR No: 2493
Case Number: 7664-93-9
EHS: Y
Storage Location: Basement
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4302
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): Sulfuric Acid (Battery Electrolyte)

Year: 2009
Facility ID: 59682
Location: NW cnr Walker Ave & N 49th St
SR No: 2533

Chemical:
Year: 2009
SR No: 2533
Case Number: 7664-93-9
EHS: Y
Storage Location: Basement
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4302
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): Sulfuric Acid (Battery Electrolyte)

Year: 2008
Facility ID: 59682
Location: NW cnr Walker Ave & N 49th St
SR No: 2394

Chemical:
Year: 2008
SR No: 2394
Case Number: 7664-93-9
EHS: Y
Storage Location: Basement
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4302
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): Sulfuric Acid (Battery Electrolyte)

Year: 2007

WINDSTREAM COMMUNICATIONS (Continued) **1005825066**

Facility ID: 59682
Location: NW cnr Walker Ave & N 49th St
SR No: 2483

Chemical:
Year: 2007
SR No: 2483
Case Number: 7664-93-9
EHS: Y
Storage Location: Basement
Max. Amount: Not reported
Average Amount: Not reported
Chemical ID: 4302
Chemical Reporting Name(Active Ingredient): Not reported
Chemical Reporting Name(Trade Name): Sulfuric Acid (Battery Electrolyte)

Year: 2006
Facility ID: 59682
Location: Not reported
SR No: Not reported

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26 **ORPHAN USTS** **NE LUST** **S102257841**
2401 N 48 ST **N/A**
LINCOLN, NE

LUST:
Facility Status: No Further Action
Incident Type: LUST-EXEMPT TK
File Number: 090893-99-0000
Owner/RP: UNIV PLACE LINCOLN
Line Num: 635
SFM Num: 10836

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26 **AMOCO (FORMER)** **NE UST** **U004054099**
2402 N 48TH ST **N/A**
LINCOLN, NE 68504

UST:

Facility:
Facility ID: 11665
Owner Name: AMOCO STATION (FORMER)
Owner Address: 2502 N 48TH ST
Owner City,St,Zip: LINCOLN, NE 68506
Tanks Currently In Use: 0
Tanks Temp Out Of Use: 0
Tanks Perm Out Of Use: 0
Tanks Closed In Place: 0
Tanks Removed: 2

Owner: AMOCO STATION (FORMER)
Owner Address: 2502 N 48TH ST
Owner City,St,Zip: LINCOLN, NE 68506
Owner Phone: Not reported
Tank Id/Tank Status: 1 / Not Reported
Tank Contents: Not reported
Tank Size: Not reported

AMOCO (FORMER) (Continued) U004054099

Tank Date Installed: Not reported
Tank Type: Not reported
Tank Construction: Not reported
Tank Internal Protection: Not reported
Tank External Protection: Not reported
Tank Secondary Containment: Not reported
Piping Construction Material: Not reported

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26 **EDR US Hist Cleaners** **1015065405**
4740 HUNTINGTON AVE **N/A**
LINCOLN, NE 68504

EDR Historical Cleaners:
Name: WILLIAMS CLEANERS
Year: 2011
Address: 4740 HUNTINGTON AVE

Name: WILLIAMS CLEANERS
Year: 2012
Address: 4740 HUNTINGTON AVE

---

26 **FORMER AMOCO STATI** **NE LUST** **S102955407**
2502 N 48TH ST **N/A**
LINCOLN, NE

LUST:
Facility Status: **No Further Action**
Incident Type: LUST
File Number: 110597-GW-0530
Owner/RP: AMOCO OIL CORP
Line Num: 42
SFM Num: 11665

---

26 **WILLIAMS CLEANERS INC** **NE UST** **U004060091**
2541 N 48TH ST **N/A**
LINCOLN, NE 68504

UST:

Facility:
Facility ID: 2836
Owner Name: WILLIAMS CLEANERS INC
Owner Address: 2541 N 48TH ST
Owner City,St,Zip: LINCOLN, NE 68504
Tanks Currently In Use: 0
Tanks Temp Out Of Use: 0
Tanks Perm Out Of Use: 0
Tanks Closed In Place: 0
Tanks Removed: 0

Owner: WILLIAMS CLEANERS INC
Owner Address: 2541 N 48TH ST
Owner City,St,Zip: LINCOLN, NE 68504
Owner Phone: Not reported
Tank Id/Tank Status: 1 / Not Reported

WILLIAMS CLEANERS INC (Continued) **U004060091**

Tank Contents:	Not reported
Tank Size:	Not reported
Tank Date Installed:	Not reported
Tank Type:	Not reported
Tank Construction:	Not reported
Tank Internal Protection:	Not reported
Tank External Protection:	Not reported
Tank Secondary Containment:	Not reported
Piping Construction Material:	Not reported

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26 **WILLIAMS CLEANERS & LAUNDERERS** **NE LUST** **S105832174**
2541 N 48TH ST **NE DRYCLEANERS** **N/A**
LINCOLN, NE 68504 **NE AIRS**

LUST:

Facility Status:	**No Further Action**
Incident Type:	LUST-EXEMPT TK
File Number:	AP2836
Owner/RP:	WILLIAMS CLEANERS
Line Num:	203
SFM Num:	2836

NE Dryclean:

Facility Type:	Drycleaning Plants Except Rug Cleaning
Number Of Facilities:	3
SIC Code:	7216
SIC Code 2:	0

NE AIRS:

Facility ID:	60638
Directions to Facility:	SW Cnr 48 St & Baldwin & NW Cnr 48 St & Huntington

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26 **WILLIAMS CLEANERS & LAUNDERERS** **RCRA-SQG** **1000284132**
2541 N 48TH ST **FINDS** **NED087068763**
LINCOLN, NE 68504 **US AIRS**

RCRA-SQG:

Date form received by agency:	03/24/2004
Facility name:	WILLIAMS CLEANERS
Facility address:	2541 NORTH 48 ST LINCOLN, NE 68504
EPA ID:	NED087068763
Mailing address:	NORTH 48 ST LINCOLN, NE 68504
Contact:	DAVID D WINTER
Contact address:	NORTH 48 ST LINCOLN, NE 68504
Contact country:	US
Contact telephone:	(402) 464-7447
Contact email:	Not reported
EPA Region:	07
Land type:	Private
Classification:	Small Small Quantity Generator
Description:	Handler: generates more than 100 and less than 1000 kg of hazardous waste during any calendar month and accumulates less than 6000 kg of

WILLIAMS CLEANERS & LAUNDERERS (Continued) **1000284132**

hazardous waste at any time; or generates 100 kg or less of hazardous waste during any calendar month, and accumulates more than 1000 kg of hazardous waste at any time

Owner/Operator Summary:

Owner/operator name:	DAVID D WINTER
Owner/operator address:	Not reported Not reported
Owner/operator country:	US
Owner/operator telephone:	Not reported
Legal status:	Private
Owner/Operator Type:	Operator
Owner/Op start date:	12/01/1999
Owner/Op end date:	Not reported

Owner/operator name:	DAVID D WINTER
Owner/operator address:	Not reported Not reported
Owner/operator country:	US
Owner/operator telephone:	Not reported
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	12/01/1999
Owner/Op end date:	Not reported

Owner/operator name:	RONALD STROUGH
Owner/operator address:	2541 NORTH 48TH LINCOLN, NE 68504
Owner/operator country:	Not reported
Owner/operator telephone:	(402) 464-7447
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	01/01/0001
Owner/Op end date:	Not reported

Handler Activities Summary:

U.S. importer of hazardous waste:	No
Mixed waste (haz. and radioactive):	No
Recycler of hazardous waste:	No
Transporter of hazardous waste:	No
Treater, storer or disposer of HW:	No
Underground injection activity:	No
On-site burner exemption:	No
Furnace exemption:	No
Used oil fuel burner:	No
Used oil processor:	No
User oil refiner:	No
Used oil fuel marketer to burner:	No
Used oil Specification marketer:	No
Used oil transfer facility:	No
Used oil transporter:	No

Historical Generators:

Date form received by agency:	09/20/1995
Site name:	WILLIAMS CLEANERS, INC.
Classification:	Small Quantity Generator

WILLIAMS CLEANERS & LAUNDERERS (Continued) **1000284132**

Hazardous Waste Summary:

Waste code:	F001
Waste name:	THE FOLLOWING SPENT HALOGENATED SOLVENTS USED IN DEGREASING: TETRACHLOROETHYLENE, TRICHLOROETHYLENE, METHYLENE CHLORIDE, 1,1,1-TRICHLOROETHANE, CARBON TETRACHLORIDE, AND CHLORINATED FLUOROCARBONS; ALL SPENT SOLVENT MIXTURES/BLENDS USED IN DEGREASING CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.
Waste code:	D007
Waste name:	CHROMIUM
Waste code:	D039
Waste name:	TETRACHLOROETHYLENE
Waste code:	D040
Waste name:	TRICHLOROETHYLENE
Waste code:	F002
Waste name:	THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2-TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE LISTED IN F001, F004, OR F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Facility Has Received Notices of Violations:

Regulation violated:	SR - T128, Ch4, 003.02
Area of violation:	Generators - General
Date violation determined:	03/10/2004
Date achieved compliance:	03/22/2004
Violation lead agency:	State
Enforcement action:	WRITTEN INFORMAL
Enforcement action date:	03/10/2004
Enf. disposition status:	Not reported
Enf. disp. status date:	Not reported
Enforcement lead agency:	State
Proposed penalty amount:	Not reported
Final penalty amount:	Not reported
Paid penalty amount:	Not reported

Regulation violated:	SR - T128, Ch9, 007.09B
Area of violation:	Generators - General
Date violation determined:	03/10/2004
Date achieved compliance:	03/22/2004
Violation lead agency:	State
Enforcement action:	WRITTEN INFORMAL
Enforcement action date:	03/10/2004
Enf. disposition status:	Not reported
Enf. disp. status date:	Not reported
Enforcement lead agency:	State

WILLIAMS CLEANERS & LAUNDERERS (Continued) **1000284132**

Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: SR - T128, Ch10, 004.01F
Area of violation: Generators - General
Date violation determined: 03/10/2004
Date achieved compliance: 03/22/2004
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 03/10/2004
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: SR - T128, Ch10, 004.01A2
Area of violation: Generators - General
Date violation determined: 03/10/2004
Date achieved compliance: 03/22/2004
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 03/10/2004
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: SR - T128, Ch17, 007.01D
Area of violation: Generators - General
Date violation determined: 03/10/2004
Date achieved compliance: 03/22/2004
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 03/10/2004
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: SR - T128, Ch4, 002
Area of violation: Generators - General
Date violation determined: 03/10/2004
Date achieved compliance: 03/30/2004
Violation lead agency: State
Enforcement action: WRITTEN INFORMAL
Enforcement action date: 03/10/2004
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported

WILLIAMS CLEANERS & LAUNDERERS (Continued) **1000284132**

Final penalty amount: Not reported
Paid penalty amount: Not reported

Evaluation Action Summary:

Evaluation date:	02/03/2004
Evaluation:	COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation:	Generators - General
Date achieved compliance:	03/30/2004
Evaluation lead agency:	State
Evaluation date:	02/03/2004
Evaluation:	COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation:	Generators - General
Date achieved compliance:	03/22/2004
Evaluation lead agency:	State

FINDS:

Registry ID: 110001515851

Environmental Interest/Information System

AFS (Aerometric Information Retrieval System (AIRS) Facility Subsystem) replaces the former Compliance Data System (CDS), the National Emission Data System (NEDS), and the Storage and Retrieval of Aerometric Data (SAROAD). AIRS is the national repository for information concerning airborne pollution in the United States. AFS is used to track emissions and compliance data from industrial plants. AFS data are utilized by states to prepare State Implementation Plans to comply with regulatory programs and by EPA as an input for the estimation of total national emissions. AFS is undergoing a major redesign to support facility operating permits required under Title V of the Clean Air Act.

RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

STATE MASTER

CRITERIA AND HAZARDOUS AIR POLLUTANT INVENTORY

AIRS (AFS):

Airs Minor Details:

EPA plant ID:	110001515851
Plant name:	WILLIAMS CLEANERS & LAUNDERERS
Plant address:	2541 N 48TH ST LINCOLN, NE 68504
County:	LANCASTER
Region code:	07
Dunn & Bradst #:	Not reported
Air quality cntrl region:	145

WILLIAMS CLEANERS & LAUNDERERS (Continued) **1000284132**

Sic code: 7216
Sic code desc: DRYCLEANING PLANTS, EXCEPT RUG
North Am. industrial classf: 812320
NAIC code description: Drycleaning and Laundry Services (except Coin-Operated)
Default compliance status: UNKNOWN COMPLIANCE STATUS
Default classification: POTENTIAL UNCONTROLLED EMISSIONS < 100 TONS/YEAR
Govt facility: ALL OTHER FACILITIES NOT OWNED OR OPERATED BY A FEDERAL, STATE, OR LOCAL GOVERNMENT
Current HPV: Not reported

Compliance and Enforcement Major Issues:

Air program: SIP SOURCE
National action type: Not reported
Date achieved: 00000
Penalty amount: Not reported

Air program: SIP SOURCE
National action type: Not reported
Date achieved: 00000
Penalty amount: Not reported

Air program: SIP SOURCE
National action type: Not reported
Date achieved: 00000
Penalty amount: Not reported

Air program: SIP SOURCE
National action type: Not reported
Date achieved: 00000
Penalty amount: Not reported

Air program: SIP SOURCE
National action type: Not reported
Date achieved: 00000
Penalty amount: Not reported

Air program: SIP SOURCE
National action type: Not reported
Date achieved: 00000
Penalty amount: Not reported

Air program: Not reported
National action type: Not reported
Date achieved: Not reported
Penalty amount: Not reported

Air program: Not reported
National action type: Not reported
Date achieved: Not reported
Penalty amount: Not reported

Air program: Not reported
National action type: Not reported
Date achieved: Not reported
Penalty amount: Not reported

WILLIAMS CLEANERS & LAUNDERERS (Continued) **1000284132**

Air program: Not reported
National action type: Not reported
Date achieved: Not reported
Penalty amount: Not reported

Air program: Not reported
National action type: Not reported
Date achieved: Not reported
Penalty amount: Not reported

Air program: Not reported
National action type: Not reported
Date achieved: Not reported
Penalty amount: Not reported

Air program: Not reported
National action type: Not reported
Date achieved: Not reported
Penalty amount: Not reported

Air program: Not reported
National action type: Not reported
Date achieved: Not reported
Penalty amount: Not reported

Air program: Not reported
National action type: Not reported
Date achieved: Not reported
Penalty amount: Not reported

Air program: Not reported
National action type: Not reported
Date achieved: Not reported
Penalty amount: Not reported

Historical Compliance Minor Sources:
State compliance status: IN COMPLIANCE - INSPECTION
Hist compliance date: 1403
Air prog code hist file: MACT (SECTION 63 NESHAPS)

State compliance status: IN COMPLIANCE - INSPECTION
Hist compliance date: 1402
Air prog code hist file: MACT (SECTION 63 NESHAPS)

State compliance status: IN COMPLIANCE - INSPECTION
Hist compliance date: 1401
Air prog code hist file: MACT (SECTION 63 NESHAPS)

State compliance status: IN COMPLIANCE - INSPECTION
Hist compliance date: 1304
Air prog code hist file: MACT (SECTION 63 NESHAPS)

State compliance status: IN COMPLIANCE - INSPECTION
Hist compliance date: 1303
Air prog code hist file: MACT (SECTION 63 NESHAPS)

State compliance status: IN COMPLIANCE - INSPECTION

WILLIAMS CLEANERS & LAUNDERERS (Continued) **1000284132**

Hist compliance date: 1302
Air prog code hist file: MACT (SECTION 63 NESHAPS)

State compliance status: IN COMPLIANCE - INSPECTION
Hist compliance date: 1301
Air prog code hist file: MACT (SECTION 63 NESHAPS)

State compliance status: IN COMPLIANCE - INSPECTION
Hist compliance date: 1204
Air prog code hist file: MACT (SECTION 63 NESHAPS)

State compliance status: IN COMPLIANCE - INSPECTION
Hist compliance date: 1203
Air prog code hist file: MACT (SECTION 63 NESHAPS)

State compliance status: IN COMPLIANCE - INSPECTION
Hist compliance date: 1201
Air prog code hist file: MACT (SECTION 63 NESHAPS)

State compliance status: IN COMPLIANCE - INSPECTION
Hist compliance date: 1104
Air prog code hist file: MACT (SECTION 63 NESHAPS)

State compliance status: UNKNOWN COMPLIANCE STATUS
Hist compliance date: 1402
Air prog code hist file: SIP SOURCE

State compliance status: UNKNOWN COMPLIANCE STATUS
Hist compliance date: 1304
Air prog code hist file: SIP SOURCE

State compliance status: UNKNOWN COMPLIANCE STATUS
Hist compliance date: 1303
Air prog code hist file: SIP SOURCE

State compliance status: UNKNOWN COMPLIANCE STATUS
Hist compliance date: 1301
Air prog code hist file: SIP SOURCE

State compliance status: UNKNOWN COMPLIANCE STATUS
Hist compliance date: 1203
Air prog code hist file: SIP SOURCE

State compliance status: UNKNOWN COMPLIANCE STATUS
Hist compliance date: 1202
Air prog code hist file: SIP SOURCE

State compliance status: UNKNOWN COMPLIANCE STATUS
Hist compliance date: 1104
Air prog code hist file: SIP SOURCE

State compliance status: IN COMPLIANCE - INSPECTION
Hist compliance date: 1202
Air prog code hist file: MACT (SECTION 63 NESHAPS)

State compliance status: UNKNOWN COMPLIANCE STATUS
Hist compliance date: 1403

WILLIAMS CLEANERS & LAUNDERERS (Continued) **1000284132**

Air prog code hist file: SIP SOURCE

State compliance status: UNKNOWN COMPLIANCE STATUS
Hist compliance date: 1401
Air prog code hist file: SIP SOURCE

State compliance status: UNKNOWN COMPLIANCE STATUS
Hist compliance date: 1302
Air prog code hist file: SIP SOURCE

State compliance status: UNKNOWN COMPLIANCE STATUS
Hist compliance date: 1204
Air prog code hist file: SIP SOURCE

State compliance status: UNKNOWN COMPLIANCE STATUS
Hist compliance date: 1201
Air prog code hist file: SIP SOURCE

Compliance & Violation Data by Minor Sources:

Air program code: SIP SOURCE
Plant air program pollutant: PARTICULATE MATTER
Default pollutant classification: POTENTIAL UNCONTROLLED EMISSIONS < 100 TONS/YEAR
Def. poll. compliance status: UNKNOWN COMPLIANCE STATUS
Def. attainment/non attnmnt: ATTAINMENT AREA FOR GIVEN POLLUTANT
Repeat violator date: Not reported
Turnover compliance: Not reported

Air program code: SIP SOURCE
Plant air program pollutant: DEFAULT POLLUTANT FROM CDS
Default pollutant classification: POTENTIAL UNCONTROLLED EMISSIONS < 100 TONS/YEAR
Def. poll. compliance status: NO APPLICABLE STATE REGULATION
Def. attainment/non attnmnt: Not reported
Repeat violator date: Not reported
Turnover compliance: Not reported

Air program code: SIP SOURCE
Plant air program pollutant: TOTAL HYDROCARBONS
Default pollutant classification: POTENTIAL UNCONTROLLED EMISSIONS < 100 TONS/YEAR
Def. poll. compliance status: UNKNOWN COMPLIANCE STATUS
Def. attainment/non attnmnt: Not reported
Repeat violator date: Not reported
Turnover compliance: Not reported

Air program code: SIP SOURCE
Plant air program pollutant: TOTAL PARTICULATE MATTER
Default pollutant classification: POTENTIAL UNCONTROLLED EMISSIONS < 100 TONS/YEAR
Def. poll. compliance status: UNKNOWN COMPLIANCE STATUS
Def. attainment/non attnmnt: ATTAINMENT AREA FOR GIVEN POLLUTANT
Repeat violator date: Not reported
Turnover compliance: Not reported

Air program code: MACT (SECTION 63 NESHAPS)
Plant air program pollutant: TOTAL HYDROCARBONS
Default pollutant classification: POTENTIAL UNCONTROLLED EMISSIONS < 100 TONS/YEAR
Def. poll. compliance status: IN COMPLIANCE - INSPECTION
Def. attainment/non attnmnt: Not reported
Repeat violator date: Not reported

WILLIAMS CLEANERS & LAUNDERERS (Continued) **1000284132**

Turnover compliance: Not reported

Air program code: MACT (SECTION 63 NESHAPS)
Plant air program pollutant: Not reported
Default pollutant classification: POTENTIAL UNCONTROLLED EMISSIONS < 100 TONS/YEAR
Def. poll. compliance status: IN COMPLIANCE - INSPECTION
Def. attainment/non attnmnt: Not reported
Repeat violator date: Not reported
Turnover compliance: Not reported

Permit Information:
Compliance plant ID: 00199
Permit number: 00199
Permit category: N
Permit category desc: NON-TITLE V OPERATING PER

Permit Source:
Compliance plant ID: 00199
Plant name: WILLIAMS CLEANERS & LAUNDERERS
Plant address: 2541 N 48TH ST
LINCOLN, NE 68504

Event Information:
Compliance permit ID: 00199
Permit number: 00199
Event action type: IF
Event description: Not reported
Event action #: 002
Event date: 20070809

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26 **EDR US Hist Cleaners** **1015028975**
2541 N 48TH ST **N/A**
LINCOLN, NE 68504

EDR Historical Cleaners:
Name: WILLIAMS CLEANERS INC
Year: 2004
Address: 2541 N 48TH ST

Name: WILLIAMS CLEANERS INC
Year: 2005
Address: 2541 N 48TH ST

Name: WILLIAMS DRY CLEANERS
Year: 2007
Address: 2541 N 48TH ST

Name: WILLIAMS CLEANERS & LAUNDERERS
Year: 2010
Address: 2541 N 48TH ST

Name: WILLIAMS CLEANERS & LAUNDERERS
Year: 2010
Address: 2541 N 48TH ST

Name: WILLIAMS CLEANERS & LAUNDERERS

(Continued) **1015028975**

Year: 2010
Address: 2541 N 48TH ST

Name: WILLIAMS CLEANERS & SHIRT
Year: 2010
Address: 2541 N 48TH ST

Name: WILLAIMS CLEANERS & LAUNDERERS
Year: 2010
Address: 2541 N 48TH ST

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26 **WILLIAMS CLEANERS** **NE LUST** **S101291989**
48 & BALDWIN **N/A**
LINCOLN, NE

LUST:

Facility Status: **Priority List for orphan sites (Responsible Party not viable)**
Incident Type: LUST
File Number: 07250-EPP-1100
Owner/RP: UNK, 48 & BALDWIN
Line Num: 659
SFM Num: 2836

Facility Status: **No Further Action**
Incident Type: LUST-EXEMPT TK
File Number: 10039-KSA-1130
Owner/RP: WILLIAMS CLEANERS
Line Num: 756
SFM Num: 2836

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27 **EDR US Hist Auto Stat** **1015366185**
2525 STATE FAIR PARK DR **N/A**
LINCOLN, NE 68504

EDR Historical Auto Stations:

Name: CENTRAL BODY SHOP
Year: 1999
Address: 2525 STATE FAIR PARK DR

Name: CENTRAL BODY SHOP
Year: 2000
Address: 2525 STATE FAIR PARK DR

Name: CENTRAL BODY SHOP
Year: 2001
Address: 2525 STATE FAIR PARK DR

Name: CENTRAL BODY SHOP
Year: 2002
Address: 2525 STATE FAIR PARK DR

Name: CENTRAL BODY SHOP
Year: 2003
Address: 2525 STATE FAIR PARK DR

Name: CENTRAL BODY SHOP

(Continued) **1015366185**

Year: 2004
Address: 2525 STATE FAIR PARK DR

Name: CENTRAL BODY SHOP
Year: 2005
Address: 2525 STATE FAIR PARK DR

Name: CENTRAL BODY SHOP
Year: 2006
Address: 2525 STATE FAIR PARK DR

Name: CENTRAL BODY SHOP
Year: 2007
Address: 2525 STATE FAIR PARK DR

Name: CENTRAL BODY SHOP
Year: 2008
Address: 2525 STATE FAIR PARK DR

Name: CENTRAL BODY SHOP
Year: 2009
Address: 2525 STATE FAIR PARK DR

Name: CENTRAL BODY SHOP
Year: 2010
Address: 2525 STATE FAIR PARK DR

Name: CENTRAL BODY SHOP
Year: 2012
Address: 2525 STATE FAIR PARK DR

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27 **EDR US Hist Auto Stat** **1015367490**
2542 N 27TH ST **N/A**
LINCOLN, NE 68521

EDR Historical Auto Stations:
Name: ANDERSON BODY SHOP
Year: 1999
Address: 2542 N 27TH ST

Name: ANDERSON BODY SHOP
Year: 2000
Address: 2542 N 27TH ST

Name: ANDERSON BODY SHOP
Year: 2001
Address: 2542 N 27TH ST

Name: ANDERSONS BODY SHOP
Year: 2002
Address: 2542 N 27TH ST

Name: ANDERSON BODY SHOP
Year: 2003
Address: 2542 N 27TH ST

Name: ANDERSONS BODY SHOP
Year: 2004

(Continued) **1015367490**

Address: 2542 N 27TH ST

Name: WAYNES BODY SHOP
Year: 2007
Address: 2542 N 27TH ST

Name: ANDERSONS BODY SHOP
Year: 2010
Address: 2542 N 27TH ST

Name: ANDERSONS BODY SHOP
Year: 2011
Address: 2542 N 27TH ST

Name: ANDERSONS BODY SHOP
Year: 2012
Address: 2542 N 27TH ST

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28 **NEBCO REALTY GROUP** **NE UST** **U004107988**
2405 N 33RD ST **N/A**
LINCOLN, NE 68504

UST:

Facility:

Facility ID:	12383
Owner Name:	NEBCO REALTY GROUP
Owner Address:	1815 Y STREET
Owner City,St,Zip:	LINCOLN, NE 68508
Tanks Currently In Use:	0
Tanks Temp Out Of Use:	0
Tanks Perm Out Of Use:	0
Tanks Closed In Place:	0
Tanks Removed:	1

Owner:	NEBCO REALTY GROUP
Owner Address:	1815 Y STREET
Owner City,St,Zip:	LINCOLN, NE 68508
Owner Phone:	Not reported
Tank Id/Tank Status:	1 / Not Reported
Tank Contents:	Not reported
Tank Size:	Not reported
Tank Date Installed:	Not reported
Tank Type:	Not reported
Tank Construction:	Not reported
Tank Internal Protection:	Not reported
Tank External Protection:	Not reported
Tank Secondary Containment:	Not reported
Piping Construction Material:	Not reported

Map ID Direction Distance Distance (ft.)Site		Database(s)	EDR ID Number EPA ID Number
28	**BLUM'S AUTO REPAIR** **2415 N 33RD ST** **LINCOLN, NE 68504**	**RCRA NonGen / NLR**	**1000294539** **NED035062447**

RCRA NonGen / NLR:

Date form received by agency:	10/15/1986
Facility name:	BLUM'S AUTO REPAIR
Facility address:	2415 N 33RD ST LINCOLN, NE 68504
EPA ID:	NED035062447
Mailing address:	N 33RD ST LINCOLN, NE 68504
Contact:	DAVE COLEMAN
Contact address:	2415 N 33RD ST LINCOLN, NE 68504
Contact country:	US
Contact telephone:	(402) 464-5261
Contact email:	Not reported
EPA Region:	07
Classification:	Non-Generator
Description:	Handler: Non-Generators do not presently generate hazardous waste

Owner/Operator Summary:

Owner/operator name:	DAVID COLEMAN
Owner/operator address:	Not reported Not reported
Owner/operator country:	Not reported
Owner/operator telephone:	Not reported
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	Not reported
Owner/Op end date:	Not reported

Handler Activities Summary:

U.S. importer of hazardous waste:	No
Mixed waste (haz. and radioactive):	No
Recycler of hazardous waste:	No
Transporter of hazardous waste:	No
Treater, storer or disposer of HW:	No
Underground injection activity:	No
On-site burner exemption:	No
Furnace exemption:	No
Used oil fuel burner:	No
Used oil processor:	No
User oil refiner:	No
Used oil fuel marketer to burner:	No
Used oil Specification marketer:	No
Used oil transfer facility:	No
Used oil transporter:	No

Hazardous Waste Summary:

Waste code:	D001
Waste name:	IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT

BLUM'S AUTO REPAIR (Continued) **1000294539**

WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Waste code: F002
Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2-TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE LISTED IN F001, F004, OR F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Violation Status: No violations found

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28 **EDR US Hist Auto Stat** **1015356007**
N/A

2415 N 33RD ST
LINCOLN, NE 68504

EDR Historical Auto Stations:

Name: BLUMS AUTO REPAIR SERVICE
Year: 1999
Address: 2415 N 33RD ST

Name: BLUMS AUTO REPAIR SERVICE
Year: 2000
Address: 2415 N 33RD ST

Name: BLUMS AUTO REPAIR SERVICE
Year: 2001
Address: 2415 N 33RD ST

Name: BLUMS AUTO REPAIR
Year: 2002
Address: 2415 N 33RD ST

Name: BLUMS AUTO REPAIR
Year: 2003
Address: 2415 N 33RD ST

Name: BLUMS AUTO REPAIR
Year: 2004
Address: 2415 N 33RD ST

Name: BLUMS AUTO REPAIR SERVICE
Year: 2005
Address: 2415 N 33RD ST

Name: BLUMS AUTO REPAIR SERVICE
Year: 2007
Address: 2415 N 33RD ST

Name: BLUMS AUTO REPAIR SERVICE
Year: 2008
Address: 2415 N 33RD ST

Name: BLUMS AUTO REPAIR SERVICE
Year: 2009
Address: 2415 N 33RD ST

(Continued) 1015356007

Name: BLUMS AUTO REPAIR SVC
Year: 2010
Address: 2415 N 33RD ST

Name: BLUMS AUTO REPAIR SERVICE
Year: 2011
Address: 2415 N 33RD ST

Name: BLUMS AUTO REPAIR SERVICE
Year: 2012
Address: 2415 N 33RD ST

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28 **EDR US Hist Auto Stat** **1015357848**
2435 N 33RD ST **N/A**
LINCOLN, NE 68504

EDR Historical Auto Stations:

Name: OLSTONS IMPORT CAR SALES
Year: 1999
Address: 2435 N 33RD ST

Name: OLSTONS IMPORT CAR SALES
Year: 2000
Address: 2435 N 33RD ST

Name: OLSTONS IMPORT CAR SALES
Year: 2001
Address: 2435 N 33RD ST

Name: OLSTONS IMPORT CAR REPAIR
Year: 2002
Address: 2435 N 33RD ST

Name: OLSTONS IMPORT CAR REPAIR
Year: 2003
Address: 2435 N 33RD ST

Name: OLSTONS IMPORT CAR REPAIR
Year: 2008
Address: 2435 N 33RD ST

Name: OLSTONS IMPORT CAR REPAIR
Year: 2009
Address: 2435 N 33RD ST

Name: OLSTONS IMPORT CAR REPAIR
Year: 2010
Address: 2435 N 33RD ST

Name: OLSTONS IMPORT AUTO REPAIR
Year: 2011
Address: 2435 N 33RD ST

Name: OLSTONS IMPORT AUTO REPAIR
Year: 2012
Address: 2435 N 33RD ST

28 **OLSTONS IMPORT AUTO** **RCRA-CESQG** **1000417660**
2435 NORTH 33RD STREET **NED072895220**
LINCOLN, NE 68504

RCRA-CESQG:

Date form received by agency:	02/04/2005
Facility name:	OLSTONS IMPORT AUTO
Facility address:	2435 NORTH 33RD STREET LINCOLN, NE 68504
EPA ID:	NED072895220
Mailing address:	NORTH 33RD STREET LINCOLN, NE 68504
Contact:	ROBERT MALOUSEK
Contact address:	NORTH 33RD STREET LINCOLN, NE 68504
Contact country:	US
Contact telephone:	(402) 467-2397
Contact email:	Not reported
EPA Region:	07
Land type:	Facility is not located on Indian land. Additional information is not known.
Classification:	Conditionally Exempt Small Quantity Generator
Description:	Handler: generates 100 kg or less of hazardous waste per calendar month, and accumulates 1000 kg or less of hazardous waste at any time; or generates 1 kg or less of acutely hazardous waste per calendar month, and accumulates at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste; or generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste

Owner/Operator Summary:

Owner/operator name:	ROBERT MALOUSEK
Owner/operator address:	Not reported Not reported
Owner/operator country:	Not reported
Owner/operator telephone:	Not reported
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	Not reported
Owner/Op end date:	Not reported

Owner/operator name:	ROBERT MALOUSEK
Owner/operator address:	Not reported Not reported
Owner/operator country:	Not reported
Owner/operator telephone:	Not reported
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	01/01/0001
Owner/Op end date:	Not reported

Handler Activities Summary:

OLSTONS IMPORT AUTO (Continued) **1000417660**

U.S. importer of hazardous waste: No
Mixed waste (haz. and radioactive): No
Recycler of hazardous waste: No
Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

Historical Generators:
Date form received by agency: 07/25/1986
Site name: OLSTONS IMPORT AUTO
Classification: Not a generator, verified

Hazardous Waste Summary:
Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Waste code: F002
Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2-TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE LISTED IN F001, F004, OR F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Waste code: F002
Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND

OLSTONS IMPORT AUTO (Continued) **1000417660**

1,1,2-TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE LISTED IN F001, F004, OR F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Violation Status: No violations found

Evaluation Action Summary:

Evaluation date:	01/21/2005
Evaluation:	COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation:	Not reported
Date achieved compliance:	Not reported
Evaluation lead agency:	State

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28 **OLSTONS IMPORT AUTO** **FINDS** **1016665202**
2435 N 33 ST **N/A**
LINCOLN, NE 68504

FINDS:

Registry ID: 110004076240

Environmental Interest/Information System

US EPA Air Quality System (AQS) contains ambient air pollution data collected by EPA, State, Local, and Tribal air pollution control agencies from thousands of monitoring stations.

RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

STATE MASTER

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28 **CRASHBUSTER BODY & PAINT INC** **RCRA-CESQG** **1004748033**
3221 HUNTINGTON **WI MANIFEST** **NED981128176**
LINCOLN, NE 68504

RCRA-CESQG:

Date form received by agency:	10/05/1995
Facility name:	CRASHBUSTER BODY & PAINT INC
Facility address:	3221 HUNTINGTON LINCOLN, NE 68504
EPA ID:	NED981128176
Mailing address:	HUNTINGTON AVENUE LINCOLN, NE 68504
Contact:	DARRELL SWARTZ
Contact address:	3221 HUNTINGTON LINCOLN, NE 68504
Contact country:	US
Contact telephone:	(402) 465-4150
Contact email:	Not reported
EPA Region:	07

CRASHBUSTER BODY & PAINT INC (Continued) **1004748033**

Classification: Conditionally Exempt Small Quantity Generator
Description: Handler: generates 100 kg or less of hazardous waste per calendar month, and accumulates 1000 kg or less of hazardous waste at any time; or generates 1 kg or less of acutely hazardous waste per calendar month, and accumulates at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste; or generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste

Owner/Operator Summary:
Owner/operator name: S & W ENTERPRISES
Owner/operator address: 3221 HUNTINGTON AVE
LINCOLN, NE 68504
Owner/operator country: Not reported
Owner/operator telephone: (402) 465-4150
Legal status: Private
Owner/Operator Type: Owner
Owner/Op start date: Not reported
Owner/Op end date: Not reported

Handler Activities Summary:
U.S. importer of hazardous waste: No
Mixed waste (haz. and radioactive): No
Recycler of hazardous waste: No
Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

Hazardous Waste Summary:
Waste code: F003
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

CRASHBUSTER BODY & PAINT INC (Continued) **1004748033**

Waste code: F005
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Violation Status: No violations found

WI MANIFEST:

Year: 2006
EPA ID: NED981128176
FID: 999499270
ACT Code: 201
ACT Status: A
ACT Code 1: 201
ACT Name: HW Generator - Large
Contact Title: Not reported
Contact Name: GENE HOBELMAN
Contact Address: 3221 HUNTINGTON
Contact City/State/Zip: LINCOLN, NE 68504
Contact Telephone: 4024675252
Contact EMail Address: Not reported

Year: 2005
EPA ID: NED981128176
FID: 999499270
ACT Code: 201
ACT Status: A
ACT Code 1: 201
ACT Name: HW Generator - Large
Contact Title: Not reported
Contact Name: GENE HOBELMAN
Contact Address: 3221 HUNTINGTON
Contact City/State/Zip: LINCOLN, NE 68504
Contact Telephone: 4024675252
Contact EMail Address: Not reported

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28 **EDR US Hist Auto Stat** **1015424448**
3221 HUNTINGTON AVE **N/A**
LINCOLN, NE 68504

EDR Historical Auto Stations:

Name: OLSTONS BODY SHOP
Year: 2001
Address: 3221 HUNTINGTON AVE

28 **CRASHBUSTERS BODY & PAINT INC** **FINDS** **1016662929**
3221 HUNTINGTON **N/A**
LINCOLN, NE 68504

FINDS:

Registry ID: 110004078569

Environmental Interest/Information System
RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

STATE MASTER

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28 **FLEMING FIELDS** **FINDS** **1016691106**
3300 HUNTINGTON AVE **N/A**
LINCOLN, NE 68504

FINDS:

Registry ID: 110045910831

Environmental Interest/Information System
STATE MASTER

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28 **FLEMING FIELDS** **NE NPDES** **S113664069**
3300 HUNTINGTON AVE **N/A**
LINCOLN, NE 68504

NE NPDES:
Facility ID: 81406
Directions to Facility: Between Huntington & Leighton Aves, W Side 33rd
Program Acronym: PCS

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28 **EDR US Hist Auto Stat** **1015363914**
2505 N 33RD ST **N/A**
LINCOLN, NE 68504

EDR Historical Auto Stations:
Name: LANCASTER AUTO SALES
Year: 1999
Address: 2505 N 33RD ST

Name: LANCASTER AUTO SALES
Year: 2000
Address: 2505 N 33RD ST

Name: JOES BODY SHOP
Year: 2001
Address: 2505 N 33RD ST

(Continued) **1015363914**

Name: JOES BODY SHOP
Year: 2002
Address: 2505 N 33RD ST

Name: JOES BODY SHOP
Year: 2003
Address: 2505 N 33RD ST

Name: JOES BODY SHOP
Year: 2004
Address: 2505 N 33RD ST

Name: JOES BODY SHOP
Year: 2005
Address: 2505 N 33RD ST

Name: JOES BODY SHOP
Year: 2007
Address: 2505 N 33RD ST

Name: JOES BODY SHOP
Year: 2008
Address: 2505 N 33RD ST

Name: JOES BODY SHOP
Year: 2009
Address: 2505 N 33RD ST

Name: JOES BODY SHOP
Year: 2010
Address: 2505 N 33RD ST

Name: JOES BODY SHOP
Year: 2011
Address: 2505 N 33RD ST

Name: JOES BODY SHOP
Year: 2012
Address: 2505 N 33RD ST

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28 **JOE'S BODY SHOP** **FINDS** **1016643313**
2505 NORTH 33RD **N/A**
LINCOLN, NE 68504

FINDS:

Registry ID: 110004074769

Environmental Interest/Information System
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STATE MASTER

28 JOE'S BODY SHOP — **RCRA-CESQG** — **1004747955**
2505 NORTH 33RD — **NED045273315**
LINCOLN, NE 68504

RCRA-CESQG:

Date form received by agency:	10/03/1995
Facility name:	JOE'S BODY SHOP
Facility address:	2505 NORTH 33RD LINCOLN, NE 68504
EPA ID:	NED045273315
Mailing address:	NORTH 33RD LINCOLN, NE 68504
Contact:	VERN STOPPEL
Contact address:	2505 NORTH 33RD LINCOLN, NE 68504
Contact country:	US
Contact telephone:	(402) 464-1114
Contact email:	Not reported
EPA Region:	07
Classification:	Conditionally Exempt Small Quantity Generator
Description:	Handler: generates 100 kg or less of hazardous waste per calendar month, and accumulates 1000 kg or less of hazardous waste at any time; or generates 1 kg or less of acutely hazardous waste per calendar month, and accumulates at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste; or generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste

Owner/Operator Summary:

Owner/operator name:	GERALD HEMMINGER
Owner/operator address:	2505 NORTH 33RD LINCOLN, NE 68504
Owner/operator country:	Not reported
Owner/operator telephone:	(402) 464-1114
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	Not reported
Owner/Op end date:	Not reported

Handler Activities Summary:

U.S. importer of hazardous waste:	No
Mixed waste (haz. and radioactive):	No
Recycler of hazardous waste:	No
Transporter of hazardous waste:	No
Treater, storer or disposer of HW:	No
Underground injection activity:	No
On-site burner exemption:	No
Furnace exemption:	No
Used oil fuel burner:	No
Used oil processor:	No
User oil refiner:	No

JOE'S BODY SHOP (Continued) **1004747955**

Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

Hazardous Waste Summary:

Waste code: F003
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F005
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Violation Status: No violations found

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29 **NE CENTER FOR CHIL** **NE LUST** **S105173272**
2320 N 57TH ST **N/A**
LINCOLN, NE

LUST:
Facility Status: No Further Action
Incident Type: LUST-EXEMPT TK
File Number: APHO-0347
Owner/RP: NE CENTER FOR CHIL
Line Num: 139
SFM Num: 8816

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30 **EDR US Hist Auto Stat** **1015428311**
3281 MERRILL ST **N/A**
LINCOLN, NE 68503

EDR Historical Auto Stations:
Name: GROPP AUTOMOTIVE SPECIALTIES
Year: 2004
Address: 3281 MERRILL ST

Name: GROPP AUTOMOTIVE
Year: 2005
Address: 3281 MERRILL ST

Name: GROPP AUTOMOTIVE
Year: 2006
Address: 3281 MERRILL ST

30 **GAME & PARKS COMMISSION** **NE LUST** **S103716013**
2200 N 33RD ST **NE SPILLS** **N/A**
LINCOLN, NE 68503 **NE AIRS**

LUST:
Facility Status: **Additional work needed, DEQ has not yet directed the work to begin**
Incident Type: LUST-EXEMPT TK
File Number: 111998-GW-1510
Owner/RP: NEBR GAME & PARKS
Line Num: 484
SFM Num: 8704

NE SPILL:
File Number: 091109-KM-0000
Owner Name: NEBRASKA GAME & PA
Facility Status: **NFA**
Incident Type: FIXED FACILITY
Line Num: 553
SFM Num: NONE

NE AIRS:
Facility ID: 30437
Directions to Facility: NE Cnr N 33 & Merrill,S of Leighton,NW of E Campus

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30 **NEBRASKA GAME & PARKS COMMISSION** **NE UST** **U004057909**
2200 N 33RD ST **N/A**
LINCOLN, NE 68503

UST:

Facility:
Facility ID: 8704
Owner Name: NEB GAME & PARKS COMMISSION
Owner Address: 2200 N 33RD ST
Owner City,St,Zip: LINCOLN, NE 68503
Tanks Currently In Use: 0
Tanks Temp Out Of Use: 0
Tanks Perm Out Of Use: 0
Tanks Closed In Place: 0
Tanks Removed: 1

Owner: NEB GAME & PARKS COMMISSION
Owner Address: 2200 N 33RD ST
Owner City,St,Zip: LINCOLN, NE 68503
Owner Phone: Not reported
Tank Id/Tank Status: 1 / Not Reported
Tank Contents: Not reported
Tank Size: Not reported
Tank Date Installed: Not reported
Tank Type: Not reported
Tank Construction: Not reported
Tank Internal Protection: Not reported
Tank External Protection: Not reported
Tank Secondary Containment: Not reported
Piping Construction Material: Not reported

30 **H R BOOKSTROM CONST CO** **NE UST** **U004056306**
3260 LEIGHTON AVE **N/A**
LINCOLN, NE 68504

UST:

Facility:

Facility ID:	2912
Owner Name:	H R BOOKSTROM CONST CO
Owner Address:	PO BOX 4492
Owner City,St,Zip:	LINCOLN, NE 68504
Tanks Currently In Use:	0
Tanks Temp Out Of Use:	0
Tanks Perm Out Of Use:	0
Tanks Closed In Place:	0
Tanks Removed:	2

Owner:	H R BOOKSTROM CONST CO
Owner Address:	PO BOX 4492
Owner City,St,Zip:	LINCOLN, NE 68504
Owner Phone:	Not reported
Tank Id/Tank Status:	1 / Not Reported
Tank Contents:	Not reported
Tank Size:	Not reported
Tank Date Installed:	Not reported
Tank Type:	Not reported
Tank Construction:	Not reported
Tank Internal Protection:	Not reported
Tank External Protection:	Not reported
Tank Secondary Containment:	Not reported
Piping Construction Material:	Not reported

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30 **H R BOOKSTROM CONS** **NE LUST** **U000914570**
3260 LEIGHTON AVE **N/A**
LINCOLN, NE

LUST:

Facility Status:	**Additional work needed, DEQ has not yet directed the work to begin**
Incident Type:	LUST
File Number:	081601-GW-0837
Owner/RP:	H R BOOKSTROM CONS
Line Num:	235
SFM Num:	2912

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31 **J & I CARWASH** **NE SPILLS** **S105241306**
2110 NORTH 48TH ST **N/A**
LINCOLN, NE

NE SPILL:

File Number:	11056-RRV-1230
Owner Name:	J & I CARWASH
Facility Status:	**NFA**
Incident Type:	MOTOR VEHICLE
Line Num:	384
SFM Num:	Not reported

31 **STOP N SHOP #5**
2200 N 48TH ST
LINCOLN, NE 68504

NE LUST **U000914561**
NE UST **N/A**
NE HIST UST

LUST:

Facility Status: **No Further Action**
Incident Type: LUST
File Number: 111094-GW-1017
Owner/RP: HOLIDAY STATION CO
Line Num: 256
SFM Num: 5665

UST:

Facility:

Facility ID: 5665
Owner Name: SNS PROPERTIES LLC
Owner Address: PO BOX 5546
Owner City,St,Zip: LINCOLN, NE 68505
Tanks Currently In Use: 3
Tanks Temp Out Of Use: 0
Tanks Perm Out Of Use: 0
Tanks Closed In Place: 0
Tanks Removed: 3

Owner: SNS PROPERTIES LLC
Owner Address: PO BOX 5546
Owner City,St,Zip: LINCOLN, NE 68505
Owner Phone: 402-613-7960
Tank Id/Tank Status: 4 / Currently in Use
Tank Contents: 10% Ethanol
Tank Size: 12000
Tank Date Installed: 1994
Tank Type: Federally Regulated
Tank Construction: Steel
Tank Internal Protection: None
Tank External Protection: Galvanic/Sacrificial Current Cathodic Protection
Tank Secondary Containment: Not reported
Piping Construction Material: Fiberglass Reinforced Plastic

Tank Id/Tank Status: 5 / Currently in Use
Tank Contents: 10% Ethanol
Tank Size: 12000
Tank Date Installed: 1994
Tank Type: Federally Regulated
Tank Construction: Steel
Tank Internal Protection: None
Tank External Protection: Galvanic/Sacrificial Current Cathodic Protection
Tank Secondary Containment: Not reported
Piping Construction Material: Fiberglass Reinforced Plastic

Tank Id/Tank Status: 6 / Currently in Use
Tank Contents: Gasoline
Tank Size: 12000
Tank Date Installed: 1994
Tank Type: Federally Regulated
Tank Construction: Steel
Tank Internal Protection: None
Tank External Protection: Galvanic/Sacrificial Current Cathodic Protection

STOP N SHOP #5 (Continued) U000914561

Tank Secondary Containment: Not reported
Piping Construction Material: Fiberglass Reinforced Plastic

HIST UST:

Facility ID:	5665
Owner:	Salem FB, LLC
Owner Address:	PO Box 81006
Owner City,St,Zip:	Lincoln, NE 68508
Tank Number:	4
Tank Usage Status:	**Currently In Use**
Tank Size (Gal):	12000
Tank Construction Material:	Steel
Tank Content(s):	Not reported
Tank Installed:	1994
Piping Construction Material(s):	Fiberglass Reinforced Plastic

Facility ID:	5665
Owner:	Salem FB, LLC
Owner Address:	PO Box 81006
Owner City,St,Zip:	Lincoln, NE 68508
Tank Number:	5
Tank Usage Status:	**Currently in Use**
Tank Size (Gal):	12000
Tank Construction Material:	Steel
Tank Content(s):	Not reported
Tank Installed:	1994
Piping Construction Material(s):	Fiberglass Reinforced Plastic

Facility ID:	5665
Owner:	Salem FB, LLC
Owner Address:	PO Box 81006
Owner City,St,Zip:	Lincoln, NE 68508
Tank Number:	6
Tank Usage Status:	**Currently in Use**
Tank Size (Gal):	12000
Tank Construction Material:	Steel
Tank Content(s):	Not reported
Tank Installed:	1994
Piping Construction Material(s):	Fiberglass Reinforced Plastic

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32 **LINCOLN PUBLIC WOR** **NE LUST** **S100066363**
5145 COLBY ST. **N/A**
LINCOLN, NE

LUST:

Facility Status:	**No Further Action**
Incident Type:	LUST
File Number:	09218-MGF-1330
Owner/RP:	LINCOLN PUBLIC WOR
Line Num:	393
SFM Num:	1079

32 **EDR US Hist Cleaners** **1015071511**
5204 COLBY ST **N/A**
LINCOLN, NE 68504

EDR Historical Cleaners:

Name:	R & S CLEANING
Year:	2010
Address:	5204 COLBY ST

---

32 **LINCOLN PARKS DEPT** **NE UST** **U000914597**
5045 COLBY AVE **NE HIST UST** **N/A**
LINCOLN, NE 68504

UST:

Facility:

Facility ID:	1079
Owner Name:	CITY OF LINCOLN EQUIP MGMT
Owner Address:	901 N 6TH ST
Owner City,St,Zip:	LINCOLN, NE 68508
Tanks Currently In Use:	3
Tanks Temp Out Of Use:	0
Tanks Perm Out Of Use:	0
Tanks Closed In Place:	0
Tanks Removed:	0

Owner:	CITY OF LINCOLN EQUIP MGMT
Owner Address:	901 N 6TH ST
Owner City,St,Zip:	LINCOLN, NE 68508
Owner Phone:	402-441-7705
Tank Id/Tank Status:	1 / Currently in Use
Tank Contents:	#2 Diesel
Tank Size:	6000
Tank Date Installed:	1987
Tank Type:	Federally Regulated
Tank Construction:	Fiberglass Reinforced Plastic
Tank Internal Protection:	Internal Lining(e.g., epoxy resins)
Tank External Protection:	Fiberglass Reinforced Plastic Coated
Tank Secondary Containment:	Not reported
Piping Construction Material:	Fiberglass Reinforced Plastic

Tank Id/Tank Status:	2 / Currently in Use
Tank Contents:	Gasoline
Tank Size:	6000
Tank Date Installed:	1987
Tank Type:	Federally Regulated
Tank Construction:	Fiberglass Reinforced Plastic
Tank Internal Protection:	Internal Lining(e.g., epoxy resins)
Tank External Protection:	Fiberglass Reinforced Plastic Coated
Tank Secondary Containment:	Not reported
Piping Construction Material:	Fiberglass Reinforced Plastic

Tank Id/Tank Status:	3 / Currently in Use
Tank Contents:	Gasoline
Tank Size:	6000
Tank Date Installed:	1987
Tank Type:	Federally Regulated
Tank Construction:	Fiberglass Reinforced Plastic
Tank Internal Protection:	Internal Lining(e.g., epoxy resins)
Tank External Protection:	Fiberglass Reinforced Plastic Coated

LINCOLN PARKS DEPT (Continued) **U000914597**

Tank Secondary Containment: Not reported
Piping Construction Material: Fiberglass Reinforced Plastic

HIST UST:

Facility ID: 1079
Owner: CITY OF LINCOLN
Owner Address: EQUIPMENT MANAGEMENT 901 N 6TH ST
Owner City,St,Zip: LINCOLN, NE 685080000
Tank Number: 1
Tank Usage Status: **Currently In Use**
Tank Size (Gal): 6000
Tank Construction Material: Fiberglass Reinforced Plastic
Tank Content(s): #2 Diesel
Tank Installed: 1987
Piping Construction Material(s): Fiberglass Reinforced Plastic

Facility ID: 1079
Owner: CITY OF LINCOLN
Owner Address: EQUIPMENT MANAGEMENT 901 N 6TH ST
Owner City,St,Zip: LINCOLN, NE 685080000
Tank Number: 2
Tank Usage Status: **Currently in Use**
Tank Size (Gal): 6000
Tank Construction Material: Fiberglass Reinforced Plastic
Tank Content(s): Gasoline
Tank Installed: 1987
Piping Construction Material(s): Fiberglass Reinforced Plastic

Facility ID: 1079
Owner: CITY OF LINCOLN
Owner Address: EQUIPMENT MANAGEMENT 901 N 6TH ST
Owner City,St,Zip: LINCOLN, NE 685080000
Tank Number: 3
Tank Usage Status: **Currently in Use**
Tank Size (Gal): 6000
Tank Construction Material: Fiberglass Reinforced Plastic
Tank Content(s): Gasoline
Tank Installed: 1987
Piping Construction Material(s): Fiberglass Reinforced Plastic

---

33 **ANIMAL RESEARCH FA** **NE LUST** **S105689903**
3940 FAIR ST (ANIM **N/A**
LINCOLN, NE

LUST:

Facility Status: **Risk Based Corrective Action investigation**
Incident Type: LUST-EXEMPT TK
File Number: 110498-NM-1310
Owner/RP: UNIVERSITY OF NEBR
Line Num: 638
SFM Num: 5073

Map ID
Direction
Distance
Distance (ft.)Site | Database(s) | EDR ID Number / EPA ID Number

34 **UNIV OF NEBR-LINCO**
E CMPUS POW PLT,36
LINCOLN, NE

NE LAST **S105241486**
NE SPILLS **N/A**

LAST:
File Number: 061301-QK-0920
Owner/RP: UNL
Facility Status: No Further Action
Incident Type: ABV GRND TNK
Line Num: 746
SFM Num: NONE

NE SPILL:
File Number: 061301-QK-0920
Owner Name: UNL
Facility Status: NFA
Incident Type: ABV GRND TNK
Line Num: 746
SFM Num: NONE

---

35 **CITY OF LINCOLN WATER DEPT**
2021 N 27TH ST
LINCOLN, NE 68503

NE LUST **U003880809**
NE UST **N/A**
NE HIST UST

LUST:
Facility Status: No Further Action
Incident Type: LUST
File Number: 010694-99-0003
Owner/RP: LINCOLN WATER DEPA
Line Num: 404
SFM Num: 1081

UST:

Facility:
Facility ID: 1081
Owner Name: CITY OF LINCOLN EQUIP MGMT
Owner Address: 901 N 6TH ST
Owner City,St,Zip: LINCOLN, NE 68508
Tanks Currently In Use: 3
Tanks Temp Out Of Use: 0
Tanks Perm Out Of Use: 0
Tanks Closed In Place: 0
Tanks Removed: 0

Owner: CITY OF LINCOLN EQUIP MGMT
Owner Address: 901 N 6TH ST
Owner City,St,Zip: LINCOLN, NE 68508
Owner Phone: 402-441-7705
Tank Id/Tank Status: 1 / Currently in Use
Tank Contents: Gasoline
Tank Size: 9728
Tank Date Installed: 1985
Tank Type: Federally Regulated
Tank Construction: Fiberglass Reinforced Plastic
Tank Internal Protection: None
Tank External Protection: None
Tank Secondary Containment: Not reported
Piping Construction Material: Fiberglass Reinforced Plastic

CITY OF LINCOLN WATER DEPT (Continued) **U003880809**

Tank Id/Tank Status: 2 / Currently in Use
Tank Contents: Gasoline
Tank Size: 9728
Tank Date Installed: 1985
Tank Type: Federally Regulated
Tank Construction: Fiberglass Reinforced Plastic
Tank Internal Protection: None
Tank External Protection: None
Tank Secondary Containment: Not reported
Piping Construction Material: Fiberglass Reinforced Plastic

Tank Id/Tank Status: 3 / Currently in Use
Tank Contents: #2 Diesel
Tank Size: 9728
Tank Date Installed: 1985
Tank Type: Federally Regulated
Tank Construction: Fiberglass Reinforced Plastic
Tank Internal Protection: None
Tank External Protection: None
Tank Secondary Containment: Not reported
Piping Construction Material: Fiberglass Reinforced Plastic

HIST UST:
Facility ID: 1081
Owner: CITY OF LINCOLN
Owner Address: EQUIPMENT MANAGEMENT 901 N 6TH ST
Owner City,St,Zip: LINCOLN, NE 685080000
Tank Number: 1
Tank Usage Status: **Currently In Use**
Tank Size (Gal): 9728
Tank Construction Material: Fiberglass Reinforced Plastic
Tank Content(s): Gasoline
Tank Installed: 1985
Piping Construction Material(s): Fiberglass Reinforced Plastic

Facility ID: 1081
Owner: CITY OF LINCOLN
Owner Address: EQUIPMENT MANAGEMENT 901 N 6TH ST
Owner City,St,Zip: LINCOLN, NE 685080000
Tank Number: 2
Tank Usage Status: **Currently in Use**
Tank Size (Gal): 9728
Tank Construction Material: Fiberglass Reinforced Plastic
Tank Content(s): Gasoline
Tank Installed: 1985
Piping Construction Material(s): Fiberglass Reinforced Plastic

Facility ID: 1081
Owner: CITY OF LINCOLN
Owner Address: EQUIPMENT MANAGEMENT 901 N 6TH ST
Owner City,St,Zip: LINCOLN, NE 685080000
Tank Number: 3
Tank Usage Status: **Currently in Use**
Tank Size (Gal): 9728
Tank Construction Material: Fiberglass Reinforced Plastic
Tank Content(s): #2 Diesel
Tank Installed: 1985

CITY OF LINCOLN WATER DEPT (Continued) **U003880809**

Piping Construction Material(s): Fiberglass Reinforced Plastic

---

36 **EAST CAMPUS SVC ST** **NE LUST** **S106057299**
37TH & FAIR ST, NW **N/A**
LINCOLN, NE

LUST:
Facility Status: **No Further Action**
Incident Type: LUST
File Number: AP5074
Owner/RP: UN-L FACILITIES MG
Line Num: 50
SFM Num: 5074

---

37 **GENERAL JOHN J PERSHING USARTC** **RCRA NonGen / NLR** **1004748260**
2000 NORTH 33RD STREET **NER000003624**
LINCOLN, NE 68503

RCRA NonGen / NLR:
Date form received by agency: 05/15/2006
Facility name: GENERAL JOHN J PERSHING USARTC
Facility address: 2000 NORTH 33RD STREET
LINCOLN, NE 685031498
EPA ID: NER000003624
Mailing address: NORTH 33RD STREET
LINCOLN, NE 685031498
Contact: LARRY BROCKMAN
Contact address: 2000 NORTH 33RD STREET
LINCOLN, NE 685031498
Contact country: US
Contact telephone: (402) 471-4985
Contact email: Not reported
EPA Region: 07
Classification: Non-Generator
Description: Handler: Non-Generators do not presently generate hazardous waste

Owner/Operator Summary:
Owner/operator name: US ARMY 89TH REGIONAL SUPPORT
Owner/operator address: 3130 WASHINGTON BLVD
WICHITA, KS 67210
Owner/operator country: Not reported
Owner/operator telephone: (800) 892-7266
Legal status: Federal
Owner/Operator Type: Owner
Owner/Op start date: 01/01/0001
Owner/Op end date: Not reported

Handler Activities Summary:
U.S. importer of hazardous waste: No
Mixed waste (haz. and radioactive): No
Recycler of hazardous waste: No
Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: No

GENERAL JOHN J PERSHING USARTC (Continued) **1004748260**

Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

Historical Generators:
Date form received by agency: 07/14/1997
Site name: US ARMY RESERVE TRNG CENTER J J PERSHING
Classification: Conditionally Exempt Small Quantity Generator

Hazardous Waste Summary:
Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Waste code: D006
Waste name: CADMIUM

Waste code: D007
Waste name: CHROMIUM

Waste code: D008
Waste name: LEAD

Waste code: D009
Waste name: MERCURY

Waste code: D011
Waste name: SILVER

Waste code: D018
Waste name: BENZENE

Waste code: D035
Waste name: METHYL ETHYL KETONE

Waste code: D039
Waste name: TETRACHLOROETHYLENE

Waste code: D040
Waste name: TRICHLOROETHYLENE

Violation Status: No violations found

38 **UN-L VETERINARY DI**
FAIR ST & E CAMPUS
LINCOLN, NE

NE LUST **S109525655**
N/A

LUST:

Facility Status:	**No Further Action**
Incident Type:	LUST-EXEMPT TK
File Number:	011509-NH-1045
Owner/RP:	UN-L EAST CAMPUS V
Line Num:	625
SFM Num:	NONE

---

39 **TRACTOR TESTING TR**
TRACTOR TESTING TR
LINCOLN, NE

NE LUST **S101822836**
N/A

LUST:

Facility Status:	**No Further Action**
Incident Type:	LUST
File Number:	112995-99-0015
Owner/RP:	UNL AG/ENG. DEPART
Line Num:	697
SFM Num:	5086

---

40 **NE TELECOMMUNICATI**
1800 N 33RD
LINCOLN, NE

NE LUST **S103716018**
N/A

LUST:

Facility Status:	**Risk Based Corrective Action investigation**
Incident Type:	LUST
File Number:	111798-GW-0830
Owner/RP:	UNIV OF NEBR FAC M
Line Num:	634
SFM Num:	5072

---

41 **WILLIAMS GARDEN CTR INC**
1742 N 48TH ST
LINCOLN, NE 68504

NE UST **U004060093**
N/A

UST:

Facility:

Facility ID:	6247
Owner Name:	WILLIAMS GARDEN CTR INC
Owner Address:	1742 N 48TH ST
Owner City,St,Zip:	LINCOLN, NE 68504
Tanks Currently In Use:	0
Tanks Temp Out Of Use:	0
Tanks Perm Out Of Use:	0
Tanks Closed In Place:	0
Tanks Removed:	0

Owner:	WILLIAMS GARDEN CTR INC
Owner Address:	1742 N 48TH ST
Owner City,St,Zip:	LINCOLN, NE 68504
Owner Phone:	Not reported

WILLIAMS GARDEN CTR INC (Continued) **U004060093**

Tank Id/Tank Status:	1 / Not Reported
Tank Contents:	Not reported
Tank Size:	Not reported
Tank Date Installed:	Not reported
Tank Type:	Not reported
Tank Construction:	Not reported
Tank Internal Protection:	Not reported
Tank External Protection:	Not reported
Tank Secondary Containment:	Not reported
Piping Construction Material:	Not reported

---

42 **BROWNELL ELEMENTAR** **NE LUST** **S105173195**
6000 AYLESWORTH **N/A**
LINCOLN, NE

LUST:

Facility Status:	**No Further Action**
Incident Type:	LUST-EXEMPT TK
File Number:	AP8633
Owner/RP:	LINCOLN PUBLIC SCH
Line Num:	19
SFM Num:	8633

---

43 **UN-L EAST CAMPUS U** **NE LUST** **S103219668**
38TH & EAST CAMPUS **N/A**
LINCOLN, NE

LUST:

Facility Status:	**No Further Action**
Incident Type:	LUST
File Number:	032798-99-0004
Owner/RP:	UN-L PHYSICAL PLAN
Line Num:	627
SFM Num:	5077

---

44 **EDR US Hist Cleaners** **1014993856**
1440 N 56TH ST **N/A**
LINCOLN, NE 68504

EDR Historical Cleaners:

Name:	LAUNDRY LAND
Year:	2001
Address:	1440 N 56TH ST
Name:	CITY LAUNDRIES
Year:	2003
Address:	1440 N 56TH ST
Name:	CITY LAUNDRIES
Year:	2004
Address:	1440 N 56TH ST
Name:	LAUNDRY LAND
Year:	2005
Address:	1440 N 56TH ST

Map ID
Direction
Distance
Distance (ft.)Site | Database(s) | EDR ID Number / EPA ID Number

(Continued) **1014993856**

Name: LAUNDRY LAND
Year: 2006
Address: 1440 N 56TH ST

Name: LAUNDRY LAND
Year: 2007
Address: 1440 N 56TH ST

Name: LAUNDRY LAND
Year: 2008
Address: 1440 N 56TH ST

Name: LAUNDRY LAND
Year: 2009
Address: 1440 N 56TH ST

Name: LAUNDRY LAND
Year: 2010
Address: 1440 N 56TH ST

---

44 **ANDERSEN SERVICE** **NE LUST** **S102420395**
1445 N 56TH STREET **N/A**
LINCOLN, NE

LUST:
Facility Status: **No Further Action (PL) No Further Action (was a Priority List orphan site)**
Incident Type: LUST
File Number: 090192-GW-0817
Owner/RP: HOLO INC.
Line Num: 258
SFM Num: 1126

---

44 **AUTO CONNECTION** **NE UST** **U004054234**
1445 N 56TH ST **N/A**
LINCOLN, NE 68504

UST:

Facility:
Facility ID: 1126
Owner Name: HOLO INC
Owner Address: PO BOX 57278
Owner City,St,Zip: LINCOLN, NE 68505
Tanks Currently In Use: 0
Tanks Temp Out Of Use: 0
Tanks Perm Out Of Use: 0
Tanks Closed In Place: 0
Tanks Removed: 0

Owner: HOLO INC
Owner Address: PO BOX 57278
Owner City,St,Zip: LINCOLN, NE 68505
Owner Phone: Not reported
Tank Id/Tank Status: 1 / Not Reported
Tank Contents: Not reported
Tank Size: Not reported

AUTO CONNECTION (Continued) **U004054234**

Tank Date Installed: Not reported
Tank Type: Not reported
Tank Construction: Not reported
Tank Internal Protection: Not reported
Tank External Protection: Not reported
Tank Secondary Containment: Not reported
Piping Construction Material: Not reported

---

44 **ANDERSEN SERVICE**
1445 N 56TH STREET
LINCOLN, NE

NE RGA LUST **S115134199**
N/A

RGA LUST:

2012	ANDERSEN SERVICE	1445 N 56TH STREET
2011	ANDERSEN SERVICE	1445 N 56TH STREET
2010	ANDERSEN SERVICE	1445 N 56TH STREET
2009	ANDERSEN SERVICE	1445 N 56TH STREET
2008	ANDERSEN SERVICE	1445 N 56TH STREET
2007	ANDERSEN SERVICE	1445 N 56TH STREET
2006	ANDERSEN SERVICE	1445 N 56TH STREET
2005	ANDERSEN SERVICE	1445 N 56TH STREET
2004	ANDERSEN SERVICE	1445 N 56TH STREET
2003	ANDERSEN SERVICE	1445 N 56TH STREET
2002	ANDERSEN SERVICE	1445 N 56TH STREET
2001	ANDERSEN SERVICE	1445 N 56TH STREET
2000	ANDERSEN SERVICE	1445 N 56TH STREET
1999	ANDERSEN SERVICE	1445 N 56TH STREET

---

44 **ROCS STOP & SHOP**
1449 N 56TH ST
LINCOLN, NE 68504

NE UST **U004124506**
N/A

UST:

Facility:
Facility ID: 11141
Owner Name: ROBIN OIL COMPANY
Owner Address: 3442 OLD DOMINION RD
Owner City,St,Zip: LINCOLN, NE 68516
Tanks Currently In Use: 3
Tanks Temp Out Of Use: 0
Tanks Perm Out Of Use: 0
Tanks Closed In Place: 0
Tanks Removed: 0

ROCS STOP & SHOP (Continued) **U004124506**

Owner:	ROBIN OIL COMPANY
Owner Address:	3442 OLD DOMINION RD
Owner City,St,Zip:	LINCOLN, NE 68516
Owner Phone:	402-421-1769
Tank Id/Tank Status:	1 / Currently in Use
Tank Contents:	Gasoline
Tank Size:	10000
Tank Date Installed:	1993
Tank Type:	Federally Regulated
Tank Construction:	Steel
Tank Internal Protection:	None
Tank External Protection:	Galvanic/Sacrificial Current Cathodic Protection
Tank Secondary Containment:	Not reported
Piping Construction Material:	Fiberglass Reinforced Plastic

Tank Id/Tank Status:	2 / Currently in Use
Tank Contents:	Gasoline
Tank Size:	10000
Tank Date Installed:	1993
Tank Type:	Federally Regulated
Tank Construction:	Steel
Tank Internal Protection:	None
Tank External Protection:	Galvanic/Sacrificial Current Cathodic Protection
Tank Secondary Containment:	Not reported
Piping Construction Material:	Fiberglass Reinforced Plastic

Tank Id/Tank Status:	3 / Currently in Use
Tank Contents:	Gasoline
Tank Size:	6000
Tank Date Installed:	1993
Tank Type:	Federally Regulated
Tank Construction:	Steel
Tank Internal Protection:	None
Tank External Protection:	Galvanic/Sacrificial Current Cathodic Protection
Tank Secondary Containment:	Not reported
Piping Construction Material:	Fiberglass Reinforced Plastic

---

44 **ROBIN INC**
DBA U-STOP 1449 N 56TH ST
LINCOLN, NE 68504

NE HIST UST **U003880916**
N/A

HIST UST:

Facility ID:	11141
Owner:	ROBIN INC d/b/a U-STOP
Owner Address:	1449 N 56TH ST
Owner City,St,Zip:	LINCOLN, NE 685040000
Tank Number:	1
Tank Usage Status:	**Currently in Use**
Tank Size (Gal):	10000
Tank Construction Material:	Steel
Tank Content(s):	Gasoline
Tank Installed:	1993
Piping Construction Material(s):	Fiberglass Reinforced Plastic

Facility ID:	11141
Owner:	ROBIN INC d/b/a U-STOP
Owner Address:	1449 N 56TH ST
Owner City,St,Zip:	LINCOLN, NE 685040000

ROBIN INC (Continued) **U003880916**

Tank Number: 2
Tank Usage Status: **Currently In Use**
Tank Size (Gal): 10000
Tank Construction Material: Steel
Tank Content(s): Gasoline
Tank Installed: 1993
Piping Construction Material(s): Fiberglass Reinforced Plastic

Facility ID: 11141
Owner: ROBIN INC d/b/a U-STOP
Owner Address: 1449 N 56TH ST
Owner City,St,Zip: LINCOLN, NE 685040000
Tank Number: 3
Tank Usage Status: **Currently in Use**
Tank Size (Gal): 6000
Tank Construction Material: Steel
Tank Content(s): Gasoline
Tank Installed: 1993
Piping Construction Material(s): Fiberglass Reinforced Plastic

---

44 **KWIK SHOP #650** **NE LUST** **U000914624**
5600 HOLDREGE **NE UST** **N/A**
LINCOLN, NE 68505 **NE HIST UST**

LUST:
Facility Status: **Additional work needed, DEQ has not yet directed the work to begin**
Incident Type: LUST
File Number: 082196-CT-1005
Owner/RP: KWIK SHOP
Line Num: 317
SFM Num: 654

UST:

Facility:
Facility ID: 654
Owner Name: KWIK SHOP INC ATTN ARLIS NEUFELD
Owner Address: PO BOX 1927
Owner City,St,Zip: HUTCHINSON, KS 67504-1927
Tanks Currently In Use: 3
Tanks Temp Out Of Use: 0
Tanks Perm Out Of Use: 0
Tanks Closed In Place: 0
Tanks Removed: 0

Owner: KWIK SHOP INC ATTN ARLIS NEUFELD
Owner Address: PO BOX 1927
Owner City,St,Zip: HUTCHINSON, KS 67504-1927
Owner Phone: 620-699-8504
Tank Id/Tank Status: 1 / Currently in Use
Tank Contents: Gasoline
Tank Size: 10000
Tank Date Installed: 1985
Tank Type: Federally Regulated
Tank Construction: Fiberglass Reinforced Plastic
Tank Internal Protection: None
Tank External Protection: None
Tank Secondary Containment: Not reported

KWIK SHOP #650 (Continued) U000914624

Piping Construction Material: Fiberglass Reinforced Plastic

Tank Id/Tank Status: 2 / Currently in Use
Tank Contents: Gasoline
Tank Size: 10000
Tank Date Installed: 1985
Tank Type: Federally Regulated
Tank Construction: Fiberglass Reinforced Plastic
Tank Internal Protection: None
Tank External Protection: None
Tank Secondary Containment: Not reported
Piping Construction Material: Fiberglass Reinforced Plastic

Tank Id/Tank Status: 3 / Currently in Use
Tank Contents: Gasoline
Tank Size: 10000
Tank Date Installed: 1985
Tank Type: Federally Regulated
Tank Construction: Fiberglass Reinforced Plastic
Tank Internal Protection: None
Tank External Protection: None
Tank Secondary Containment: Not reported
Piping Construction Material: Fiberglass Reinforced Plastic

HIST UST:

Facility ID: 654
Owner: Kwik Shop Inc Attn: Arlis Neufeld
Owner Address: PO Box 1927
Owner City,St,Zip: Hutchinson, KS 675041927
Tank Number: 1
Tank Usage Status: Currently in Use
Tank Size (Gal): 10000
Tank Construction Material: Fiberglass Reinforced Plastic
Tank Content(s): Gasoline
Tank Installed: 1985
Piping Construction Material(s): Fiberglass Reinforced Plastic

Facility ID: 654
Owner: Kwik Shop Inc Attn: Arlis Neufeld
Owner Address: PO Box 1927
Owner City,St,Zip: Hutchinson, KS 675041927
Tank Number: 2
Tank Usage Status: Currently in Use
Tank Size (Gal): 10000
Tank Construction Material: Fiberglass Reinforced Plastic
Tank Content(s): Gasoline
Tank Installed: 1985
Piping Construction Material(s): Fiberglass Reinforced Plastic

Facility ID: 654
Owner: Kwik Shop Inc Attn: Arlis Neufeld
Owner Address: PO Box 1927
Owner City,St,Zip: Hutchinson, KS 675041927
Tank Number: 3
Tank Usage Status: Currently In Use
Tank Size (Gal): 10000
Tank Construction Material: Fiberglass Reinforced Plastic

Map ID Direction Distance Distance (ft.)	Site	Database(s)	EDR ID Number EPA ID Number
	KWIK SHOP #650 (Continued)		**U000914624**

Tank Content(s): Gasoline
Tank Installed: 1985
Piping Construction Material(s): Fiberglass Reinforced Plastic

---

44 — **NE SPILLS** — **S105238510** / **N/A**

56TH & HOLDREGE
LINCOLN, NE

NE SPILL:
File Number: 030799-ML-1400
Owner Name: KWIK SHOP
Facility Status: **NFA**
Incident Type: FIXED FACILITY
Line Num: 402
SFM Num: Not reported

---

44 — **NE SPILLS** — **S105238509** / **N/A**

5600 HOLDREGE STRE
LINCOLN, NE

NE SPILL:
File Number: 093097-JB-2145
Owner Name: JIM SMITH
Facility Status: **NFA**
Incident Type: MOTOR VEHICLE
Line Num: 388
SFM Num: Not reported

---

45 — **NE LUST** — **S105173292** / **N/A**

UNIVERSITY OF NEBR
43RD AND HOLDREGE
LINCOLN, NE

LUST:
Facility Status: **No Further Action**
Incident Type: LUST-EXEMPT TK
File Number: AP5078
Owner/RP: UNIV. OF NEB. APTS
Line Num: 191
SFM Num: 5078

---

46 — **NE LUST** — **S101291849** / **N/A**

MCCARTNEY AUTO SER
1440 N COTNER BLVD
LINCOLN, NE

LUST:
Facility Status: **No Further Action**
Incident Type: LUST
File Number: 07200-RJF-1500
Owner/RP: MCCARTNEY AUTO SER
Line Num: 412
SFM Num: 1358

46 **KWIK SHOP #680**
1441 N COTNER BLVD
LINCOLN, NE 68505

NE LUST **U001130198**
NE UST **N/A**
NE HIST UST

LUST:

Facility Status: **No Further Action**
Incident Type: LUST
File Number: 06178-RRV-1330
Owner/RP: TEXACO REFINING &
Line Num: 607
SFM Num: 7736

Facility Status: **Additional work needed, DEQ has not yet directed the work to begin**
Incident Type: LUST
File Number: 081396-JB-0830
Owner/RP: TEXACO REFINING &
Line Num: 608
SFM Num: 7736

UST:

Facility:
Facility ID: 7736
Owner Name: KWIK SHOP INC ATTN ARLIS NEUFELD
Owner Address: PO BOX 1927
Owner City,St,Zip: HUTCHINSON, KS 67504-1927
Tanks Currently In Use: 4
Tanks Temp Out Of Use: 0
Tanks Perm Out Of Use: 0
Tanks Closed In Place: 0
Tanks Removed: 0

Owner: KWIK SHOP INC ATTN ARLIS NEUFELD
Owner Address: PO BOX 1927
Owner City,St,Zip: HUTCHINSON, KS 67504-1927
Owner Phone: 620-699-8504
Tank Id/Tank Status: 1 / Currently in Use
Tank Contents: Gasoline
Tank Size: 10000
Tank Date Installed: 1987
Tank Type: Federally Regulated
Tank Construction: Fiberglass Reinforced Plastic
Tank Internal Protection: None
Tank External Protection: None
Tank Secondary Containment: Not reported
Piping Construction Material: Fiberglass Reinforced Plastic

Tank Id/Tank Status: 2 / Currently in Use
Tank Contents: Gasoline
Tank Size: 10000
Tank Date Installed: 1987
Tank Type: Federally Regulated
Tank Construction: Fiberglass Reinforced Plastic
Tank Internal Protection: None
Tank External Protection: None
Tank Secondary Containment: Not reported
Piping Construction Material: Fiberglass Reinforced Plastic

Tank Id/Tank Status: 3 / Currently in Use

KWIK SHOP #680 (Continued) **U001130198**

Tank Contents:	Gasoline
Tank Size:	10000
Tank Date Installed:	1987
Tank Type:	Federally Regulated
Tank Construction:	Fiberglass Reinforced Plastic
Tank Internal Protection:	None
Tank External Protection:	None
Tank Secondary Containment:	Not reported
Piping Construction Material:	Fiberglass Reinforced Plastic

Tank Id/Tank Status:	4 / Currently in Use
Tank Contents:	Gasoline
Tank Size:	10000
Tank Date Installed:	1987
Tank Type:	Federally Regulated
Tank Construction:	Fiberglass Reinforced Plastic
Tank Internal Protection:	None
Tank External Protection:	None
Tank Secondary Containment:	Not reported
Piping Construction Material:	Fiberglass Reinforced Plastic

HIST UST:

Facility ID:	7736
Owner:	Kwik Shop Inc Attn: Arlis Neufeld
Owner Address:	PO Box 1927
Owner City,St,Zip:	Hutchinson, KS 67504-1927
Tank Number:	1
Tank Usage Status:	**Currently In Use**
Tank Size (Gal):	10000
Tank Construction Material:	Fiberglass Reinforced Plastic
Tank Content(s):	Gasoline
Tank Installed:	1987
Piping Construction Material(s):	Fiberglass Reinforced Plastic

Facility ID:	7736
Owner:	Kwik Shop Inc Attn: Arlis Neufeld
Owner Address:	PO Box 1927
Owner City,St,Zip:	Hutchinson, KS 67504-1927
Tank Number:	2
Tank Usage Status:	**Currently in Use**
Tank Size (Gal):	10000
Tank Construction Material:	Fiberglass Reinforced Plastic
Tank Content(s):	Gasoline
Tank Installed:	1987
Piping Construction Material(s):	Fiberglass Reinforced Plastic

Facility ID:	7736
Owner:	Kwik Shop Inc Attn: Arlis Neufeld
Owner Address:	PO Box 1927
Owner City,St,Zip:	Hutchinson, KS 67504-1927
Tank Number:	3
Tank Usage Status:	**Currently in Use**
Tank Size (Gal):	10000
Tank Construction Material:	Fiberglass Reinforced Plastic
Tank Content(s):	Gasoline
Tank Installed:	1987
Piping Construction Material(s):	Fiberglass Reinforced Plastic

KWIK SHOP #680 (Continued) **U001130198**

Facility ID:	7736
Owner:	Kwik Shop Inc Attn: Arlis Neufeld
Owner Address:	PO Box 1927
Owner City,St,Zip:	Hutchinson, KS 67504-1927
Tank Number:	4
Tank Usage Status:	**Currently In Use**
Tank Size (Gal):	10000
Tank Construction Material:	Fiberglass Reinforced Plastic
Tank Content(s):	Gasoline
Tank Installed:	1987
Piping Construction Material(s):	Fiberglass Reinforced Plastic

---

47 **CORMACK ENTERPRISE** **NE LUST** **S102420375**
1448 NORTH 48TH ST **N/A**
LINCOLN, NE

LUST:

Facility Status:	**No Further Action**
Incident Type:	LUST
File Number:	012898-99-0006
Owner/RP:	UNKNOWN
Line Num:	670
SFM Num:	NONE

---

48 **EDR US Hist Cleaners** **1015079709**
6033 DOBBINS DR **N/A**
LINCOLN, NE 68505

EDR Historical Cleaners:

Name:	REEDS CLEANING INC
Year:	2004
Address:	6033 DOBBINS DR
Name:	REEDS CLEANING INC
Year:	2005
Address:	6033 DOBBINS DR
Name:	REEDS CLEANING INC
Year:	2010
Address:	6033 DOBBINS DR

---

49 **EDR US Hist Auto Stat** **1015180157**
1201 N 54TH ST **N/A**
LINCOLN, NE 68504

EDR Historical Auto Stations:

Name:	AUTOMOTIVE EMSN & CMPTR SRVC
Year:	2004
Address:	1201 N 54TH ST

50 **RILEY ELEMENTARY** **NE LUST** **S105173277**
5024 ORCHARD **N/A**
LINCOLN, NE

LUST:

Facility Status:	**No Further Action**
Incident Type:	LUST-EXEMPT TK
File Number:	AP8653
Owner/RP:	LINCOLN PUBLIC SCH
Line Num:	160
SFM Num:	8653

---

51 **JACK KEEF IMPORTS** **NE LUST** **S102420398**
1241 N 48TH ST **N/A**
LINCOLN, NE

LUST:

Facility Status:	**No Further Action**
Incident Type:	LUST
File Number:	052092-CT-0820
Owner/RP:	JACK KEEF IMPORTS
Line Num:	275
SFM Num:	2065

---

52 **KWIK SHOP #620** **NE LUST** **U001130204**
1111 N COTNER BLVD **NE UST** **N/A**
LINCOLN, NE 68505 **NE HIST UST**

LUST:

Facility Status:	**No Further Action**
Incident Type:	LUST
File Number:	122298-CT-1500
Owner/RP:	KWIK SHOP
Line Num:	310
SFM Num:	629

UST:

Facility:

Facility ID:	629
Owner Name:	KWIK SHOP INC ATTN ARLIS NEUFELD
Owner Address:	PO BOX 1927
Owner City,St,Zip:	HUTCHINSON, KS 67504-1927
Tanks Currently In Use:	0
Tanks Temp Out Of Use:	0
Tanks Perm Out Of Use:	0
Tanks Closed In Place:	0
Tanks Removed:	2

Owner:	KWIK SHOP INC ATTN ARLIS NEUFELD
Owner Address:	PO BOX 1927
Owner City,St,Zip:	HUTCHINSON, KS 67504-1927
Owner Phone:	Not reported
Tank Id/Tank Status:	1 / Not Reported
Tank Contents:	Not reported
Tank Size:	Not reported
Tank Date Installed:	Not reported
Tank Type:	Not reported

KWIK SHOP #620 (Continued) **U001130204**

Tank Construction:	Not reported
Tank Internal Protection:	Not reported
Tank External Protection:	Not reported
Tank Secondary Containment:	Not reported
Piping Construction Material:	Not reported

HIST UST:

Facility ID:	629
Owner:	Kwik Shop Inc Attn: Arlis Neufeld
Owner Address:	PO Box 1927
Owner City,St,Zip:	Hutchinson, KS 675041927
Tank Number:	1
Tank Usage Status:	**Currently in Use**
Tank Size (Gal):	10000
Tank Construction Material:	Steel
Tank Content(s):	Gasoline
Tank Installed:	1978
Piping Construction Material(s):	Fiberglass Reinforced Plastic

Facility ID:	629
Owner:	Kwik Shop Inc Attn: Arlis Neufeld
Owner Address:	PO Box 1927
Owner City,St,Zip:	Hutchinson, KS 675041927
Tank Number:	2
Tank Usage Status:	**Currently in Use**
Tank Size (Gal):	6000
Tank Construction Material:	Steel
Tank Content(s):	Gasoline
Tank Installed:	1978
Piping Construction Material(s):	Fiberglass Reinforced Plastic

---

52 **TYRRELLS FLOWERS** **NE LUST** **S105173291**
1133 N COTNER BLVD **N/A**
LINCOLN, NE

LUST:

Facility Status:	**No Further Action**
Incident Type:	LUST-EXEMPT TK
File Number:	AP1824
Owner/RP:	TYRRELLS FLOWERS
Line Num:	187
SFM Num:	1824

---

52 **TYRRELLS FLOWERS INC** **NE UST** **U004059482**
1133 N COTNER BLVD **N/A**
LINCOLN, NE 68505

UST:

Facility:

Facility ID:	1824
Owner Name:	TYRRELLS FLOWERS INC
Owner Address:	1133 N COTNER BLVD
Owner City,St,Zip:	LINCOLN, NE 68505
Tanks Currently In Use:	0
Tanks Temp Out Of Use:	0

TYRRELLS FLOWERS INC (Continued) **U004059482**

Tanks Perm Out Of Use: 0
Tanks Closed In Place: 0
Tanks Removed: 0

Owner: TYRRELLS FLOWERS INC
Owner Address: 1133 N COTNER BLVD
Owner City,St,Zip: LINCOLN, NE 68505
Owner Phone: Not reported
Tank Id/Tank Status: 1 / Not Reported
Tank Contents: Not reported
Tank Size: Not reported
Tank Date Installed: Not reported
Tank Type: Not reported
Tank Construction: Not reported
Tank Internal Protection: Not reported
Tank External Protection: Not reported
Tank Secondary Containment: Not reported
Piping Construction Material: Not reported

---

52 **NE LUST** **S108963514**
1200 N COTNER BLVD **N/A**
LINCOLN, NE

LUST:
Facility Status: No Further Action (PL) No Further Action (was a Priority List orphan site)
Incident Type: LUST
File Number: 110207-JF-1415
Owner/RP: HOUSE OF HOPE
Line Num: 261
SFM Num: Not reported

---

53 **LINCOLN LUTHRTSN SCHOOL ASSOC** **NE UST** **U004057275**
1100 N 56TH ST **N/A**
LINCOLN, NE 68504

UST:

Facility:
Facility ID: 3704
Owner Name: LINCOLN LUTH SCH ASSOC
Owner Address: 1100 N 56TH ST
Owner City,St,Zip: LINCOLN, NE 68504
Tanks Currently In Use: 0
Tanks Temp Out Of Use: 0
Tanks Perm Out Of Use: 0
Tanks Closed In Place: 0
Tanks Removed: 0

Owner: LINCOLN LUTH SCH ASSOC
Owner Address: 1100 N 56TH ST
Owner City,St,Zip: LINCOLN, NE 68504
Owner Phone: Not reported
Tank Id/Tank Status: 1 / Not Reported
Tank Contents: Not reported
Tank Size: Not reported
Tank Date Installed: Not reported

LINCOLN LUTHRTSN SCHOOL ASSOC (Continued) **U004057275**

Tank Type: Not reported
Tank Construction: Not reported
Tank Internal Protection: Not reported
Tank External Protection: Not reported
Tank Secondary Containment: Not reported
Piping Construction Material: Not reported

---

53 **LINCOLN LUTHERAN S** **NE LUST** **1002971171**
1100 N 56TH ST **N/A**
LINCOLN, NE

LUST:
Facility Status: **No Further Action**
Incident Type: LUST
File Number: 030990-99-0009
Owner/RP: LINCOLN LUTHERAN S
Line Num: 358
SFM Num: 3704

---

54 **SKOROHOD CONOCO** **NE LUST** **U001130197**
6236 VINE ST **NE UST** **N/A**
LINCOLN, NE 68505 **NE HIST UST**
NE NPDES

LUST:
Facility Status: **No Further Action**
Incident Type: LUST
File Number: 062392-SM-1000
Owner/RP: SKOROHOD SERVICE
Line Num: 583
SFM Num: 8417

UST:

Facility:
Facility ID: 8417
Owner Name: SKOROHOD CONOCO
Owner Address: 6236 VINE ST
Owner City,St,Zip: LINCOLN, NE 68505
Tanks Currently In Use: 0
Tanks Temp Out Of Use: 0
Tanks Perm Out Of Use: 1
Tanks Closed In Place: 0
Tanks Removed: 4

Owner: SKOROHOD CONOCO
Owner Address: 6236 VINE ST
Owner City,St,Zip: LINCOLN, NE 68505
Owner Phone: 402-466-1616
Tank Id/Tank Status: 5 / Permanently Out of Use
Tank Contents: Used Oil
Tank Size: 500
Tank Date Installed: 1979
Tank Type: Federally Regulated
Tank Construction: Steel
Tank Internal Protection: None

SKOROHOD CONOCO (Continued) **U001130197**

Tank External Protection:	None
Tank Secondary Containment:	Not reported
Piping Construction Material:	Steel

HIST UST:

Facility ID:	8417
Owner:	SKOROHOD CONOCO
Owner Address:	6236 VINE ST
Owner City,St,Zip:	LINCOLN, NE 685050000
Tank Number:	1
Tank Usage Status:	**Currently In Use**
Tank Size (Gal):	10000
Tank Construction Material:	Steel
Tank Content(s):	Gasoline
Tank Installed:	1983
Piping Construction Material(s):	Fiberglass Reinforced Plastic

Facility ID:	8417
Owner:	SKOROHOD CONOCO
Owner Address:	6236 VINE ST
Owner City,St,Zip:	LINCOLN, NE 685050000
Tank Number:	2
Tank Usage Status:	**Currently in Use**
Tank Size (Gal):	10000
Tank Construction Material:	Steel
Tank Content(s):	Gasoline
Tank Installed:	1983
Piping Construction Material(s):	Fiberglass Reinforced Plastic

Facility ID:	8417
Owner:	SKOROHOD CONOCO
Owner Address:	6236 VINE ST
Owner City,St,Zip:	LINCOLN, NE 685050000
Tank Number:	3
Tank Usage Status:	**Currently in Use**
Tank Size (Gal):	6000
Tank Construction Material:	Steel
Tank Content(s):	Gasoline
Tank Installed:	1983
Piping Construction Material(s):	Fiberglass Reinforced Plastic

Facility ID:	8417
Owner:	SKOROHOD CONOCO
Owner Address:	6236 VINE ST
Owner City,St,Zip:	LINCOLN, NE 685050000
Tank Number:	4
Tank Usage Status:	**Currently In Use**
Tank Size (Gal):	2000
Tank Construction Material:	Steel
Tank Content(s):	#2 Diesel
Tank Installed:	1983
Piping Construction Material(s):	Fiberglass Reinforced Plastic

Facility ID:	8417
Owner:	SKOROHOD CONOCO
Owner Address:	6236 VINE ST
Owner City,St,Zip:	LINCOLN, NE 685050000

SKOROHOD CONOCO (Continued) **U001130197**

Tank Number: 5
Tank Usage Status: **Permanently Out of Use**
Tank Size (Gal): 500
Tank Construction Material: Steel
Tank Content(s): Used Oil
Tank Installed: 1979
Piping Construction Material(s): Steel

NE NPDES:
Facility ID: 29498
Directions to Facility: NW Cnr Jct N Cotner Blvd & Vine St
Program Acronym: PCS

---

55 **CULLER JR HIGH** **NE LUST** **S105172428**
5201 VINE ST **N/A**
LINCOLN, NE

LUST:
Facility Status: **No Further Action**
Incident Type: LUST
File Number: 06266-CCC-1030
Owner/RP: LINCOLN PUBLIC SCH
Line Num: 372
SFM Num: 8622

Facility Status: **No Further Action**
Incident Type: LUST-EXEMPT TK
File Number: 121101-99-0001
Owner/RP: LINCOLN PUBLIC SCH
Line Num: 373
SFM Num: 8622

Facility Status: **Additional work needed, DEQ has not yet directed the work to begin**
Incident Type: LUST-EXEMPT TK
File Number: 122298-CT-1140
Owner/RP: LINCOLN PUBLIC SCH
Line Num: 374
SFM Num: 8622

---

56 **MEADOWLANE ELEMENT** **NE LUST** **S105690013**
7200 VINE ST **N/A**
LINCOLN, NE

LUST:
Facility Status: **No Further Action**
Incident Type: LUST-EXEMPT TK
File Number: AP8646
Owner/RP: LINCOLN PUBLIC SCH
Line Num: 125
SFM Num: 8646

57 **PERFORMANCE 66 SERVICE** **NE LUST** **U003052407**
7000 VINE ST **NE UST** **N/A**
LINCOLN, NE 68505 **NE HIST UST**

LUST:

Facility Status: **Additional work needed, DEQ has not yet directed the work to begin**
Incident Type: LUST
File Number: 053195-GW-1330
Owner/RP: WHITEHEAD OIL CO
Line Num: 744
SFM Num: 2957

Facility Status: **Priority List for orphan sites (Responsible Party not viable)**
Incident Type: LUST
File Number: 071693-NM-0900
Owner/RP: WHITEHEAD OIL CO
Line Num: 745
SFM Num: 2957

UST:

Facility:
Facility ID: 2957
Owner Name: WHITEHEAD OIL CO
Owner Address: PO BOX 30211
Owner City,St,Zip: LINCOLN, NE 68510
Tanks Currently In Use: 3
Tanks Temp Out Of Use: 0
Tanks Perm Out Of Use: 0
Tanks Closed In Place: 0
Tanks Removed: 0

Owner: WHITEHEAD OIL CO
Owner Address: PO BOX 30211
Owner City,St,Zip: LINCOLN, NE 68510
Owner Phone: 402-435-3509
Tank Id/Tank Status: 1 / Currently in Use
Tank Contents: Gasoline
Tank Size: 3000
Tank Date Installed: 1951
Tank Type: Federally Regulated
Tank Construction: Steel
Tank Internal Protection: Internal Lining(e.g., epoxy resins)
Tank External Protection: None
Tank Secondary Containment: Not reported
Piping Construction Material: Fiberglass Reinforced Plastic

Tank Id/Tank Status: 2 / Currently in Use
Tank Contents: Gasoline
Tank Size: 3000
Tank Date Installed: 1951
Tank Type: Federally Regulated
Tank Construction: Steel
Tank Internal Protection: Internal Lining(e.g., epoxy resins)
Tank External Protection: None
Tank Secondary Containment: Not reported
Piping Construction Material: Fiberglass Reinforced Plastic

Tank Id/Tank Status: 3 / Currently in Use

PERFORMANCE 66 SERVICE (Continued) **U003052407**

Tank Contents:	Gasoline
Tank Size:	4000
Tank Date Installed:	1951
Tank Type:	Federally Regulated
Tank Construction:	Steel
Tank Internal Protection:	Internal Lining(e.g., epoxy resins)
Tank External Protection:	None
Tank Secondary Containment:	Not reported
Piping Construction Material:	Fiberglass Reinforced Plastic

HIST UST:

Facility ID:	2957
Owner:	WHITEHEAD OIL CO
Owner Address:	PO BOX 30211
Owner City,St,Zip:	LINCOLN, NE 685100000
Tank Number:	1
Tank Usage Status:	**Currently in Use**
Tank Size (Gal):	3000
Tank Construction Material:	Steel
Tank Content(s):	Gasoline
Tank Installed:	1951
Piping Construction Material(s):	Fiberglass Reinforced Plastic

Facility ID:	2957
Owner:	WHITEHEAD OIL CO
Owner Address:	PO BOX 30211
Owner City,St,Zip:	LINCOLN, NE 685100000
Tank Number:	2
Tank Usage Status:	**Currently In Use**
Tank Size (Gal):	3000
Tank Construction Material:	Steel
Tank Content(s):	Gasoline
Tank Installed:	1951
Piping Construction Material(s):	Fiberglass Reinforced Plastic

Facility ID:	2957
Owner:	WHITEHEAD OIL CO
Owner Address:	PO BOX 30211
Owner City,St,Zip:	LINCOLN, NE 685100000
Tank Number:	3
Tank Usage Status:	**Currently in Use**
Tank Size (Gal):	4000
Tank Construction Material:	Steel
Tank Content(s):	Gasoline
Tank Installed:	1951
Piping Construction Material(s):	Fiberglass Reinforced Plastic

---

58 **CHURCH OF JESUS CH** **NE LUST** **S101291722**
640 N 56 **N/A**
LINCOLN, NE

LUST:

Facility Status:	**No Further Action**
Incident Type:	LUST
File Number:	07227-BHI-1000
Owner/RP:	CHURCH OF JESUS CH
Line Num:	115

CHURCH OF JESUS CH (Continued) **S101291722**

SFM Num: NONE

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59 **EDR US Hist Auto Stat** **1015256298**
162 GATEWAY MALL **N/A**
LINCOLN, NE 68505

EDR Historical Auto Stations:
Name: SEARS AUTO CENTER
Year: 2012
Address: 162 GATEWAY MALL

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59 **EDR US Hist Auto Stat** **1015318828**
210 GATEWAY MALL **N/A**
LINCOLN, NE 68505

EDR Historical Auto Stations:
Name: NEBRASKA AUTO INC
Year: 2007
Address: 210 GATEWAY MALL

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59 **SHERWIN-WILLIAMS** **RCRA NonGen / NLR** **1000371483**
228 LINCOLN GATEWAY 61 ST & O **NED000829804**
LINCOLN, NE 68505

RCRA NonGen / NLR:
Date form received by agency: 08/18/1980
Facility name: SHERWIN-WILLIAMS
Facility address: 228 LINCOLN GATEWAY 61 ST & O
LINCOLN, NE 68505
EPA ID: NED000829804
Mailing address: LINCOLN GATEWAY 61 ST & O
LINCOLN, NE 68505
Contact: H.B. WILLIAMS JR
Contact address: 228 LINCOLN GATEWAY 61 ST & O
LINCOLN, NE 68505
Contact country: US
Contact telephone: (216) 566-3096
Contact email: Not reported
EPA Region: 07
Classification: Non-Generator
Description: Handler: Non-Generators do not presently generate hazardous waste

Owner/Operator Summary:
Owner/operator name: UNKNOWN
Owner/operator address: UNKNOWN
UNKNOWN, NE UNKNO
Owner/operator country: Not reported
Owner/operator telephone: UNKNOWN
Legal status: Private
Owner/Operator Type: Owner
Owner/Op start date: Not reported
Owner/Op end date: Not reported

SHERWIN-WILLIAMS (Continued) **1000371483**

Handler Activities Summary:

U.S. importer of hazardous waste:	No
Mixed waste (haz. and radioactive):	No
Recycler of hazardous waste:	No
Transporter of hazardous waste:	No
Treater, storer or disposer of HW:	No
Underground injection activity:	No
On-site burner exemption:	No
Furnace exemption:	No
Used oil fuel burner:	No
Used oil processor:	No
User oil refiner:	No
Used oil fuel marketer to burner:	No
Used oil Specification marketer:	No
Used oil transfer facility:	No
Used oil transporter:	No

Hazardous Waste Summary:

Waste code: D000
Waste name: Not Defined

Waste code: D001
Waste name: IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.

Waste code: D002
Waste name: A WASTE WHICH HAS A PH OF LESS THAN 2 OR GREATER THAN 12.5 IS CONSIDERED TO BE A CORROSIVE HAZARDOUS WASTE. SODIUM HYDROXIDE, A CAUSTIC SOLUTION WITH A HIGH PH, IS OFTEN USED BY INDUSTRIES TO CLEAN OR DEGREASE PARTS. HYDROCHLORIC ACID, A SOLUTION WITH A LOW PH, IS USED BY MANY INDUSTRIES TO CLEAN METAL PARTS PRIOR TO PAINTING. WHEN THESE CAUSTIC OR ACID SOLUTIONS BECOME CONTAMINATED AND MUST BE DISPOSED, THE WASTE WOULD BE A CORROSIVE HAZARDOUS WASTE.

Waste code: D003
Waste name: A MATERIAL IS CONSIDERED TO BE A REACTIVE HAZARDOUS WASTE IF IT IS NORMALLY UNSTABLE, REACTS VIOLENTLY WITH WATER, GENERATES TOXIC GASES WHEN EXPOSED TO WATER OR CORROSIVE MATERIALS, OR IF IT IS CAPABLE OF DETONATION OR EXPLOSION WHEN EXPOSED TO HEAT OR A FLAME. ONE EXAMPLE OF SUCH WASTE WOULD BY WASTE GUNPOWDER.

Waste code: F002
Waste name: THE FOLLOWING SPENT HALOGENATED SOLVENTS: TETRACHLOROETHYLENE, METHYLENE CHLORIDE, TRICHLOROETHYLENE, 1,1,1-TRICHLOROETHANE, CHLOROBENZENE, 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE, ORTHO-DICHLOROBENZENE, TRICHLOROFLUOROMETHANE, AND 1,1,2-TRICHLOROETHANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE HALOGENATED SOLVENTS OR THOSE LISTED IN F001, F004, OR F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

SHERWIN-WILLIAMS (Continued) **1000371483**

Waste code: F003
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NON-HALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS, AND, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005, AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F005
Waste name: THE FOLLOWING SPENT NON-HALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NON-HALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Waste code: F017
Waste name: Not Defined

Waste code: F018
Waste name: Not Defined

Waste code: P090
Waste name: Not Defined

Waste code: U002
Waste name: ACETONE (I)

Waste code: U031
Waste name: 1-BUTANOL (I)

Waste code: U112
Waste name: ACETIC ACID ETHYL ESTER (I)

Waste code: U150
Waste name: MELPHALAN

Waste code: U154
Waste name: METHANOL (I)

Waste code: U159
Waste name: 2-BUTANONE (I,T)

Waste code: U161
Waste name: METHYL ISOBUTYL KETONE (I)

Waste code: U220
Waste name: BENZENE, METHYL-

Waste code: U239
Waste name: BENZENE, DIMETHYL- (I,T)

SHERWIN-WILLIAMS (Continued) **1000371483**

Violation Status: No violations found

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60 **LINCOLN TELEPHONE CO** **NE UST** **U004057292**
500 N 66TH ST **N/A**
LINCOLN, NE 68505

UST:

Facility:
Facility ID: 2565
Owner Name: LINCOLN TELEPHONE CO
Owner Address: 1440 'M' ST
Owner City,St,Zip: LINCOLN, NE 68508
Tanks Currently In Use: 0
Tanks Temp Out Of Use: 0
Tanks Perm Out Of Use: 0
Tanks Closed In Place: 0
Tanks Removed: 0

Owner: LINCOLN TELEPHONE CO
Owner Address: 1440 'M' ST
Owner City,St,Zip: LINCOLN, NE 68508
Owner Phone: Not reported
Tank Id/Tank Status: 1 / Not Reported
Tank Contents: Not reported
Tank Size: Not reported
Tank Date Installed: Not reported
Tank Type: Not reported
Tank Construction: Not reported
Tank Internal Protection: Not reported
Tank External Protection: Not reported
Tank Secondary Containment: Not reported
Piping Construction Material: Not reported

---

61 **MEGGINIS FORD** **NE LUST** **S102955404**
6400 Q ST **N/A**
LINCOLN, NE

LUST:
Facility Status: **No Further Action**
Incident Type: LUST-EXEMPT TK
File Number: 111297-99-0000
Owner/RP: MEGINNIS FORD
Line Num: 418
SFM Num: 2823

---

62 **BRIDGESTON/FIRESTO** **NE LUST** **S100536903**
300 N. 66TH ST. **N/A**
LINCOLN, NE

LUST:
Facility Status: **No Further Action**
Incident Type: LUST
File Number: 072093-99-0000
Owner/RP: BRIDGESTONE FIRSTO
Line Num: 82

BRIDGESTON/FIRESTO (Continued) **S100536903**

SFM Num: 4603

---

63 **GATEWAY MALL** **NE LUST** **S105173219**
6100 'O' ST; JC PE **N/A**
LINCOLN, NE

LUST:

Facility Status: **No Further Action**
Incident Type: LUST-EXEMPT TK
File Number: AP4196
Owner/RP: LINCOLN JOINT VENT
Line Num: 67
SFM Num: 4196

---

63 **GATEWAY MALL** **NE LUST** **S107689412**
6100 O ST **NE NPDES** **N/A**
LINCOLN, NE 68510 **NE AIRS**

LUST:

Facility Status: **No Further Action**
Incident Type: LUST-EXEMPT TK
File Number: 011294-99-0000
Owner/RP: LINCOLN JOINT VENT
Line Num: 354
SFM Num: 4987

Facility Status: **No Further Action**
Incident Type: LUST
File Number: 070293-NM-1200
Owner/RP: LINCOLN JOINT VENT
Line Num: 355
SFM Num: 4987

NE NPDES:

Facility ID: 30730
Directions to Facility: N 61st St, N Side O
Program Acronym: PCS

NE AIRS:

Facility ID: 30730
Directions to Facility: N 61st St, N Side O

---

64 **HUSKER CAR WASH** **NE LUST** **U003944802**
6135 O ST **NE UST** **N/A**
LINCOLN, NE 68510

LUST:

Facility Status: **No Further Action**
Incident Type: LUST
File Number: 062990-99-0001
Owner/RP: HUSKER CAR WASH IN
Line Num: 263
SFM Num: 3176

HUSKER CAR WASH (Continued) **U003944802**

UST:

Facility:
Facility ID: 3176
Owner Name: HUSKER CAR WASH
Owner Address: 6135 'O' ST
Owner City,St,Zip: LINCOLN, NE 68510
Tanks Currently In Use: 0
Tanks Temp Out Of Use: 0
Tanks Perm Out Of Use: 0
Tanks Closed In Place: 0
Tanks Removed: 0

Owner: HUSKER CAR WASH
Owner Address: 6135 'O' ST
Owner City,St,Zip: LINCOLN, NE 68510
Owner Phone: Not reported
Tank Id/Tank Status: 1 / Not Reported
Tank Contents: Not reported
Tank Size: Not reported
Tank Date Installed: Not reported
Tank Type: Not reported
Tank Construction: Not reported
Tank Internal Protection: Not reported
Tank External Protection: Not reported
Tank Secondary Containment: Not reported
Piping Construction Material: Not reported

---

64 **BANKERS LIFE** **NE LUST** **S101291640**
GATEWAY/BEHIND BAK **N/A**
LINCOLN, NE

LUST:
Facility Status: No Further Action
Incident Type: LUST
File Number: 12115-TSK-1530
Owner/RP: BANKERS LIFE INSUR
Line Num: 64
SFM Num: 4196

---

65 **EASTMONT TOWERS** **FINDS** **1005823064**
6315 O ST **NE LUST** **N/A**
LINCOLN, NE 68510 **NE SPILLS**

FINDS:

Registry ID: 110006601356

Environmental Interest/Information System
STATE MASTER

LUST:
Facility Status: No Further Action
Incident Type: LUST-EXEMPT TK
File Number: 080597-99-0000

EASTMONT TOWERS (Continued) **1005823064**

Owner/RP: EASTMONT TOWERS
Line Num: 184
SFM Num: 5494

NE SPILL:
File Number: 011993-DT-1300
Owner Name: CHRISTIAN RETIREME
Facility Status: NFA
Incident Type: OTHER
Line Num: 240
SFM Num: Not reported

---

65 **SEARS ROEBUCK & CO** **NE LUST** **S105173284**
6400 O STREET **N/A**
LINCOLN, NE

LUST:
Facility Status: No Further Action
Incident Type: LUST
File Number: AP5633
Owner/RP: SEARS ROEBUCK & CO
Line Num: 173
SFM Num: 5633

Count: 51 records

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
LANCASTER COUNTY	M300003543	YANKEE HILL BRICK MFG CO	LANCASTER COUNTY MINES		US MINES
LINCOLN	S116735725	BLOCK 68 TANK SITE	10TH & N STREETS		NE LUST
LINCOLN	S114852790	NEBCO LOT TANK SIT	540 S 11TH		NE LUST
LINCOLN	S105173184	ADKISSON, FLOYD	RT 16		NE LUST
LINCOLN	U004059598	UNKNOWN	17TH & VINE	68503	NE UST
LINCOLN	S113408159	UNK 17TH & HOLDREG	17TH & HOLDREGE		NE LUST
LINCOLN	S109146013	UN-L STUDENT HOUSI	17TH & R STS		NE LAST, NE SPILLS
LINCOLN	S107415246	NDOR - GRANT YARD	HWY 23 & 61, 1/4 M		NE LUST
LINCOLN	U004055671	ELLIOTT ELEMENTARY SCHOOL	2225 S 25TH ST	68510	NE UST
LINCOLN	S109146016	NE ARMY NATIONAL G	NW 25TH & SAUNDERS		NE LUST
LINCOLN	1015884034	KINGERY CONSTRUCTION SITE	3029 & 3243 APPLE STREET	68503	US BROWNFIELDS, FINDS
LINCOLN	U004057283	LINCOLN REAL ESTATE	35TH & ADAMS ST	68507	NE UST
LINCOLN	U004054539	BRUNSWICK CORPORATION	NW 38TH ST	68504	NE UST
LINCOLN	U004057119	LANCASTER COUNTY ENG DEPT	11401 S 40TH & SALTILLO RD	68508	NE UST
LINCOLN	U004059615	UNKNOWN	48TH & FREMONT (SE CORNER)	68507	NE UST
LINCOLN	U004057624	MIKE BRANKER BUICK	49TH & VINE (NW CORNER)	68504	NE UST
LINCOLN	1000869524	OKLAHOMA INSTALLATION COMPANY	61ST & O STREET	68505	RCRA NonGen / NLR
LINCOLN	1016660710	BURLINGTON NORTHERN & SANTA FE	6TH & P STREETS AND 5TH & NORTH STREETS	68508	US BROWNFIELDS, FINDS
LINCOLN	1000164239	WARBONNET AERIAL SPRAY SERVICE	HWY 77, 7 MI N OF TOWN	68507	RCRA NonGen / NLR
LINCOLN	S110993348	UPRR PROPERTY TANK	313 N 7TH ST		NE LUST
LINCOLN	1005500406	LINCOLN WESTBOUND REST AREA	INTERSTATE 80	68508	FINDS, NE SHWS, NE UIC, NE NPDE
LINCOLN	S112185380		8TH & N STREETS		NE LUST
LINCOLN	1015735279	AF (EX) 811 SPECIAL DEPOT	APPROX AT "A" STREET & EVERGREEN STREET	68510	CERC-NFRAP
LINCOLN	S108479418	BNSF: B-1 EAST FUE	R-2-W, B-I EAST FU		NE LAST, NE SPILLS
LINCOLN	S116297872		6001 BLUFF RD, E S		NE LAST, NE SPILLS
LINCOLN	S106560799	DEPT OF ARMY	BULK FUEL AFB		NE LAST, NE SPILLS
LINCOLN	S107691984	UNL-E CAMPUS POWER	EAST CAMPUS POWER		NE LAST, NE SPILLS
LINCOLN	1007111332	FAITH LUTHERAN CHURCH	2313 N CORNER BLVD	68507	RCRA NonGen / NLR
LINCOLN	S110133735	BP STATION	SE CORNER 48TH & R		NE LUST
LINCOLN	1000269260	WALKER GRADING	8607 CORNHUSKER	68508	RCRA NonGen / NLR
LINCOLN	U004222874	ORPHAN	NE CRNR OF S 11TH ST & LINCOLN MALL		NE UST
LINCOLN	U004197707	ORPHAN	SW CRNR OF 35TH & HOLDREGE ST	68504	NE UST
LINCOLN	S110133734	KWIK SHOP	NW CRNR OF 48TH &		NE LUST
LINCOLN	S105241221	BURLINGTON NORTHER	B1 EAST REFUELING		NE LAST, NE SPILLS
LINCOLN	S112185396	TRNSFRMR: 5900 EZE	5900 EZEKIEL PL		NE LAST, NE SPILLS
LINCOLN	U004057269	LINCOLN FIRE DEPT	FIRE STATION #9 901 N COTNER BLVD	68505	NE UST
LINCOLN	S110084075	CONTROL DATA CORP	FLETCHER AVE	68508	NE SHWS
LINCOLN	S108917826	NORTHEAST LINCOLN PWS SITE	FLETCHER AVE	68507	NE SHWS
LINCOLN	S105241244	CITY OF LINCOLN	20' FROM SW CORNER		NE LAST, NE SPILLS
LINCOLN	U004057699	MONTGOMERY WARD	GATEWAY SHOP CTR 61ST & O ST	68505	NE UST
LINCOLN	S114852703	HOBSON: B-2 EAST	HOBSON B-2 EAST		NE LAST, NE SPILLS
LINCOLN	S109525651	HOBSON B-1 EAST FU	HOBSON B-1 EAST FU		NE LAST, NE SPILLS
LINCOLN	S111380404	BNSF HOBSON - B-2	HOBSON PUMPHOUSE B		NE LAST, NE SPILLS

Count: 51 records

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
LINCOLN	S111096931	OAK LAKE LANDFILL SITE	JCT N 1ST & CHARLESTON STS	68508	NE BROWNFIELDS
LINCOLN	S108479299	ORPH UST: 1300 N 1	JCT N 16TH & HOLDR		NE LUST
LINCOLN	S108785101	27TH & CORNHUSKER PWS SITE	JCT N 27TH ST & CORNHUSKER HWY	68521	NE SHWS
LINCOLN	S108785195	NORTH 44TH STREET PWS SITE	JCT N 44TH & COLFAX STS	68504	NE SHWS
LINCOLN	S105173212	FAA VORTAC - LINCO	RURAL ROUTE		NE LUST
LINCOLN	S105241257	DEPT OF ARMY	STEAM HEATING AFB		NE LAST, NE SPILLS
LINCOLN	S117266860	GREAT AMERICAN SPORTS PARK	SUN VALLEY BLVD	68508	NE BROWNFIELDS, NE NPDES
LINCOLN	S114852734	UNL UTILITY PLANT	UTILITY PLANT 14TH		NE LAST, NE SPILLS

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

FEDERAL RECORDS

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 09/29/2014
Date Data Arrived at EDR: 10/08/2014
Date Made Active in Reports: 11/17/2014
Number of Days to Update: 40

Source: EPA
Telephone: N/A
Last EDR Contact: 01/08/2015
Next Scheduled EDR Contact: 04/20/2015
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 3
Telephone 215-814-5418

EPA Region 4
Telephone 404-562-8033

EPA Region 5
Telephone 312-886-6686

EPA Region 10
Telephone 206-553-8665

EPA Region 6
Telephone: 214-655-6659

EPA Region 7
Telephone: 913-551-7247

EPA Region 8
Telephone: 303-312-6774

EPA Region 9
Telephone: 415-947-4246

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 09/29/2014
Date Data Arrived at EDR: 10/08/2014
Date Made Active in Reports: 11/17/2014
Number of Days to Update: 40

Source: EPA
Telephone: N/A
Last EDR Contact: 01/08/2015
Next Scheduled EDR Contact: 04/20/2015
Data Release Frequency: Quarterly

DELISTED NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 09/29/2014
Date Data Arrived at EDR: 10/08/2014
Date Made Active in Reports: 11/17/2014
Number of Days to Update: 40

Source: EPA
Telephone: N/A
Last EDR Contact: 01/08/2015
Next Scheduled EDR Contact: 04/20/2015
Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System

CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 11/11/2013
Date Made Active in Reports: 02/13/2014
Number of Days to Update: 94

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 01/09/2015
Next Scheduled EDR Contact: 03/09/2015
Data Release Frequency: Quarterly

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned

Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 11/11/2013
Date Made Active in Reports: 02/13/2014
Number of Days to Update: 94

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 01/09/2015
Next Scheduled EDR Contact: 03/09/2015
Data Release Frequency: Quarterly

LIENS 2: CERCLA Lien Information

A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 02/18/2014
Date Data Arrived at EDR: 03/18/2014
Date Made Active in Reports: 04/24/2014
Number of Days to Update: 37

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 10/27/2014
Next Scheduled EDR Contact: 02/09/2015
Data Release Frequency: Varies

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 06/10/2014
Date Data Arrived at EDR: 07/02/2014
Date Made Active in Reports: 09/18/2014
Number of Days to Update: 78

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 12/29/2014
Next Scheduled EDR Contact: 04/13/2015
Data Release Frequency: Quarterly

RCRA-TSDF: RCRA - Treatment, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 06/10/2014
Date Data Arrived at EDR: 07/02/2014
Date Made Active in Reports: 09/18/2014
Number of Days to Update: 78

Source: Environmental Protection Agency
Telephone: 913-551-7003
Last EDR Contact: 12/29/2014
Next Scheduled EDR Contact: 04/13/2015
Data Release Frequency: Quarterly

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 06/10/2014
Date Data Arrived at EDR: 07/02/2014
Date Made Active in Reports: 09/18/2014
Number of Days to Update: 78

Source: Environmental Protection Agency
Telephone: 913-551-7003
Last EDR Contact: 12/29/2014
Next Scheduled EDR Contact: 04/13/2015
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 06/10/2014
Date Data Arrived at EDR: 07/02/2014
Date Made Active in Reports: 09/18/2014
Number of Days to Update: 78

Source: Environmental Protection Agency
Telephone: 913-551-7003
Last EDR Contact: 12/29/2014
Next Scheduled EDR Contact: 04/13/2015
Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 06/10/2014
Date Data Arrived at EDR: 07/02/2014
Date Made Active in Reports: 09/18/2014
Number of Days to Update: 78

Source: Environmental Protection Agency
Telephone: 913-551-7003
Last EDR Contact: 12/29/2014
Next Scheduled EDR Contact: 04/13/2015
Data Release Frequency: Varies

RCRA NonGen / NLR: RCRA - Non Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 06/10/2014
Date Data Arrived at EDR: 07/02/2014
Date Made Active in Reports: 09/18/2014
Number of Days to Update: 78

Source: Environmental Protection Agency
Telephone: 913-551-7003
Last EDR Contact: 12/29/2014
Next Scheduled EDR Contact: 04/13/2015
Data Release Frequency: Varies

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 09/18/2014
Date Data Arrived at EDR: 09/19/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 31

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 12/03/2014
Next Scheduled EDR Contact: 03/16/2015
Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 09/18/2014
Date Data Arrived at EDR: 09/19/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 31

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 12/03/2014
Next Scheduled EDR Contact: 03/16/2015
Data Release Frequency: Varies

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 09/29/2014
Date Data Arrived at EDR: 09/30/2014
Date Made Active in Reports: 11/06/2014
Number of Days to Update: 37

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 12/29/2014
Next Scheduled EDR Contact: 04/13/2015
Data Release Frequency: Annually

HMIRS: Hazardous Materials Information Reporting System

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 09/30/2014
Date Data Arrived at EDR: 10/01/2014
Date Made Active in Reports: 11/06/2014
Number of Days to Update: 36

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 12/30/2014
Next Scheduled EDR Contact: 04/13/2015
Data Release Frequency: Annually

DOT OPS: Incident and Accident Data

Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 07/31/2012
Date Data Arrived at EDR: 08/07/2012
Date Made Active in Reports: 09/18/2012
Number of Days to Update: 42

Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 11/04/2014
Next Scheduled EDR Contact: 02/16/2015
Data Release Frequency: Varies

US CDL: Clandestine Drug Labs

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 07/25/2014
Date Data Arrived at EDR: 09/09/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 41

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 11/25/2014
Next Scheduled EDR Contact: 03/16/2015
Data Release Frequency: Quarterly

US BROWNFIELDS: A Listing of Brownfields Sites

Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

Date of Government Version: 09/22/2014
Date Data Arrived at EDR: 09/23/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 27

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 12/22/2014
Next Scheduled EDR Contact: 04/06/2015
Data Release Frequency: Semi-Annually

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 11/10/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 62

Source: USGS
Telephone: 888-275-8747
Last EDR Contact: 11/07/2014
Next Scheduled EDR Contact: 01/26/2015
Data Release Frequency: Semi-Annually

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 06/06/2014
Date Data Arrived at EDR: 09/10/2014
Date Made Active in Reports: 09/18/2014
Number of Days to Update: 8

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 12/12/2014
Next Scheduled EDR Contact: 03/23/2015
Data Release Frequency: Varies

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 08/29/2014
Date Data Arrived at EDR: 10/09/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 11

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 11/17/2014
Next Scheduled EDR Contact: 03/02/2015
Data Release Frequency: Varies

CONSENT: Superfund (CERCLA) Consent Decrees

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 01/24/2014
Date Made Active in Reports: 02/24/2014
Number of Days to Update: 31

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 12/24/2014
Next Scheduled EDR Contact: 04/13/2015
Data Release Frequency: Varies

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 11/25/2013
Date Data Arrived at EDR: 12/12/2013
Date Made Active in Reports: 02/24/2014
Number of Days to Update: 74

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 12/12/2014
Next Scheduled EDR Contact: 03/23/2015
Data Release Frequency: Annually

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 09/14/2010
Date Data Arrived at EDR: 10/07/2011
Date Made Active in Reports: 03/01/2012
Number of Days to Update: 146

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 11/26/2014
Next Scheduled EDR Contact: 03/09/2015
Data Release Frequency: Varies

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations

A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009
Date Data Arrived at EDR: 05/07/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 137

Source: EPA, Region 9
Telephone: 415-947-4219
Last EDR Contact: 10/24/2014
Next Scheduled EDR Contact: 02/09/2015
Data Release Frequency: No Update Planned

ODI: Open Dump Inventory

An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

US MINES: Mines Master Index File

Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 08/05/2014
Date Data Arrived at EDR: 09/04/2014
Date Made Active in Reports: 11/17/2014
Number of Days to Update: 74

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 12/30/2014
Next Scheduled EDR Contact: 03/16/2015
Data Release Frequency: Semi-Annually

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 07/31/2013
Date Made Active in Reports: 09/13/2013
Number of Days to Update: 44

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 11/26/2014
Next Scheduled EDR Contact: 03/09/2015
Data Release Frequency: Annually

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2006
Date Data Arrived at EDR: 09/29/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 64

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 12/22/2014
Next Scheduled EDR Contact: 04/06/2015
Data Release Frequency: Every 4 Years

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 11/19/2014
Next Scheduled EDR Contact: 03/09/2015
Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 11/19/2014
Next Scheduled EDR Contact: 03/09/2015
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing

A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing

A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 12/10/2010
Date Made Active in Reports: 02/25/2011
Number of Days to Update: 77

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 10/27/2014
Next Scheduled EDR Contact: 02/09/2015
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System

The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 07/31/2014
Date Data Arrived at EDR: 10/29/2014
Date Made Active in Reports: 11/06/2014
Number of Days to Update: 8

Source: Environmental Protection Agency
Telephone: 202-564-5088
Last EDR Contact: 01/09/2015
Next Scheduled EDR Contact: 04/27/2015
Data Release Frequency: Quarterly

PADS: PCB Activity Database System

PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 07/01/2014
Date Data Arrived at EDR: 10/15/2014
Date Made Active in Reports: 11/17/2014
Number of Days to Update: 33

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 10/15/2014
Next Scheduled EDR Contact: 01/26/2015
Data Release Frequency: Annually

MLTS: Material Licensing Tracking System

MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 07/22/2013
Date Data Arrived at EDR: 08/02/2013
Date Made Active in Reports: 11/01/2013
Number of Days to Update: 91

Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 12/04/2014
Next Scheduled EDR Contact: 03/23/2015
Data Release Frequency: Quarterly

RADINFO: Radiation Information Database

The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 10/07/2014
Date Data Arrived at EDR: 10/08/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 12

Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 01/08/2015
Next Scheduled EDR Contact: 04/20/2015
Data Release Frequency: Quarterly

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 08/16/2014	Source: EPA
Date Data Arrived at EDR: 09/10/2014	Telephone: (913) 551-7003
Date Made Active in Reports: 10/20/2014	Last EDR Contact: 12/09/2014
Number of Days to Update: 40	Next Scheduled EDR Contact: 03/23/2015
	Data Release Frequency: Quarterly

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995	Source: EPA
Date Data Arrived at EDR: 07/03/1995	Telephone: 202-564-4104
Date Made Active in Reports: 08/07/1995	Last EDR Contact: 06/02/2008
Number of Days to Update: 35	Next Scheduled EDR Contact: 09/01/2008
	Data Release Frequency: No Update Planned

RMP: Risk Management Plans

When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 08/01/2014	Source: Environmental Protection Agency
Date Data Arrived at EDR: 08/12/2014	Telephone: 202-564-8600
Date Made Active in Reports: 11/06/2014	Last EDR Contact: 10/27/2014
Number of Days to Update: 86	Next Scheduled EDR Contact: 02/09/2015
	Data Release Frequency: Varies

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2011	Source: EPA/NTIS
Date Data Arrived at EDR: 02/26/2013	Telephone: 800-424-9346
Date Made Active in Reports: 04/19/2013	Last EDR Contact: 11/26/2014
Number of Days to Update: 52	Next Scheduled EDR Contact: 03/09/2015
	Data Release Frequency: Biennially

LEAD SMELTER 2: Lead Smelter Sites

A list of several hundred sites in the U.S. where secondary lead smelting was done from 1931and 1964. These sites may pose a threat to public health through ingestion or inhalation of contaminated soil or dust

Date of Government Version: 04/05/2001	Source: American Journal of Public Health
Date Data Arrived at EDR: 10/27/2010	Telephone: 703-305-6451
Date Made Active in Reports: 12/02/2010	Last EDR Contact: 12/02/2009
Number of Days to Update: 36	Next Scheduled EDR Contact: N/A
	Data Release Frequency: No Update Planned

LEAD SMELTER 1: Lead Smelter Sites

A listing of former lead smelter site locations.

Date of Government Version: 06/04/2014
Date Data Arrived at EDR: 06/12/2014
Date Made Active in Reports: 07/28/2014
Number of Days to Update: 46

Source: Environmental Protection Agency
Telephone: 703-603-8787
Last EDR Contact: 01/05/2015
Next Scheduled EDR Contact: 04/20/2015
Data Release Frequency: Varies

PRP: Potentially Responsible Parties
A listing of verified Potentially Responsible Parties

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 10/17/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 3

Source: EPA
Telephone: 202-564-6023
Last EDR Contact: 12/29/2015
Next Scheduled EDR Contact: 04/13/2015
Data Release Frequency: Quarterly

EPA WATCH LIST: EPA WATCH LIST
EPA maintains a "Watch List" to facilitate dialogue between EPA, state and local environmental agencies on enforcement matters relating to facilities with alleged violations identified as either significant or high priority. Being on the Watch List does not mean that the facility has actually violated the law only that an investigation by EPA or a state or local environmental agency has led those organizations to allege that an unproven violation has in fact occurred. Being on the Watch List does not represent a higher level of concern regarding the alleged violations that were detected, but instead indicates cases requiring additional dialogue between EPA, state and local agencies - primarily because of the length of time the alleged violation has gone unaddressed or unresolved.

Date of Government Version: 08/30/2013
Date Data Arrived at EDR: 03/21/2014
Date Made Active in Reports: 06/17/2014
Number of Days to Update: 88

Source: Environmental Protection Agency
Telephone: 617-520-3000
Last EDR Contact: 11/14/2014
Next Scheduled EDR Contact: 02/23/2015
Data Release Frequency: Quarterly

COAL ASH DOE: Sleam-Electric Plan Operation Data
A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 08/07/2009
Date Made Active in Reports: 10/22/2009
Number of Days to Update: 76

Source: Department of Energy
Telephone: 202-586-8719
Last EDR Contact: 10/17/2014
Next Scheduled EDR Contact: 01/26/2015
Data Release Frequency: Varies

FEDERAL FACILITY: Federal Facility Site Information listing
A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPA Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 07/21/2014
Date Data Arrived at EDR: 10/07/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 13

Source: Environmental Protection Agency
Telephone: 703-603-8704
Last EDR Contact: 01/09/2015
Next Scheduled EDR Contact: 04/20/2015
Data Release Frequency: Varies

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List
A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 07/01/2014
Date Data Arrived at EDR: 09/10/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 12/12/2014
Next Scheduled EDR Contact: 03/23/2015
Data Release Frequency: Varies

FEMA UST: Underground Storage Tank Listing
A listing of all FEMA owned underground storage tanks.

Date of Government Version: 01/01/2010
Date Data Arrived at EDR: 02/16/2010
Date Made Active in Reports: 04/12/2010
Number of Days to Update: 55

Source: FEMA
Telephone: 202-646-5797
Last EDR Contact: 01/12/2015
Next Scheduled EDR Contact: 04/27/2015
Data Release Frequency: Varies

PCB TRANSFORMER: PCB Transformer Registration Database
The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 02/01/2011
Date Data Arrived at EDR: 10/19/2011
Date Made Active in Reports: 01/10/2012
Number of Days to Update: 83

Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 10/31/2014
Next Scheduled EDR Contact: 02/09/2015
Data Release Frequency: Varies

US HIST CDL: National Clandestine Laboratory Register
A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 07/25/2014
Date Data Arrived at EDR: 09/09/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 41

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 11/25/2014
Next Scheduled EDR Contact: 03/16/2015
Data Release Frequency: No Update Planned

US FIN ASSUR: Financial Assurance Information
All owners and operators of facilities that treat, store, or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean up, closure, and post-closure care of their facilities.

Date of Government Version: 09/04/2014
Date Data Arrived at EDR: 09/04/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 46

Source: Environmental Protection Agency
Telephone: 202-566-1917
Last EDR Contact: 11/11/2014
Next Scheduled EDR Contact: 03/02/2015
Data Release Frequency: Quarterly

US AIRS (AFS): Aerometric Information Retrieval System Facility Subsystem (AFS)
The database is a sub-system of Aerometric Information Retrieval System (AIRS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants.

Date of Government Version: 10/16/2014
Date Data Arrived at EDR: 10/31/2014
Date Made Active in Reports: 11/17/2014
Number of Days to Update: 17

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 12/23/2014
Next Scheduled EDR Contact: 04/13/2015
Data Release Frequency: Annually

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing
The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 03/07/2011	Source: Environmental Protection Agency
Date Data Arrived at EDR: 03/09/2011	Telephone: 615-532-8599
Date Made Active in Reports: 05/02/2011	Last EDR Contact: 11/18/2014
Number of Days to Update: 54	Next Scheduled EDR Contact: 02/02/2015
	Data Release Frequency: Varies

2020 COR ACTION: 2020 Corrective Action Program List

The EPA has set ambitious goals for the RCRA Corrective Action program by creating the 2020 Corrective Action Universe. This RCRA cleanup baseline includes facilities expected to need corrective action. The 2020 universe contains a wide variety of sites. Some properties are heavily contaminated while others were contaminated but have since been cleaned up. Still others have not been fully investigated yet, and may require little or no remediation. Inclusion in the 2020 Universe does not necessarily imply failure on the part of a facility to meet its RCRA obligations.

Date of Government Version: 11/11/2011	Source: Environmental Protection Agency
Date Data Arrived at EDR: 05/18/2012	Telephone: 703-308-4044
Date Made Active in Reports: 05/25/2012	Last EDR Contact: 11/14/2014
Number of Days to Update: 7	Next Scheduled EDR Contact: 02/23/2015
	Data Release Frequency: Varies

US AIRS MINOR: Air Facility System Data

A listing of minor source facilities.

Date of Government Version: 10/16/2014	Source: EPA
Date Data Arrived at EDR: 10/31/2014	Telephone: 202-564-2496
Date Made Active in Reports: 11/17/2014	Last EDR Contact: 12/23/2014
Number of Days to Update: 17	Next Scheduled EDR Contact: 04/13/2015
	Data Release Frequency: Annually

STATE AND LOCAL RECORDS

SHWS: Superfund State Program List

The Nebraska Department of Environmental Quality is providing this information from it's own database. The data, although not verified to be the most current or accurate for any specific site, is generally based on the contents of the physical documents in the files. You may contact the Records Management Unit at (402) 471-3557 to make arrangements to view or to get a photocopy of the physical file.

Date of Government Version: 09/23/2014	Source: Dept. of Environmental Quality
Date Data Arrived at EDR: 10/02/2014	Telephone: 402-471-3557
Date Made Active in Reports: 11/04/2014	Last EDR Contact: 01/05/2015
Number of Days to Update: 33	Next Scheduled EDR Contact: 04/06/2015
	Data Release Frequency: Varies

SWF/LF: Licensed Landfill List

Solid Waste Facilities/Landfill Sites. SWF/LF type records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, these may be active or inactive facilities or open dumps that failed to meet RCRA Subtitle D Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 09/24/2014	Source: Department of Environmental Quality
Date Data Arrived at EDR: 09/26/2014	Telephone: 402-471-4210
Date Made Active in Reports: 11/03/2014	Last EDR Contact: 12/18/2014
Number of Days to Update: 38	Next Scheduled EDR Contact: 04/06/2015
	Data Release Frequency: Semi-Annually

UIC: Undergound Injection Control Database

A listing of underground injection well locations. The UIC Program is responsible for regulating the construction, operation, permitting, and closure of injection wells that place fluids underground for storage or disposal.

Date of Government Version: 11/04/2014	Source: Department of Environmental Quality
Date Data Arrived at EDR: 11/18/2014	Telephone: 402-471-2186
Date Made Active in Reports: 12/24/2014	Last EDR Contact: 11/03/2014
Number of Days to Update: 36	Next Scheduled EDR Contact: 02/16/2015
	Data Release Frequency: Varies

SWRCY: Recycling Resource Directory
A listing of recycling facilities.

Date of Government Version: 09/26/2014
Date Data Arrived at EDR: 09/26/2014
Date Made Active in Reports: 11/03/2014
Number of Days to Update: 38

Source: Department of Environmental Quality
Telephone: 402-471-6974
Last EDR Contact: 12/29/2014
Next Scheduled EDR Contact: 04/06/2015
Data Release Frequency: Varies

LUST: Leaking Underground Storage Tank Sites
Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.

Date of Government Version: 09/01/2014
Date Data Arrived at EDR: 10/15/2014
Date Made Active in Reports: 11/04/2014
Number of Days to Update: 20

Source: Department of Environmental Quality
Telephone: 402-471-3557
Last EDR Contact: 01/13/2015
Next Scheduled EDR Contact: 04/27/2015
Data Release Frequency: Quarterly

UST: Facility and Tank Data
Registered Underground Storage Tanks. UST's are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program.

Date of Government Version: 10/29/2014
Date Data Arrived at EDR: 11/05/2014
Date Made Active in Reports: 12/24/2014
Number of Days to Update: 49

Source: Nebraska State Fire Marshal
Telephone: 402-471-9664
Last EDR Contact: 11/05/2014
Next Scheduled EDR Contact: 02/16/2015
Data Release Frequency: Annually

HIST UST: Underground Storage Tank Database Listing
A listing of underground storage tank locations. This listing contains detail information that the UST listing does not. It is no longer updated by the agency. For current information see the UST listing.

Date of Government Version: 02/28/2005
Date Data Arrived at EDR: 09/01/2006
Date Made Active in Reports: 10/11/2006
Number of Days to Update: 40

Source: State Fire Marshal
Telephone: 402-471-2027
Last EDR Contact: 02/23/2009
Next Scheduled EDR Contact: 05/25/2009
Data Release Frequency: No Update Planned

LAST: Leaking Aboveground Storage Tank Sites
Releases from an aboveground storage tank system.

Date of Government Version: 09/01/2014
Date Data Arrived at EDR: 10/15/2014
Date Made Active in Reports: 11/04/2014
Number of Days to Update: 20

Source: Department of Environmental Quality
Telephone: 402-471-3557
Last EDR Contact: 10/15/2014
Next Scheduled EDR Contact: 01/26/2015
Data Release Frequency: Quarterly

AST: AST Data
A listing of aboveground storage tank site locations. Aboveground storage tanks dispensing hazardous substances must register such tank with this office. Storage tanks of 1000 gallons or less are exempt from this requirement.

Date of Government Version: 12/01/2014
Date Data Arrived at EDR: 12/01/2014
Date Made Active in Reports: 12/24/2014
Number of Days to Update: 23

Source: State Fire Marshal
Telephone: 402-471-9465
Last EDR Contact: 12/01/2014
Next Scheduled EDR Contact: 03/16/2015
Data Release Frequency: Semi-Annually

HIST AST: Aboveground Storage Tank Database Listing

A listing of aboveground storage tank locations. This listing contains detail information that the AST listing does not. It is no longer updated by the agency. For current information see the AST listing.

Date of Government Version: 10/19/2004
Date Data Arrived at EDR: 09/01/2006
Date Made Active in Reports: 10/11/2006
Number of Days to Update: 40

Source: State Fire Marshal
Telephone: 402-471-2027
Last EDR Contact: 03/23/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: No Update Planned

SPILLS: Surface Spill List

Releases of petroleum or hazardous substances to the air, land, or water.

Date of Government Version: 09/01/2014
Date Data Arrived at EDR: 10/15/2014
Date Made Active in Reports: 11/04/2014
Number of Days to Update: 20

Source: Department of Environmental Quality
Telephone: 402-471-2186
Last EDR Contact: 10/15/2014
Next Scheduled EDR Contact: 01/26/2015
Data Release Frequency: Quarterly

INST CONTROL: Nebraska's Institutional Control Registry

A list of sites within Nebraska that have institutional controls. According to the Environmental Protection Agency (EPA), institutional controls are "non-engineering measures designed to prevent or limit exposure to hazardous substances left in place at a site, or assure effectiveness of the chosen remedy. Institutional controls are usually, but not always, legal controls, such as easements, restrictive covenants, and zoning ordinances." In short, institutional controls are a type of environmental covenant typically used when property is to be cleanup to a level determined by the potential environmental risks posed by a planned use, rather than to unrestricted use standards. This method of control has proven to be both environmentally and economically beneficial.

Date of Government Version: 02/01/2014
Date Data Arrived at EDR: 06/26/2014
Date Made Active in Reports: 07/14/2014
Number of Days to Update: 18

Source: Department of Environmental Quality
Telephone: 402-471-2214
Last EDR Contact: 09/23/2014
Next Scheduled EDR Contact: 01/05/2015
Data Release Frequency: Varies

VCP: RAPMA Sites

The Remedial Action Plan Monitoring Act (RAPMA), initially created in 1995, provides property owners and parties responsible for contamination with a mechanism for developing voluntary environmental cleanup plans which are reviewed and approved by the Department.

Date of Government Version: 02/01/2014
Date Data Arrived at EDR: 06/26/2014
Date Made Active in Reports: 07/10/2014
Number of Days to Update: 14

Source: Department of Environmental Quality
Telephone: 402-471-2186
Last EDR Contact: 09/26/2014
Next Scheduled EDR Contact: 01/05/2015
Data Release Frequency: Varies

DRYCLEANERS: Drycleaner Facility Listing

A listing of drycleaner facilities in Nebraska.

Date of Government Version: 01/17/2006
Date Data Arrived at EDR: 01/24/2006
Date Made Active in Reports: 03/02/2006
Number of Days to Update: 37

Source: Department of Environmental Quality
Telephone: 402-471-3557
Last EDR Contact: 12/18/2014
Next Scheduled EDR Contact: 04/06/2015
Data Release Frequency: Varies

BROWNFIELDS: Potential Brownfields Inventory Listing

"NDEQ defines a brownfields site as subpart (A) of CERCLA ? 101(39): 'Real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant.' This is a broad-based approach to capture all potential brownfields sites. In the event that CERCLA 128(a) State Response Program funds are utilized - for example, conducting a Section 128(a) Assessment - the exclusions, site-by-site determinations, and further definitions as provided by the law would need to be met. This would be done on a site-by-site basis." A preliminary Survey and Inventory of Brownfields Sites in Nebraska was constructed based on previously submitted information including sites named specifically by city representatives. The list was built on facility characteristics, which were founded on previous, broad-based contamination experience. Additions to the inventory were made by looking for other sources of potential brownfields sites using Standard Industrial Classification (SIC) codes. A general sector list was constructed to serve as an inventory guide. This list shows all of the different types of sites that are within the inventory (sorted by SIC code), and the number of sites there are of each type. Color-coated blocks, which group together similar SIC codes and the sites that they encompass also sort the sectors.

Date of Government Version: 09/23/2014
Date Data Arrived at EDR: 10/02/2014
Date Made Active in Reports: 11/03/2014
Number of Days to Update: 32

Source: Department of Environmental Quality
Telephone: 402-471-2186
Last EDR Contact: 01/05/2015
Next Scheduled EDR Contact: 04/06/2015
Data Release Frequency: Varies

NPDES: Wastewater Database Listing
A listing of permitted wastewater facilities.

Date of Government Version: 12/08/2014
Date Data Arrived at EDR: 12/18/2014
Date Made Active in Reports: 12/24/2014
Number of Days to Update: 6

Source: Department of Environmental Quality
Telephone: 402-471-3557
Last EDR Contact: 12/05/2014
Next Scheduled EDR Contact: 03/23/2015
Data Release Frequency: Quarterly

AIRS: Air State Program List
A listing of air program facilities.

Date of Government Version: 09/23/2014
Date Data Arrived at EDR: 10/02/2014
Date Made Active in Reports: 11/04/2014
Number of Days to Update: 33

Source: Department of Environmental Quality
Telephone: 402-471-3389
Last EDR Contact: 01/05/2015
Next Scheduled EDR Contact: 04/06/2015
Data Release Frequency: Quarterly

TIER 2: Tier 2 Facility Listing
A listing of facilities which store or manufacture hazardous materials that submit a chemical inventory report.

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 07/30/2014
Date Made Active in Reports: 08/21/2014
Number of Days to Update: 22

Source: Department of Environmental Quality
Telephone: 402-471-3557
Last EDR Contact: 12/05/2014
Next Scheduled EDR Contact: 03/23/2015
Data Release Frequency: Varies

TRIBAL RECORDS

INDIAN RESERV: Indian Reservations
This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 12/08/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 34

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 11/07/2014
Next Scheduled EDR Contact: 01/26/2015
Data Release Frequency: Semi-Annually

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands
Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 10/29/2014
Next Scheduled EDR Contact: 02/16/2015
Data Release Frequency: Varies

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 11/04/2014
Date Data Arrived at EDR: 11/07/2014
Date Made Active in Reports: 11/17/2014
Number of Days to Update: 10

Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 10/27/2014
Next Scheduled EDR Contact: 02/09/2015
Data Release Frequency: Quarterly

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 02/01/2013
Date Data Arrived at EDR: 05/01/2013
Date Made Active in Reports: 11/01/2013
Number of Days to Update: 184

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 10/31/2014
Next Scheduled EDR Contact: 02/09/2015
Data Release Frequency: Varies

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 10/06/2014
Date Data Arrived at EDR: 10/29/2014
Date Made Active in Reports: 11/17/2014
Number of Days to Update: 19

Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 10/27/2014
Next Scheduled EDR Contact: 02/09/2015
Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 07/30/2014
Date Data Arrived at EDR: 08/12/2014
Date Made Active in Reports: 08/22/2014
Number of Days to Update: 10

Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 10/27/2014
Next Scheduled EDR Contact: 02/09/2015
Data Release Frequency: Semi-Annually

INDIAN LUST R5: Leaking Underground Storage Tanks on Indian Land
Leaking underground storage tanks located on Indian Land in Michigan, Minnesota and Wisconsin.

Date of Government Version: 11/03/2014
Date Data Arrived at EDR: 11/05/2014
Date Made Active in Reports: 11/17/2014
Number of Days to Update: 12

Source: EPA, Region 5
Telephone: 312-886-7439
Last EDR Contact: 10/27/2014
Next Scheduled EDR Contact: 02/09/2015
Data Release Frequency: Varies

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 03/01/2013
Date Data Arrived at EDR: 03/01/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 42

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 12/09/2014
Next Scheduled EDR Contact: 02/09/2015
Data Release Frequency: Quarterly

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 05/20/2014
Date Data Arrived at EDR: 06/10/2014
Date Made Active in Reports: 08/22/2014
Number of Days to Update: 73

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 10/27/2014
Next Scheduled EDR Contact: 02/09/2015
Data Release Frequency: Quarterly

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 05/22/2014
Date Data Arrived at EDR: 08/22/2014
Date Made Active in Reports: 09/18/2014
Number of Days to Update: 27

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 10/27/2014
Next Scheduled EDR Contact: 02/09/2015
Data Release Frequency: Varies

INDIAN UST R10: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 05/20/2014
Date Data Arrived at EDR: 06/10/2014
Date Made Active in Reports: 08/15/2014
Number of Days to Update: 66

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 10/27/2014
Next Scheduled EDR Contact: 02/09/2015
Data Release Frequency: Quarterly

INDIAN UST R9: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 08/14/2014
Date Data Arrived at EDR: 08/15/2014
Date Made Active in Reports: 08/22/2014
Number of Days to Update: 7

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 10/27/2014
Next Scheduled EDR Contact: 02/09/2015
Data Release Frequency: Quarterly

INDIAN UST R7: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 08/20/2014
Date Data Arrived at EDR: 08/22/2014
Date Made Active in Reports: 09/18/2014
Number of Days to Update: 27

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 10/27/2014
Next Scheduled EDR Contact: 02/09/2015
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 10/06/2014
Date Data Arrived at EDR: 10/29/2014
Date Made Active in Reports: 11/06/2014
Number of Days to Update: 8

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 10/27/2014
Next Scheduled EDR Contact: 02/09/2015
Data Release Frequency: Semi-Annually

INDIAN UST R5: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 11/03/2014	Source: EPA Region 5
Date Data Arrived at EDR: 11/05/2014	Telephone: 312-886-6136
Date Made Active in Reports: 11/17/2014	Last EDR Contact: 10/27/2014
Number of Days to Update: 12	Next Scheduled EDR Contact: 02/09/2015
	Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 07/30/2014	Source: EPA Region 4
Date Data Arrived at EDR: 08/12/2014	Telephone: 404-562-9424
Date Made Active in Reports: 08/22/2014	Last EDR Contact: 10/27/2014
Number of Days to Update: 10	Next Scheduled EDR Contact: 02/09/2015
	Data Release Frequency: Semi-Annually

INDIAN UST R8: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 11/04/2014	Source: EPA Region 8
Date Data Arrived at EDR: 11/07/2014	Telephone: 303-312-6137
Date Made Active in Reports: 11/17/2014	Last EDR Contact: 10/27/2014
Number of Days to Update: 10	Next Scheduled EDR Contact: 02/09/2015
	Data Release Frequency: Quarterly

INDIAN UST R1: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 02/01/2013	Source: EPA, Region 1
Date Data Arrived at EDR: 05/01/2013	Telephone: 617-918-1313
Date Made Active in Reports: 01/27/2014	Last EDR Contact: 10/31/2014
Number of Days to Update: 271	Next Scheduled EDR Contact: 02/09/2015
	Data Release Frequency: Varies

INDIAN VCP R1: Voluntary Cleanup Priority Listing

A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 09/29/2014	Source: EPA, Region 1
Date Data Arrived at EDR: 10/01/2014	Telephone: 617-918-1102
Date Made Active in Reports: 11/06/2014	Last EDR Contact: 12/31/2014
Number of Days to Update: 36	Next Scheduled EDR Contact: 04/13/2015
	Data Release Frequency: Varies

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng

A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008	Source: EPA, Region 7
Date Data Arrived at EDR: 04/22/2008	Telephone: 913-551-7365
Date Made Active in Reports: 05/19/2008	Last EDR Contact: 04/20/2009
Number of Days to Update: 27	Next Scheduled EDR Contact: 07/20/2009
	Data Release Frequency: Varies

EDR PROPRIETARY RECORDS

EDR MGP: EDR Proprietary Manufactured Gas Plants

The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A	Source: EDR, Inc.
Date Data Arrived at EDR: N/A	Telephone: N/A
Date Made Active in Reports: N/A	Last EDR Contact: N/A
Number of Days to Update: N/A	Next Scheduled EDR Contact: N/A
	Data Release Frequency: No Update Planned

EDR US Hist Auto Stat: EDR Exclusive Historic Gas Stations

EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A	Source: EDR, Inc.
Date Data Arrived at EDR: N/A	Telephone: N/A
Date Made Active in Reports: N/A	Last EDR Contact: N/A
Number of Days to Update: N/A	Next Scheduled EDR Contact: N/A
	Data Release Frequency: Varies

EDR US Hist Cleaners: EDR Exclusive Historic Dry Cleaners

EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A	Source: EDR, Inc.
Date Data Arrived at EDR: N/A	Telephone: N/A
Date Made Active in Reports: N/A	Last EDR Contact: N/A
Number of Days to Update: N/A	Next Scheduled EDR Contact: N/A
	Data Release Frequency: Varies

RGA LUST: Recovered Government Archive Leaking Underground Storage Tank

The EDR Recovered Government Archive Leaking Underground Storage Tank database provides a list of LUST incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Environmental Quality in Nebraska.

Date of Government Version: N/A	Source: Department of Environmental Quality
Date Data Arrived at EDR: 07/01/2013	Telephone: N/A
Date Made Active in Reports: 01/03/2014	Last EDR Contact: 06/01/2012
Number of Days to Update: 186	Next Scheduled EDR Contact: N/A
	Data Release Frequency: Varies

RGA HWS: Recovered Government Archive State Hazardous Waste Facilities List

The EDR Recovered Government Archive State Hazardous Waste database provides a list of SHWS incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Environmental Quality in Nebraska.

Date of Government Version: N/A	Source: Department of Environmental Quality
Date Data Arrived at EDR: 07/01/2013	Telephone: N/A
Date Made Active in Reports: 01/03/2014	Last EDR Contact: 06/01/2012
Number of Days to Update: 186	Next Scheduled EDR Contact: N/A
	Data Release Frequency: Varies

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data

Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 07/30/2013
Date Data Arrived at EDR: 08/19/2013
Date Made Active in Reports: 10/03/2013
Number of Days to Update: 45

Source: Department of Energy & Environmental Protection
Telephone: 860-424-3375
Last EDR Contact: 11/17/2014
Next Scheduled EDR Contact: 03/02/2015
Data Release Frequency: No Update Planned

NY MANIFEST: Facility and Manifest Data

Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 11/01/2014
Date Data Arrived at EDR: 11/05/2014
Date Made Active in Reports: 11/24/2014
Number of Days to Update: 19

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 11/05/2014
Next Scheduled EDR Contact: 02/16/2015
Data Release Frequency: Annually

WI MANIFEST: Manifest Information

Hazardous waste manifest information.

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 06/20/2014
Date Made Active in Reports: 08/07/2014
Number of Days to Update: 48

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 12/12/2014
Next Scheduled EDR Contact: 03/30/2015
Data Release Frequency: Annually

Oil/Gas Pipelines: This data was obtained by EDR from the USGS in 1994. It is referred to by USGS as GeoData Digital Line Graphs from 1:100,000-Scale Maps. It was extracted from the transportation category including some oil, but primarily gas pipelines.

Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.
Daycare Centers: Child Care Listing
Source: Department of Health & Human Srevices
Telephone: 402-471-2306

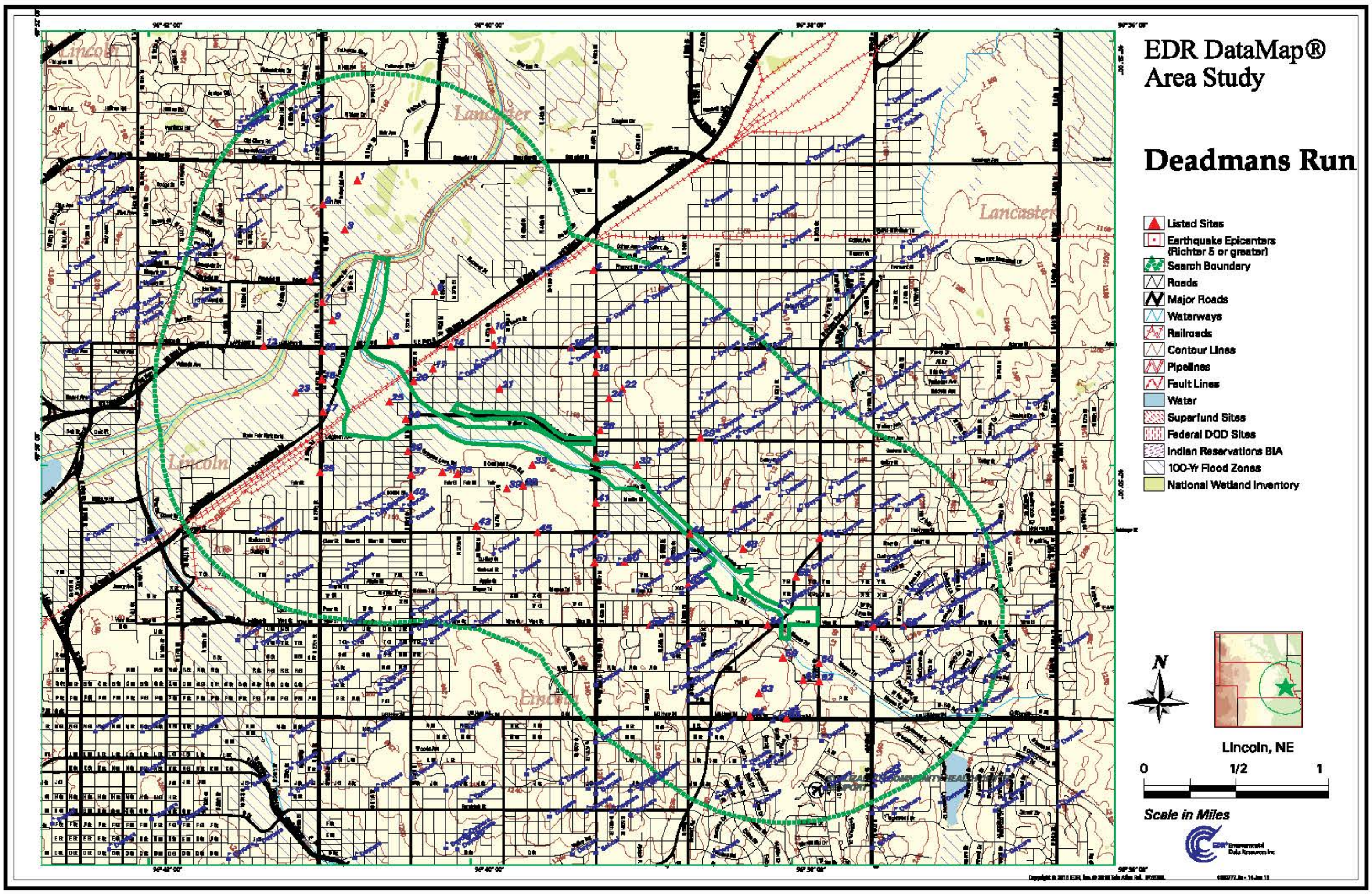
Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2011 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: National Wetlands Inventory
Source: Department of Natural Resources
Telephone: 402-471-2363

Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary faultlines, prepared in 1975 by the United State Geological Survey

STREET AND ADDRESS INFORMATION


EDR DataMap®
Area Study
Deadmans Run
Listed Sites
Earthquake Epicenters (Richter 5 or greater)
Search Boundary
Roads
Major Roads
Waterways
Railroads
Contour Lines
Pipelines
Fault Lines
Water
Superfund Sites
Federal DOD Sites
Indian Reservations BIA
100-Yr Flood Zones
National Wetland Inventory
Lincoln
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Scale in Miles

Deadmans Run
Lincoln, NE 68583

Inquiry Number: 4180777.5w
January 14, 2015

EDR DataMap™ Well Search Report

EDR® Environmental Data Resources Inc

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

GEOCHECK VERSION 2.1
SUMMARY

FEDERAL DATABASE WELL INFORMATION

MAP ID	WELL ID
12	USGS40000735438
34	USGS40000735074
39	USGS40000734973

STATE WATER WELL INFORMATION

MAP ID	WELL ID
1	NE5000000066090
1	NE5000000066085
1	NE5000000066076
1	NE5000000066062
1	NE5000000066049
2	NE5000000065796
3	NE5000000065215
4	NE5000000065180
4	NE5000000065162
5	NE5000000065146
6	NE5000000065049
7	NE5000000064962
8	NE5000000064879
9	NE5000000064870
9	NE5000000064848
9	NE5000000064834
9	NE5000000064830
10	NE5000000064733
10	NE5000000064709
10	NE5000000064686
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11	NE5000000064521
13	NE5000000064387
14	NE5000000064374
15	NE5000000064319
13	NE5000000064317
16	NE5000000064276
17	NE5000000064230
18	NE5000000064003
19	NE5000000063682
19	NE5000000063676
19	NE5000000063669
20	NE5000000063645
19	NE5000000063638
20	NE5000000063633
20	NE5000000063630
21	NE5000000063625

STATE WATER WELL INFORMATION

MAP ID	WELL ID
22	NE5000000063613
20	NE5000000063610
20	NE5000000063596
20	NE5000000063592
20	NE5000000063587
20	NE5000000063581
21	NE5000000063577
21	NE5000000063578
21	NE5000000063579
20	NE5000000063576
20	NE5000000063571
23	NE5000000063532
24	NE5000000063490
25	NE5000000063484
24	NE5000000063473
24	NE5000000063440
24	NE5000000063409
24	NE5000000063405
24	NE5000000063404
24	NE5000000063381
26	NE5000000063368
24	NE5000000063350
27	NE5000000063348
24	NE5000000063342
24	NE5000000063343
28	NE5000000063339
24	NE5000000063337
27	NE5000000063333
27	NE5000000063330
28	NE5000000063324
28	NE5000000063321
28	NE5000000063322
28	NE5000000063313
24	NE5000000063307
28	NE5000000063303
24	NE5000000063244
24	NE5000000063221
30	NE5000000063121
30	NE5000000063114
30	NE5000000063058
30	NE5000000063022
31	NE5000000062937
31	NE5000000062910
31	NE5000000062893
32	NE5000000062740
33	NE5000000062621
33	NE5000000062601
33	NE5000000062602
33	NE5000000062603
33	NE5000000062604
33	NE5000000062554
33	NE5000000062555
33	NE5000000062556
33	NE5000000062528

STATE WATER WELL INFORMATION

MAP ID	WELL ID
35	NE5000000062413
36	NE5000000062230
37	NE5000000062130
36	NE5000000062125
38	NE5000000062121
38	NE5000000062112
38	NE5000000062104
37	NE5000000062032
40	NE5000000061885
41	NE5000000061821
42	NE5000000061813
42	NE5000000061801
41	NE5000000061797
41	NE5000000061792
42	NE5000000061778
42	NE5000000061770
42	NE5000000061763
42	NE5000000061758
42	NE5000000061757
42	NE5000000061726
43	NE5000000061688
43	NE5000000061673
44	NE5000000061671
45	NE5000000061660
46	NE5000000061638
45	NE5000000061637
45	NE5000000061627
45	NE5000000061624
47	NE5000000061540
48	NE5000000061340
48	NE5000000061339
50	NE5000000061224
51	NE5000000061112
51	NE5000000061094
52	NE5000000061081
53	NE5000000061001
53	NE5000000060976
53	NE5000000060977
53	NE5000000060963
54	NE5000000060808
54	NE5000000060806
54	NE5000000060807
54	NE5000000060805
54	NE5000000060796
55	NE5000000060753
56	NE5000000060735
56	NE5000000060707
56	NE5000000060680
54	NE5000000060672
54	NE5000000060671
54	NE5000000060665
54	NE5000000060656
54	NE5000000060655
54	NE5000000060654

STATE WATER WELL INFORMATION

MAP ID	WELL ID
56	NE5000000060653
54	NE5000000060559
54	NE5000000060527
57	NE5000000060499
54	NE5000000060487
57	NE5000000060476
58	NE5000000060451
57	NE5000000060424
54	NE5000000060373
59	NE5000000060076
59	NE5000000060077
60	NE5000000060071
61	NE5000000060023
61	NE5000000060017
62	NE5000000060011
62	NE5000000060012
62	NE5000000060001
61	NE5000000059968
61	NE5000000059951
61	NE5000000059943
61	NE5000000059938
61	NE5000000059882
61	NE5000000059881
61	NE5000000059879
61	NE5000000059869
61	NE5000000059868
61	NE5000000059823
63	NE5000000059812
61	NE5000000059808
61	NE5000000059800
61	NE5000000059794
63	NE5000000059787
61	NE5000000059785
61	NE5000000059782
61	NE5000000059779
61	NE5000000059777
61	NE5000000059778
61	NE5000000059774
61	NE5000000059770
61	NE5000000059769
63	NE5000000059763
61	NE5000000059757
61	NE5000000059755
63	NE5000000059753
61	NE5000000059749
63	NE5000000059742
61	NE5000000059741
63	NE5000000059728
63	NE5000000059729
64	NE5000000059727
64	NE5000000059667
64	NE5000000059662
64	NE5000000059663
64	NE5000000059661

GEOCHECK VERSION 2.1
SUMMARY

STATE WATER WELL INFORMATION

MAP ID	WELL ID
64	NE5000000059659
64	NE5000000059656
64	NE5000000059633
64	NE5000000059634
64	NE5000000059621
64	NE5000000059604
64	NE5000000059603
64	NE5000000059601

PUBLIC WATER SUPPLY SYSTEM INFORMATION

Map ID: 29
PWS ID: NE3150400
PWS Name: BJS HIDEAWAY
5100 N 48 ST
LINCOLN, NE 68504
PWS currently has or had major violation(s) or enforcement:

Map ID: 49
PWS ID: NE3150090
PWS Name: GREENWOOD EB REST AREA
BOX 94759 STATEHOUSE STN
LINCOLN, NE 68509
PWS currently has or had major violation(s) or enforcement:

USGS TOPOGRAPHIC MAP(S)

40096-G5 WALTON, NE
40096-G6 LINCOLN, NE

AREA RADON INFORMATION

Federal Area Radon Information for Zip Code: 68504

Number of sites tested: 3

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	Not Reported	Not Reported	Not Reported	Not Reported
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	6.900 pCi/L	33%	67%	0%

Federal Area Radon Information for Zip Code: 68521

Number of sites tested: 6

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	1.900 pCi/L	100%	0%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	2.183 pCi/L	83%	17%	0%

AREA RADON INFORMATION

Federal Area Radon Information for Zip Code: 68507

Number of sites tested: 4

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	0.000 pCi/L	100%	0%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	6.925 pCi/L	0%	100%	0%

Federal Area Radon Information for Zip Code: 68503

Number of sites tested: 3

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	0.000 pCi/L	100%	0%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	8.300 pCi/L	0%	100%	0%

Federal Area Radon Information for Zip Code: 68505

Number of sites tested: 5

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	5.300 pCi/L	0%	100%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	6.740 pCi/L	0%	100%	0%

Federal Area Radon Information for Zip Code: 68510

Number of sites tested: 13

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	3.150 pCi/L	50%	50%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	7.208 pCi/L	15%	85%	0%

Federal EPA Radon Zone for LANCASTER County: 1

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for LANCASTER COUNTY, NE

Number of sites tested: 68

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	3.400 pCi/L	57%	43%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	6.171 pCi/L	26%	74%	0%

Water Well Information:

Map ID:	12		
Org. Identifier:	USGS-NE	Site ID:	USGS40000735438
Formal name:	USGS Nebraska Water Science Center		
Monloc Identifier:	USGS-405102096412601		
Monloc name:	10N 6E12 1		
Monloc type:	Well		
Monloc desc:	QW ANALYSIS SOURCE OF DATA		
Huc code:	Not Reported	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	40.8505569
Longitude:	-96.6908489	Sourcemap scale:	Not Reported
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	Not Reported
Vert measure units:	Not Reported	Vertacc measure val:	Not Reported
Vert accmeasure units:	Not Reported		
Vertcollection method:	Not Reported		
Vert coord refsys:	Not Reported	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		
Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	Not Reported
Welldepth units:	Not Reported	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

Map ID:	34		
Org. Identifier:	USGS-NE	Site ID:	USGS40000735074
Formal name:	USGS Nebraska Water Science Center		
Monloc Identifier:	USGS-404958096410401		
Monloc name:	10N 6E13DA 1		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10200203	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	40.832779
Longitude:	-96.6847378	Sourcemap scale:	Not Reported
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	1142.00
Vert measure units:	feet	Vertacc measure val:	10
Vert accmeasure units:	feet		
Vertcollection method:	Unknown		
Vert coord refsys:	NGVD29	Countrycode:	US
Aquifername:	Not Reported		
Formation type:	Not Reported		

Aquifer type:	Not Reported		
Construction date:	19510101	Welldepth:	32
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 85

Date	Feet below Surface	Feet to Sealevel	Date	Feet below Surface	Feet to Sealevel
1967-10-27	15.43		1966-10-12	15.83	
1965-10-21	14.74		1964-10-12	14.42	
1963-10-01	15.60		1962-11-09	13.49	
1962-10-15	15.19		1961-12-06	15.17	
1960-12-28	15.18		1960-04-05	13.10	
1959-11-18	15.63		1958-11-10	16.09	
1958-03-05	16.43		1957-10-25	17.44	
1957-05-09	18.31		1957-04-11	17.61	
1957-03-07	18.64		1957-01-30	18.67	
1956-12-21	18.70		1956-11-09	18.92	
1956-09-18	18.90		1956-05-31	19.00	
1956-05-04	18.58		1956-04-03	18.56	
1956-03-05	18.39		1956-02-01	18.58	
1956-01-04	18.54		1955-12-07	18.60	
1955-11-02	18.93		1955-10-12	18.90	
1955-08-03	18.04		1955-06-29	18.05	
1955-05-25	18.36		1955-04-27	17.84	
1955-03-27	17.88		1955-02-24	17.87	
1955-01-26	18.07		1954-12-29	18.01	
1954-11-24	17.78		1954-10-27	17.73	
1954-09-27	18.03		1954-09-01	17.45	
1954-08-04	18.46		1954-07-28	18.87	
1954-06-30	18.24		1954-05-26	17.29	
1954-04-28	17.65		1954-03-31	17.75	
1954-02-24	17.65		1954-01-27	18.21	
1953-12-16	18.26		1953-11-18	18.24	
1953-10-14	15.58		1953-09-16	18.25	
1953-08-13	17.81		1953-07-08	17.55	
1953-06-10	16.84		1953-05-13	16.46	
1953-04-15	16.64		1953-03-18	16.53	
1953-02-18	16.49		1953-01-21	16.64	
1953-01-07	16.35		1952-12-10	16.37	
1952-10-29	16.50		1952-10-08	16.54	
1952-09-17	16.42		1952-08-20	15.83	
1952-07-31	15.54		1952-06-25	14.57	
1952-06-11	14.94		1952-05-28	14.36	
1952-05-14	14.46		1952-04-30	14.04	
1952-04-16	14.48		1952-03-26	15.60	
1952-03-05	16.49		1952-02-20	16.36	
1952-02-06	16.40		1952-01-23	16.39	
1952-01-09	16.50		1951-12-26	16.55	
1951-12-12	16.29		1951-11-28	15.45	
1951-11-01	15.00				

GEOCHECK VERSION 2.1
STATE DATABASE WELL INFORMATION

Map ID:	39		
Org. Identifier:	USGS-NE	Site ID:	USGS40000734973
Formal name:	USGS Nebraska Water Science Center		
Monloc Identifier:	USGS-404943096400401		
Monloc name:	10N 7E18DC 1		
Monloc type:	Well		
Monloc desc:	Not Reported		
Huc code:	10200203	Drainagearea value:	Not Reported
Drainagearea Units:	Not Reported	Contrib drainagearea:	Not Reported
Contrib drainagearea units:	Not Reported	Latitude:	40.8286122
Longitude:	-96.6680706	Sourcemap scale:	Not Reported
Horiz Acc measure:	5	Horiz Acc measure units:	seconds
Horiz Collection method:	Interpolated from map		
Horiz coord refsys:	NAD83	Vert measure val:	Not Reported
Vert measure units:	Not Reported	Vertacc measure val:	Not Reported
Vert accmeasure units:	Not Reported		
Vertcollection method:	Not Reported		
Vert coord refsys:	Not Reported	Countrycode:	US
Aquifername:	Lower Cretaceous aquifers		
Formation type:	Dakota Sandstone or Formation		
Aquifer type:	Not Reported		
Construction date:	Not Reported	Welldepth:	192
Welldepth units:	ft	Wellholedepth:	Not Reported
Wellholedepth units:	Not Reported		

Ground-water levels, Number of Measurements: 0

Water Well Information:

Map ID:	1		
Oid :	0	Wellid:	110787
Regnum:	G-095867B	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	6
Subsection:	CA	Footage:	2010N 2540E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	30
Stwaterlev:	17	Pwaterlev:	0
Wedrilic:	39325	Ownernumbe:	50450
Compname:	Knox Associates LLC		
Citystzip:	Lincoln, NE 68509		
Address1:	920 Pine Tree Lane		
Address2:	Not Reported		
Fildate:	04-MAY-98	Cmpldmonth:	10
Cmpldday:	17	Cmpldyear:	1997
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.862697		
Longdd:	-96.672899		
Calcgps:	-1	Site id:	NE5000000066090

Map ID:	1		
Oid :	0	Wellid:	110785
Regnum:	G-095867A	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	6
Subsection:	CA	Footage:	2000N 2490E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	24
Stwaterlev:	17	Pwaterlev:	0
Wedrilic:	39325	Ownernumbe:	50450
Compname:	Knox Associates LLC		
Citystzip:	Lincoln, NE 68509		
Address1:	920 Pine Tree Lane		
Address2:	Not Reported		
Fildate:	04-MAY-98	Cmpldmonth:	10
Cmpldday:	16	Cmpldyear:	1997
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.862669		

Longdd:	-96.67308		
Calcgps:	-1	Site id:	NE5000000066085

Map ID:	1		
Oid :	0	Wellid:	110788
Regnum:	G-095867C	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	6
Subsection:	CA	Footage:	1980N 2520E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	24
Stwaterlev:	17	Pwaterlev:	0
Wedrilic:	39325	Ownernumbe:	50450
Compname:	Knox Associates LLC		
Citystzip:	Lincoln, NE 68509		
Address1:	920 Pine Tree Lane		
Address2:	Not Reported		
Fildate:	04-MAY-98	Cmpldmonth:	10
Cmpldday:	17	Cmpldyear:	1997
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.862614		
Longdd:	-96.672971		
Calcgps:	-1	Site id:	NE5000000066076

Map ID:	1		
Oid :	0	Wellid:	110789
Regnum:	G-095867D	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	6
Subsection:	CA	Footage:	1955N 2490E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	22
Stwaterlev:	14	Pwaterlev:	0
Wedrilic:	39325	Ownernumbe:	50450
Compname:	Knox Associates LLC		
Citystzip:	Lincoln, NE 68509		
Address1:	920 Pine Tree Lane		
Address2:	Not Reported		
Fildate:	04-MAY-98	Cmpldmonth:	10
Cmpldday:	17	Cmpldyear:	1997
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.862545		

Longdd:	-96.673079		
Calcgps:	-1	Site id:	NE5000000066062

Map ID:	1		
Oid :	0	Wellid:	110790
Regnum:	G-095867E	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	6
Subsection:	CA	Footage:	1925N 2560E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	16
Stwaterlev:	8	Pwaterlev:	0
Wedrilic:	39325	Ownernumbe:	50450
Compname:	Knox Associates LLC		
Citystzip:	Lincoln, NE 68509		
Address1:	920 Pine Tree Lane		
Address2:	Not Reported		
Fildate:	04-MAY-98	Cmpldmonth:	10
Cmpldday:	17	Cmpldyear:	1997
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.862464		
Longdd:	-96.672826		
Calcgps:	-1	Site id:	NE5000000066049

Map ID:	2		
Oid :	0	Wellid:	114144
Regnum:	G-097934	Replacemen:	0
Status:	A	Useid:	G
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	6
Subsection:	CD	Footage:	1215N 1765E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	400
Stwaterlev:	0	Pwaterlev:	0
Wedrilic:	19168	Ownernumbe:	51789
Compname:	Geothermal Design & Engineering		
Citystzip:	Oklahoma City, OK 73107		
Address1:	704 North Villa		
Address2:	Not Reported		
Fildate:	28-SEP-98	Cmpldmonth:	5
Cmpldday:	1	Cmpldyear:	1998
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.860507		

Longdd:	-96.67569		
Calcgps:	-1	Site id:	NE5000000065796

Map ID:	3		
Oid :	0	Wellid:	100475
Regnum:	G-088455	Replacemen:	0
Status:	A	Useid:	D
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	8
Subsection:	BB	Footage:	360S 210E
Areapermit:	Not Reported		
Acres:	2		
Gpm:	30	Pcoldiam:	1
Pdepth:	40	Totaldepth:	51
Stwaterlev:	12	Pwaterlev:	40
Wedrilic:	19033	Ownernumbe:	46122
Compname:	Bob Schmieding		
Citystzip:	Lincoln, NE 68504		
Address1:	4101 North 40		
Address2:	Not Reported		
Fildate:	27-JUN-96	Cmpldmonth:	2
Cmpldday:	5	Cmpldyear:	1996
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.856219		
Longdd:	-96.662511		
Calcgps:	-1	Site id:	NE5000000065215

Map ID:	4		
Oid :	0	Wellid:	137616
Regnum:	G-114050A	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	7
Subsection:	AA	Footage:	433S 1280W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	38.5
Stwaterlev:	14.5	Pwaterlev:	0
Wedrilic:	39374	Ownernumbe:	92263
Compname:	United States Environmental Protection Agency		
Citystzip:	Kansas City, KS 66101		
Address1:	901 North 5th Street		
Address2:	Brian Mitchell Superfund Division		
Fildate:	17-JAN-02	Cmpldmonth:	11
Cmpldday:	29	Cmpldyear:	2001
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.8560027778		

Longdd:	-96.6678611111		
Calcgps:	0	Site id:	NE5000000065180

Map ID:	4		
Oid :	0	Wellid:	137617
Regnum:	G-114050B	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	7
Subsection:	AA	Footage:	459S 1280W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	117.400001525879
Stwaterlev:	14.1999998092651	Pwaterlev:	0
Wedrilic:	39374	Ownernumbe:	92263
Compname:	United States Environmental Protection Agency		
Citystzip:	Kansas City, KS 66101		
Address1:	901 North 5th Street		
Address2:	Brian Mitchell Superfund Division		
Fildate:	17-JAN-02	Cmpldmonth:	12
Cmpldday:	1	Cmpldyear:	2001
Lastchgdat:	30-DEC-99	Xdate2:	4/2004
Latdd:	40.8559333333		
Longdd:	-96.6678972222		
Calcgps:	0	Site id:	NE5000000065162

Map ID:	5		
Oid :	0	Wellid:	99959
Regnum:	G-087965B	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	7
Subsection:	AB	Footage:	4800N 2000W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	38
Stwaterlev:	27	Pwaterlev:	0
Wedrilic:	89013	Ownernumbe:	45873
Compname:	Brunswick Corporation		
Citystzip:	Lake Forest, IL 60045		
Address1:	One North Field Court		
Address2:	Not Reported		
Fildate:	15-MAY-96	Cmpldmonth:	10
Cmpldday:	26	Cmpldyear:	1995
Lastchgdat:	30-DEC-99	Xdate2:	6/1996
Latdd:	40.855772		

Longdd:	-96.670501		
Calcgps:	-1	Site id:	NE5000000065146

Map ID:	6		
Oid :	0	Wellid:	99867
Regnum:	G-087965A	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	7
Subsection:	AB	Footage:	4600N 1600W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	39
Stwaterlev:	27	Pwaterlev:	0
Wedrilic:	89013	Ownernumbe:	45873
Compname:	Brunswick Corporation		
Citystzip:	Lake Forest, IL 60045		
Address1:	One North Field Court		
Address2:	Not Reported		
Fildate:	15-MAY-96	Cmpldmonth:	10
Cmpldday:	25	Cmpldyear:	1995
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.855223		
Longdd:	-96.669056		
Calcgps:	-1	Site id:	NE5000000065049

Map ID:	7		
Oid :	0	Wellid:	99960
Regnum:	G-087965C	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	7
Subsection:	AB	Footage:	4400N 2400W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	43
Stwaterlev:	34	Pwaterlev:	0
Wedrilic:	89013	Ownernumbe:	45873
Compname:	Brunswick Corporation		
Citystzip:	Lake Forest, IL 60045		
Address1:	One North Field Court		
Address2:	Not Reported		
Fildate:	15-MAY-96	Cmpldmonth:	10
Cmpldday:	26	Cmpldyear:	1995
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.854674		

Longdd:	-96.67195		
Calcgps:	-1	Site id:	NE5000000064962

Map ID:	8		
Oid :	0	Wellid:	191866
Regnum:	Not Reported	Replacemen:	0
Status:	U	Useid:	D
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	8
Subsection:	BA	Footage:	1076S 1335E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	0
Stwaterlev:	0	Pwaterlev:	0
Wedrilic:	0	Ownernumbe:	90749
Compname:	Paul Menter		
Citystzip:	Lincoln, NE 68504		
Address1:	4110 N 44th Street		
Address2:	Not Reported		
Fildate:	01-MAY-08	Cmpldmonth:	0
Cmpldday:	0	Cmpldyear:	0
Lastchgdat:	30-DEC-99	Xdate2:	12/2007
Latdd:	40.85425		
Longdd:	-96.6584444444		
Calcgps:	0	Site id:	NE5000000064879

Map ID:	9		
Oid :	0	Wellid:	166364
Regnum:	G-132786C	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	7
Subsection:	BB	Footage:	1079S 364E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	13
Stwaterlev:	5.30000019073486	Pwaterlev:	0
Wedrilic:	39374	Ownernumbe:	72232
Compname:	Precast Products		
Citystzip:	Puntagorda, FL 33950		
Address1:	883 West Retta Esplanade		
Address2:	Donald Tanner		
Fildate:	16-MAR-05	Cmpldmonth:	2
Cmpldday:	24	Cmpldyear:	2005
Lastchgdat:	30-DEC-99	Xdate2:	5/2005
Latdd:	40.854197		

Longdd:	-96.680783		
Calcgps:	-1	Site id:	NE5000000064870

Map ID:	9		
Oid :	0	Wellid:	166362
Regnum:	G-132786A	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	7
Subsection:	BB	Footage:	1107S 400E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	13
Stwaterlev:	4.5	Pwaterlev:	0
Wedrilic:	39374	Ownernumbe:	72232
Compname:	Precast Products		
Citystzip:	Puntagorda, FL 33950		
Address1:	883 West Retta Esplanade		
Address2:	Donald Tanner		
Fildate:	16-MAR-05	Cmpldmonth:	2
Cmpldday:	24	Cmpldyear:	2005
Lastchgdat:	30-DEC-99	Xdate2:	5/2005
Latdd:	40.85412		
Longdd:	-96.680654		
Calcgps:	-1	Site id:	NE5000000064848

Map ID:	9		
Oid :	0	Wellid:	166365
Regnum:	G-132786D	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	7
Subsection:	BB	Footage:	1147S 423E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	13
Stwaterlev:	4	Pwaterlev:	0
Wedrilic:	39374	Ownernumbe:	72232
Compname:	Precast Products		
Citystzip:	Puntagorda, FL 33950		
Address1:	883 West Retta Esplanade		
Address2:	Donald Tanner		
Fildate:	16-MAR-05	Cmpldmonth:	2
Cmpldday:	24	Cmpldyear:	2005
Lastchgdat:	30-DEC-99	Xdate2:	5/2005
Latdd:	40.854011		

Longdd:	-96.680573		
Calcgps:	-1	Site id:	NE5000000064834

Map ID:	9		
Oid :	0	Wellid:	166363
Regnum:	G-132786B	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	7
Subsection:	BB	Footage:	1154S 373E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	13
Stwaterlev:	5.30000019073486	Pwaterlev:	0
Wedrilic:	39374	Ownernumbe:	72232
Compname:	Precast Products		
Citystzip:	Puntagorda, FL 33950		
Address1:	883 West Retta Esplanade		
Address2:	Donald Tanner		
Fildate:	16-MAR-05	Cmpldmonth:	2
Cmpldday:	24	Cmpldyear:	2005
Lastchgdat:	30-DEC-99	Xdate2:	5/2005
Latdd:	40.853991		
Longdd:	-96.680754		
Calcgps:	-1	Site id:	NE5000000064830

Map ID:	10		
Oid :	0	Wellid:	149618
Regnum:	G-121331A	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	7
Subsection:	AC	Footage:	1418S 2292W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	45
Stwaterlev:	23.3999996185303	Pwaterlev:	0
Wedrilic:	39402	Ownernumbe:	30492
Compname:	Brunswick Corporation		
Citystzip:	Lakewood, CO 80228		
Address1:	165 South Union Blvd Suite 1000		
Address2:	Not Reported		
Fildate:	05-MAY-03	Cmpldmonth:	11
Cmpldday:	13	Cmpldyear:	2002
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.853292		

Longdd:	-96.671567		
Calcgps:	-1	Site id:	NE5000000064733

Map ID:	10		
Oid :	0	Wellid:	100428
Regnum:	G-088411	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	7
Subsection:	AB	Footage:	3800N 2000W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	44
Stwaterlev:	27	Pwaterlev:	0
Wedrilic:	89013	Ownernumbe:	45873
Compname:	Brunswick Corporation		
Citystzip:	Lake Forest, IL 60045		
Address1:	One North Field Court		
Address2:	Not Reported		
Fildate:	24-JUN-96	Cmpldmonth:	4
Cmpldday:	18	Cmpldyear:	1996
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.853027		
Longdd:	-96.670508		
Calcgps:	-1	Site id:	NE5000000064709

Map ID:	10		
Oid :	0	Wellid:	149619
Regnum:	G-121331B	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	7
Subsection:	AC	Footage:	1643S 2470W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	45
Stwaterlev:	22.7000007629395	Pwaterlev:	0
Wedrilic:	39402	Ownernumbe:	30492
Compname:	Brunswick Corporation		
Citystzip:	Lakewood, CO 80228		
Address1:	165 South Union Blvd Suite 1000		
Address2:	Not Reported		
Fildate:	05-MAY-03	Cmpldmonth:	11
Cmpldday:	14	Cmpldyear:	2003
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.852673		

Longdd:	-96.672212		
Calcgps:	-1	Site id:	NE5000000064686

Map ID:	11		
Oid :	0	Wellid:	94246
Regnum:	G-084000B	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwmum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	7
Subsection:	BC	Footage:	1800S 1300E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	16
Stwaterlev:	7	Pwaterlev:	0
Wedrilic:	39271	Ownernumbe:	43385
Compname:	Northwestern Metal Company		
Citystzip:	Lincoln, NE 68504		
Address1:	3900 Industrial Avenue		
Address2:	Not Reported		
Fildate:	01-MAR-95	Cmpldmonth:	11
Cmpldday:	5	Cmpldyear:	1993
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.852228		
Longdd:	-96.67743		
Calcgps:	-1	Site id:	NE5000000064618

Map ID:	11		
Oid :	0	Wellid:	94245
Regnum:	G-084000A	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwmum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	7
Subsection:	BC	Footage:	1800S 1200E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	18
Stwaterlev:	10	Pwaterlev:	0
Wedrilic:	39271	Ownernumbe:	43385
Compname:	Northwestern Metal Company		
Citystzip:	Lincoln, NE 68504		
Address1:	3900 Industrial Avenue		
Address2:	Not Reported		
Fildate:	01-MAR-95	Cmpldmonth:	11
Cmpldday:	5	Cmpldyear:	1993
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.852227		

Longdd:	-96.677791		
Calcgps:	-1	Site id:	NE5000000064615

Map ID:	11		
Oid :	0	Wellid:	138745
Regnum:	G-114613A	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	7
Subsection:	BC	Footage:	1800S 1210E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	25
Stwaterlev:	17.2000007629395	Pwaterlev:	0
Wedrilic:	89005	Ownernumbe:	10617
Compname:	C E G A Services		
Citystzip:	Lincoln, NE 68504		
Address1:	3900 Industrial Road		
Address2:	Not Reported		
Fildate:	13-FEB-02	Cmpldmonth:	10
Cmpldday:	29	Cmpldyear:	2001
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.852227		
Longdd:	-96.677755		
Calcgps:	-1	Site id:	NE5000000064617

Map ID:	11		
Oid :	0	Wellid:	94247
Regnum:	G-084000C	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	7
Subsection:	BC	Footage:	1800S 1210E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	15
Stwaterlev:	12	Pwaterlev:	0
Wedrilic:	39271	Ownernumbe:	43385
Compname:	Northwestern Metal Company		
Citystzip:	Lincoln, NE 68504		
Address1:	3900 Industrial Avenue		
Address2:	Not Reported		
Fildate:	01-MAR-95	Cmpldmonth:	11
Cmpldday:	5	Cmpldyear:	1993
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.852227		

Longdd:	-96.677755		
Calcgps:	-1	Site id:	NE5000000064616

Map ID:	11		
Oid :	0	Wellid:	145141
Regnum:	G-118724B	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	7
Subsection:	BC	Footage:	1850S 958E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	25
Stwaterlev:	12.3999996185303	Pwaterlev:	0
Wedrilic:	39395	Ownernumbe:	62234
Compname:	Sanford & Son LLC		
Citystzip:	Lincoln, NE 68516		
Address1:	3600 Village Drive Suite 140		
Address2:	Robert Hampton		
Fildate:	26-NOV-02	Cmpldmonth:	11
Cmpldday:	6	Cmpldyear:	2002
Lastchgdat:	30-DEC-99	Xdate2:	3/2003
Latdd:	40.8520833333		
Longdd:	-96.6786666667		
Calcgps:	0	Site id:	NE5000000064604

Map ID:	11		
Oid :	0	Wellid:	94509
Regnum:	G-084000E	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	7
Subsection:	BC	Footage:	1900S 1100E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	15
Stwaterlev:	0	Pwaterlev:	0
Wedrilic:	39271	Ownernumbe:	43385
Compname:	Northwestern Metal Company		
Citystzip:	Lincoln, NE 68504		
Address1:	3900 Industrial Avenue		
Address2:	Not Reported		
Fildate:	01-MAR-95	Cmpldmonth:	5
Cmpldday:	24	Cmpldyear:	1994
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.851951		

Longdd:	-96.678157		
Calcgps:	-1	Site id:	NE5000000064581

Map ID:	11		
Oid :	0	Wellid:	138749
Regnum:	G-114613C	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	7
Subsection:	BC	Footage:	1900S 1100E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	25
Stwaterlev:	17.2999992370605	Pwaterlev:	0
Wedrilic:	89005	Ownernumbe:	10617
Compname:	C E G A Services		
Citystzip:	Lincoln, NE 68504		
Address1:	3900 Industrial Road		
Address2:	Not Reported		
Fildate:	13-FEB-02	Cmpldmonth:	10
Cmpldday:	29	Cmpldyear:	2001
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.851951		
Longdd:	-96.678157		
Calcgps:	-1	Site id:	NE5000000064582

Map ID:	11		
Oid :	0	Wellid:	94248
Regnum:	G-084000D	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	7
Subsection:	BC	Footage:	1900S 1000E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	15
Stwaterlev:	0	Pwaterlev:	0
Wedrilic:	39271	Ownernumbe:	43385
Compname:	Northwestern Metal Company		
Citystzip:	Lincoln, NE 68504		
Address1:	3900 Industrial Avenue		
Address2:	Not Reported		
Fildate:	01-MAR-95	Cmpldmonth:	5
Cmpldday:	24	Cmpldyear:	1994
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.85195		

Longdd:	-96.678518		
Calcgps:	-1	Site id:	NE5000000064579

Map ID:	11		
Oid :	0	Wellid:	138746
Regnum:	G-114613B	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	7
Subsection:	BC	Footage:	1900S 1000E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	25
Stwaterlev:	17.2000007629395	Pwaterlev:	0
Wedrilic:	89005	Ownernumbe:	10617
Compname:	C E G A Services		
Citystzip:	Lincoln, NE 68504		
Address1:	3900 Industrial Road		
Address2:	Not Reported		
Fildate:	13-FEB-02	Cmpldmonth:	10
Cmpldday:	29	Cmpldyear:	2001
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.85195		
Longdd:	-96.678518		
Calcgps:	-1	Site id:	NE5000000064580

Map ID:	11		
Oid :	0	Wellid:	145137
Regnum:	G-118724A	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	7
Subsection:	BC	Footage:	2073S 823E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	25
Stwaterlev:	19.7999992370605	Pwaterlev:	0
Wedrilic:	39395	Ownernumbe:	62234
Compname:	Sanford & Son LLC		
Citystzip:	Lincoln, NE 68516		
Address1:	3600 Village Drive Suite 140		
Address2:	Robert Hampton		
Fildate:	26-NOV-02	Cmpldmonth:	11
Cmpldday:	6	Cmpldyear:	2002
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.8514722222		

Longdd:	-96.6791666667		
Calcgps:	0	Site id:	NE5000000064521

Map ID:	13		
Oid :	0	Wellid:	128709
Regnum:	G-107857A	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	6
Rangelet:	E	Section:	12
Subsection:	DA	Footage:	2595N 930W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	24
Stwaterlev:	7	Pwaterlev:	0
Wedrilic:	39246	Ownernumbe:	15918
Compname:	Lincoln Electric System		
Citystzip:	Lincoln, NE 68501		
Address1:	1040 O Street PO Box 80869		
Address2:	Not Reported		
Fildate:	21-NOV-00	Cmpldmonth:	10
Cmpldday:	10	Cmpldyear:	2000
Lastchgdat:	30-DEC-99	Xdate2:	4/2001
Latdd:	40.849774		
Longdd:	-96.685527		
Calcgps:	-1	Site id:	NE5000000064387

Map ID:	14		
Oid :	0	Wellid:	197054
Regnum:	Not Reported	Replacemen:	0
Status:	U	Useid:	D
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	8
Subsection:	CB	Footage:	2543N 1122E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	0
Stwaterlev:	0	Pwaterlev:	0
Wedrilic:	0	Ownernumbe:	94051
Compname:	Mildred Lee		
Citystzip:	Lincoln, NE 68504		
Address1:	3905 N 44th St		
Address2:	Not Reported		
Fildate:	10-FEB-09	Cmpldmonth:	0
Cmpldday:	0	Cmpldyear:	0
Lastchgdat:	30-DEC-99	Xdate2:	1/2009
Latdd:	40.8495722222		

Longdd:	-96.6592361111		
Calcgps:	0	Site id:	NE5000000064374

Map ID:	15		
Oid :	0	Wellid:	128710
Regnum:	G-107857B	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	6
Rangelet:	E	Section:	12
Subsection:	DA	Footage:	2300N 120W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	25
Stwaterlev:	23	Pwaterlev:	0
Wedrilic:	39246	Ownernumbe:	15918
Compname:	Lincoln Electric System		
Citystzip:	Lincoln, NE 68501		
Address1:	1040 O Street PO Box 80869		
Address2:	Not Reported		
Fildate:	21-NOV-00	Cmpldmonth:	10
Cmpldday:	10	Cmpldyear:	2000
Lastchgdat:	30-DEC-99	Xdate2:	4/2001
Latdd:	40.848917		
Longdd:	-96.682612		
Calcgps:	-1	Site id:	NE5000000064319

Map ID:	13		
Oid :	0	Wellid:	83206
Regnum:	G-074734	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	6
Rangelet:	E	Section:	12
Subsection:	DA	Footage:	2280N 800W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	20
Stwaterlev:	13	Pwaterlev:	0
Wedrilic:	39246	Ownernumbe:	15918
Compname:	Lincoln Electric System		
Citystzip:	Lincoln, NE 68501		
Address1:	1040 O Street PO Box 80869		
Address2:	Not Reported		
Fildate:	27-APR-92	Cmpldmonth:	2
Cmpldday:	24	Cmpldyear:	1992
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.848902		

Longdd:	-96.68507		
Calcgps:	-1	Site id:	NE5000000064317

Map ID:	16		
Oid :	0	Wellid:	128711
Regnum:	G-107857C	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwmum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	6
Rangelet:	E	Section:	12
Subsection:	DA	Footage:	2160N 1495W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	13
Stwaterlev:	5	Pwaterlev:	0
Wedrilic:	39246	Ownernumbe:	15918
Compname:	Lincoln Electric System		
Citystzip:	Lincoln, NE 68501		
Address1:	1040 O Street PO Box 80869		
Address2:	Not Reported		
Fildate:	21-NOV-00	Cmpldmonth:	10
Cmpldday:	10	Cmpldyear:	2000
Lastchgdat:	30-DEC-99	Xdate2:	4/2001
Latdd:	40.848613		
Longdd:	-96.687587		
Calcgps:	-1	Site id:	NE5000000064276

Map ID:	17		
Oid :	0	Wellid:	93131
Regnum:	G-083203	Replacemen:	0
Status:	A	Useid:	G
Nrdname:	Lower Platte South	Nrddwmum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	6
Rangelet:	E	Section:	12
Subsection:	DB	Footage:	Not Reported
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	240
Stwaterlev:	0	Pwaterlev:	0
Wedrilic:	19168	Ownernumbe:	42901
Compname:	Lincoln Public Schools		
Citystzip:	Lincoln, NE 68516		
Address1:	2323 South Coddington		
Address2:	Not Reported		
Fildate:	02-DEC-94	Cmpldmonth:	9
Cmpldday:	13	Cmpldyear:	1994
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.848147		

Longdd:	-96.689347		
Calcgps:	-1	Site id:	NE5000000064230

Map ID:	18		
Oid :	0	Wellid:	135455
Regnum:	G-112126	Replacemen:	0
Status:	A	Useid:	L
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	7
Subsection:	CB	Footage:	1350N 100E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	22
Stwaterlev:	14.5	Pwaterlev:	0
Wedrilic:	39325	Ownernumbe:	59358
Compname:	Lincoln SK LLC		
Citystzip:	Omaha, NE 68154		
Address1:	13710 F N B Parkway		
Address2:	Noddle Development		
Fildate:	05-OCT-01	Cmpldmonth:	7
Cmpldday:	24	Cmpldyear:	2001
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.846303		
Longdd:	-96.681857		
Calcgps:	-1	Site id:	NE5000000064003

Map ID:	19		
Oid :	0	Wellid:	151891
Regnum:	G-123050C	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	6
Rangelet:	E	Section:	12
Subsection:	CD	Footage:	224N 1437E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	20
Stwaterlev:	14.1999998092651	Pwaterlev:	0
Wedrilic:	19030	Ownernumbe:	40369
Compname:	Nebraska Department of Environmental Quality		
Citystzip:	Lincoln, NE 68509		
Address1:	INTERAGENCY		
Address2:	Phil Hargis		
Fildate:	25-AUG-03	Cmpldmonth:	6
Cmpldday:	24	Cmpldyear:	2003
Lastchgdat:	30-DEC-99	Xdate2:	10/2003
Latdd:	40.843433		

Longdd:	-96.695972		
Calcgps:	-1	Site id:	NE5000000063682

Map ID:	19		
Oid :	0	Wellid:	151889
Regnum:	G-123050A	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	6
Rangelet:	E	Section:	12
Subsection:	CD	Footage:	216N 1388E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	20
Stwaterlev:	13.8999996185303	Pwaterlev:	0
Wedrilic:	19030	Ownernumbe:	40369
Compname:	Nebraska Department of Environmental Quality		
Citystzip:	Lincoln, NE 68509		
Address1:	INTERAGENCY		
Address2:	Phil Hargis		
Fildate:	25-AUG-03	Cmpldmonth:	6
Cmpldday:	24	Cmpldyear:	2003
Lastchgdat:	30-DEC-99	Xdate2:	10/2003
Latdd:	40.843414		
Longdd:	-96.696149		
Calcgps:	-1	Site id:	NE5000000063676

Map ID:	19		
Oid :	0	Wellid:	151890
Regnum:	G-123050B	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	6
Rangelet:	E	Section:	12
Subsection:	CD	Footage:	202N 1412E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	20
Stwaterlev:	14.3000001907349	Pwaterlev:	0
Wedrilic:	19030	Ownernumbe:	40369
Compname:	Nebraska Department of Environmental Quality		
Citystzip:	Lincoln, NE 68509		
Address1:	INTERAGENCY		
Address2:	Phil Hargis		
Fildate:	25-AUG-03	Cmpldmonth:	6
Cmpldday:	24	Cmpldyear:	2003
Lastchgdat:	30-DEC-99	Xdate2:	10/2003
Latdd:	40.843374		

Longdd:	-96.696062		
Calcgps:	-1	Site id:	NE5000000063669

Map ID:	20		
Oid :	0	Wellid:	158750
Regnum:	G-127591H	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	7
Subsection:	CD	Footage:	236N 2369E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	33
Stwaterlev:	27.7999992370605	Pwaterlev:	0
Wedrilic:	39395	Ownernumbe:	40900
Compname:	Whitehead Oil Company		
Citystzip:	Lincoln, NE 68503		
Address1:	2537 Randolph Street Box 30211		
Address2:	Mark Whitehead		
Fildate:	27-MAY-04	Cmpldmonth:	3
Cmpldday:	10	Cmpldyear:	2004
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.84325		
Longdd:	-96.6737		
Calcgps:	0	Site id:	NE5000000063645

Map ID:	19		
Oid :	0	Wellid:	151892
Regnum:	G-123050D	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	6
Rangelet:	E	Section:	12
Subsection:	CD	Footage:	138N 1440E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	20
Stwaterlev:	14.3000001907349	Pwaterlev:	0
Wedrilic:	19030	Ownernumbe:	40369
Compname:	Nebraska Department of Environmental Quality		
Citystzip:	Lincoln, NE 68509		
Address1:	INTERAGENCY		
Address2:	Phil Hargis		
Fildate:	25-AUG-03	Cmpldmonth:	6
Cmpldday:	24	Cmpldyear:	2003
Lastchgdat:	30-DEC-99	Xdate2:	10/2003
Latdd:	40.843197		

Longdd:	-96.695961		
Calcgps:	-1	Site id:	NE5000000063638

Map ID:	20		
Oid :	0	Wellid:	158749
Regnum:	G-127591G	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	7
Subsection:	CD	Footage:	207N 2329E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	33
Stwaterlev:	27.7999992370605	Pwaterlev:	0
Wedrilic:	39395	Ownernumbe:	40900
Compname:	Whitehead Oil Company		
Citystzip:	Lincoln, NE 68503		
Address1:	2537 Randolph Street Box 30211		
Address2:	Mark Whitehead		
Fildate:	27-MAY-04	Cmpldmonth:	3
Cmpldday:	10	Cmpldyear:	2004
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.8431666667		
Longdd:	-96.67385		
Calcgps:	0	Site id:	NE5000000063633

Map ID:	20		
Oid :	0	Wellid:	202369
Regnum:	Not Reported	Replacemen:	0
Status:	U	Useid:	R
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	7
Subsection:	CD	Footage:	200N 2392E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	45
Stwaterlev:	0	Pwaterlev:	0
Wedrilic:	0	Ownernumbe:	40900
Compname:	Whitehead Oil Company		
Citystzip:	Lincoln, NE 68503		
Address1:	2537 Randolph Street Box 30211		
Address2:	Mark Whitehead		
Fildate:	09-DEC-09	Cmpldmonth:	0
Cmpldday:	0	Cmpldyear:	0
Lastchgdat:	30-DEC-99	Xdate2:	10/2009
Latdd:	40.84315		

Longdd:	-96.6736166667		
Calcgps:	0	Site id:	NE5000000063630

Map ID:	21		
Oid :	0	Wellid:	124611
Regnum:	G-105013D	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	7
Subsection:	CC	Footage:	190N 880E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	34
Stwaterlev:	28	Pwaterlev:	0
Wedrilic:	89005	Ownernumbe:	33932
Compname:	Gas N Shop Inc		
Citystzip:	Lincoln, NE 68501		
Address1:	701 Marina Bay Place PO Box 81763		
Address2:	Larry W Coffey		
Fildate:	10-APR-00	Cmpldmonth:	1
Cmpldday:	28	Cmpldyear:	2000
Lastchgdat:	30-DEC-99	Xdate2:	3/2001
Latdd:	40.84312		
Longdd:	-96.679086		
Calcgps:	-1	Site id:	NE5000000063625

Map ID:	22		
Oid :	0	Wellid:	174470
Regnum:	G-138891	Replacemen:	0
Status:	A	Useid:	G
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	8
Subsection:	DD	Footage:	187N 686W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	170
Stwaterlev:	0	Pwaterlev:	0
Wedrilic:	19226	Ownernumbe:	78720
Compname:	Bob Fairchild		
Citystzip:	Lincoln, NE 68504		
Address1:	5310 Adams Street		
Address2:	Not Reported		
Fildate:	22-FEB-06	Cmpldmonth:	1
Cmpldday:	12	Cmpldyear:	2006
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.8430833333		

Longdd:	-96.6467222222		
Calcgps:	0	Site id:	NE5000000063613

Map ID:	20		
Oid :	0	Wellid:	158747
Regnum:	G-127591E	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	7
Subsection:	CD	Footage:	157N 2395E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	33
Stwaterlev:	27.3999996185303	Pwaterlev:	0
Wedrilic:	39395	Ownernumbe:	40900
Compname:	Whitehead Oil Company		
Citystzip:	Lincoln, NE 68503		
Address1:	2537 Randolph Street Box 30211		
Address2:	Mark Whitehead		
Fildate:	27-MAY-04	Cmpldmonth:	3
Cmpldday:	10	Cmpldyear:	2004
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.8430333333		
Longdd:	-96.6736166667		
Calcgps:	0	Site id:	NE5000000063610

Map ID:	20		
Oid :	0	Wellid:	158746
Regnum:	G-127591D	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	7
Subsection:	CD	Footage:	141N 2395E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	33
Stwaterlev:	26.8999996185303	Pwaterlev:	0
Wedrilic:	39395	Ownernumbe:	40900
Compname:	Whitehead Oil Company		
Citystzip:	Lincoln, NE 68503		
Address1:	2537 Randolph Street Box 30211		
Address2:	Mark Whitehead		
Fildate:	27-MAY-04	Cmpldmonth:	3
Cmpldday:	10	Cmpldyear:	2004
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.8429833333		

Longdd:	-96.6736166667		
Calcgps:	0	Site id:	NE5000000063596

Map ID:	20		
Oid :	0	Wellid:	202370
Regnum:	Not Reported	Replacemen:	0
Status:	U	Useid:	R
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	7
Subsection:	CD	Footage:	131N 2543E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	45
Stwaterlev:	0	Pwaterlev:	0
Wedrilic:	0	Ownernumbe:	40900
Compname:	Whitehead Oil Company		
Citystzip:	Lincoln, NE 68503		
Address1:	2537 Randolph Street Box 30211		
Address2:	Mark Whitehead		
Fildate:	09-DEC-09	Cmpldmonth:	0
Cmpldday:	0	Cmpldyear:	0
Lastchgdat:	30-DEC-99	Xdate2:	10/2009
Latdd:	40.8429555556		
Longdd:	-96.6730833333		
Calcgps:	0	Site id:	NE5000000063592

Map ID:	20		
Oid :	0	Wellid:	158748
Regnum:	G-127591F	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	7
Subsection:	CD	Footage:	115N 2349E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	33
Stwaterlev:	27.1000003814697	Pwaterlev:	0
Wedrilic:	39395	Ownernumbe:	40900
Compname:	Whitehead Oil Company		
Citystzip:	Lincoln, NE 68503		
Address1:	2537 Randolph Street Box 30211		
Address2:	Mark Whitehead		
Fildate:	27-MAY-04	Cmpldmonth:	3
Cmpldday:	10	Cmpldyear:	2004
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.8429166667		

Longdd:	-96.6737833333		
Calcgps:	0	Site id:	NE5000000063587

Map ID:	20		
Oid :	0	Wellid:	158744
Regnum:	G-127591B	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	7
Subsection:	CD	Footage:	108N 2507E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	32
Stwaterlev:	25.8999996185303	Pwaterlev:	0
Wedrilic:	39395	Ownernumbe:	40900
Compname:	Whitehead Oil Company		
Citystzip:	Lincoln, NE 68503		
Address1:	2537 Randolph Street Box 30211		
Address2:	Mark Whitehead		
Fildate:	27-MAY-04	Cmpldmonth:	3
Cmpldday:	9	Cmpldyear:	2004
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.8429		
Longdd:	-96.6732166667		
Calcgps:	0	Site id:	NE5000000063581

Map ID:	21		
Oid :	0	Wellid:	124610
Regnum:	G-105013C	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	7
Subsection:	CC	Footage:	100N 880E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	34
Stwaterlev:	28	Pwaterlev:	0
Wedrilic:	89005	Ownernumbe:	33932
Compname:	Gas N Shop Inc		
Citystzip:	Lincoln, NE 68501		
Address1:	701 Marina Bay Place PO Box 81763		
Address2:	Larry W Coffey		
Fildate:	10-APR-00	Cmpldmonth:	1
Cmpldday:	28	Cmpldyear:	2000
Lastchgdat:	30-DEC-99	Xdate2:	3/2001
Latdd:	40.842873		

Longdd:	-96.67909		
Calcgps:	-1	Site id:	NE5000000063577

Map ID:	21		
Oid :	0	Wellid:	124609
Regnum:	G-105013B	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	7
Subsection:	CC	Footage:	100N 950E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	34
Stwaterlev:	28	Pwaterlev:	0
Wedrilic:	89005	Ownernumbe:	33932
Compname:	Gas N Shop Inc		
Citystzip:	Lincoln, NE 68501		
Address1:	701 Marina Bay Place PO Box 81763		
Address2:	Larry W Coffey		
Fildate:	10-APR-00	Cmpldmonth:	1
Cmpldday:	27	Cmpldyear:	2000
Lastchgdat:	30-DEC-99	Xdate2:	3/2001
Latdd:	40.842873		
Longdd:	-96.678837		
Calcgps:	-1	Site id:	NE5000000063578

Map ID:	21		
Oid :	0	Wellid:	124608
Regnum:	G-105013A	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	7
Subsection:	CC	Footage:	100N 1000E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	34
Stwaterlev:	27	Pwaterlev:	0
Wedrilic:	89005	Ownernumbe:	33932
Compname:	Gas N Shop Inc		
Citystzip:	Lincoln, NE 68501		
Address1:	701 Marina Bay Place PO Box 81763		
Address2:	Larry W Coffey		
Fildate:	10-APR-00	Cmpldmonth:	1
Cmpldday:	27	Cmpldyear:	2000
Lastchgdat:	30-DEC-99	Xdate2:	3/2001
Latdd:	40.842873		

Longdd:	-96.678656		
Calcgps:	-1	Site id:	NE5000000063579

Map ID:	20		
Oid :	0	Wellid:	158745
Regnum:	G-127591C	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	7
Subsection:	CD	Footage:	98N 2434E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	33
Stwaterlev:	27.5	Pwaterlev:	0
Wedrilic:	39395	Ownernumbe:	40900
Compname:	Whitehead Oil Company		
Citystzip:	Lincoln, NE 68503		
Address1:	2537 Randolph Street Box 30211		
Address2:	Mark Whitehead		
Fildate:	27-MAY-04	Cmpldmonth:	3
Cmpldday:	9	Cmpldyear:	2004
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.8428666667		
Longdd:	-96.6734666667		
Calcgps:	0	Site id:	NE5000000063576

Map ID:	20		
Oid :	0	Wellid:	158743
Regnum:	G-127591A	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	7
Subsection:	CD	Footage:	79N 2441E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	32
Stwaterlev:	27.2000007629395	Pwaterlev:	0
Wedrilic:	39395	Ownernumbe:	40900
Compname:	Whitehead Oil Company		
Citystzip:	Lincoln, NE 68503		
Address1:	2537 Randolph Street Box 30211		
Address2:	Mark Whitehead		
Fildate:	27-MAY-04	Cmpldmonth:	3
Cmpldday:	9	Cmpldyear:	2004
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.8428166667		

Longdd:	-96.67345		
Calcgps:	0	Site id:	NE5000000063571

Map ID:	23		
Oid :	0	Wellid:	133907
Regnum:	G-113316	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	17
Subsection:	AB	Footage:	44S 2540W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	34
Stwaterlev:	29	Pwaterlev:	0
Wedrilic:	39395	Ownernumbe:	58782
Compname:	Adams Street Conoco		
Citystzip:	Lincoln, NE 68510		
Address1:	810 South 70th Street		
Address2:	Mrs Leona Sorenson		
Fildate:	11-DEC-01	Cmpldmonth:	5
Cmpldday:	11	Cmpldyear:	2000
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.842463		
Longdd:	-96.65342		
Calcgps:	-1	Site id:	NE5000000063532

Map ID:	24		
Oid :	0	Wellid:	198825
Regnum:	G-152884A	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	18
Subsection:	AB	Footage:	200S 1660E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	30
Stwaterlev:	25.6000003814697	Pwaterlev:	0
Wedrilic:	39402	Ownernumbe:	95044
Compname:	Cornhusker International Trucks Inc		
Citystzip:	Omaha, NE 68137		
Address1:	4502 South 110th Street		
Address2:	John Plagman		
Fildate:	27-MAY-09	Cmpldmonth:	10
Cmpldday:	14	Cmpldyear:	2008
Lastchgdat:	30-DEC-99	Xdate2:	4/2009
Latdd:	40.84205		

Longdd:	-96.676275		
Calcgps:	-1	Site id:	NE5000000063490

Map ID:	25		
Oid :	0	Wellid:	115522
Regnum:	G-098602	Replacemen:	0
Status:	A	Useid:	G
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	17
Subsection:	AA	Footage:	205S 111W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	185
Stwaterlev:	0	Pwaterlev:	0
Wedrilic:	19168	Ownernumbe:	61925
Compname:	Lincoln Public Schools		
Citystzip:	Lincoln, NE 68510		
Address1:	5900 O Street		
Address2:	Not Reported		
Fildate:	30-NOV-98	Cmpldmonth:	5
Cmpldday:	30	Cmpldyear:	1998
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.842008		
Longdd:	-96.644638		
Calcgps:	-1	Site id:	NE5000000063484

Map ID:	24		
Oid :	0	Wellid:	198826
Regnum:	G-152884B	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	18
Subsection:	AB	Footage:	265S 1713E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	31.5
Stwaterlev:	25.8999996185303	Pwaterlev:	0
Wedrilic:	39402	Ownernumbe:	95044
Compname:	Cornhusker International Trucks Inc		
Citystzip:	Omaha, NE 68137		
Address1:	4502 South 110th Street		
Address2:	John Plagman		
Fildate:	27-MAY-09	Cmpldmonth:	10
Cmpldday:	15	Cmpldyear:	2008
Lastchgdat:	30-DEC-99	Xdate2:	4/2009
Latdd:	40.841871		

Longdd:	-96.676084		
Calcgps:	-1	Site id:	NE5000000063473

Map ID:	24		
Oid :	0	Wellid:	198827
Regnum:	G-152884C	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	18
Subsection:	AB	Footage:	358S 1773E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	31
Stwaterlev:	24.7000007629395	Pwaterlev:	0
Wedrilic:	39402	Ownernumbe:	95044
Compname:	Cornhusker International Trucks Inc		
Citystzip:	Omaha, NE 68137		
Address1:	4502 South 110th Street		
Address2:	John Plagman		
Fildate:	27-MAY-09	Cmpldmonth:	10
Cmpldday:	14	Cmpldyear:	2008
Lastchgdat:	30-DEC-99	Xdate2:	4/2009
Latdd:	40.841616		
Longdd:	-96.675867		
Calcgps:	-1	Site id:	NE5000000063440

Map ID:	24		
Oid :	0	Wellid:	198828
Regnum:	G-152884D	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	18
Subsection:	AB	Footage:	440S 1738E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	27.5
Stwaterlev:	25.7999992370605	Pwaterlev:	0
Wedrilic:	39402	Ownernumbe:	95044
Compname:	Cornhusker International Trucks Inc		
Citystzip:	Omaha, NE 68137		
Address1:	4502 South 110th Street		
Address2:	John Plagman		
Fildate:	27-MAY-09	Cmpldmonth:	10
Cmpldday:	14	Cmpldyear:	2008
Lastchgdat:	30-DEC-99	Xdate2:	4/2009
Latdd:	40.841391		

Longdd:	-96.675993		
Calcgps:	-1	Site id:	NE5000000063409

Map ID:	24		
Oid :	0	Wellid:	172334
Regnum:	G-137203E	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	18
Subsection:	BA	Footage:	Not Reported
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	32
Stwaterlev:	19	Pwaterlev:	0
Wedrilic:	39402	Ownernumbe:	76893
Compname:	ContiGroup Companies		
Citystzip:	Lincoln, NE 68510		
Address1:	3100 Cornhusker Hwy		
Address2:	Dan Decker		
Fildate:	01-NOV-05	Cmpldmonth:	8
Cmpldday:	9	Cmpldyear:	2005
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.8413888889		
Longdd:	-96.6772222222		
Calcgps:	0	Site id:	NE5000000063405

Map ID:	24		
Oid :	0	Wellid:	172330
Regnum:	G-137203A	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	18
Subsection:	BA	Footage:	Not Reported
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	52
Stwaterlev:	21	Pwaterlev:	0
Wedrilic:	39402	Ownernumbe:	76893
Compname:	ContiGroup Companies		
Citystzip:	Lincoln, NE 68510		
Address1:	3100 Cornhusker Hwy		
Address2:	Dan Decker		
Fildate:	01-NOV-05	Cmpldmonth:	8
Cmpldday:	11	Cmpldyear:	2005
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.8413888889		

Longdd:	-96.6772222222		
Calcgps:	0	Site id:	NE5000000063404

Map ID:	24		
Oid :	0	Wellid:	172332
Regnum:	G-137203C	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	18
Subsection:	BA	Footage:	Not Reported
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	51.5
Stwaterlev:	20.5	Pwaterlev:	0
Wedrilic:	39402	Ownernumbe:	76893
Compname:	ContiGroup Companies		
Citystzip:	Lincoln, NE 68510		
Address1:	3100 Cornhusker Hwy		
Address2:	Dan Decker		
Fildate:	01-NOV-05	Cmpldmonth:	8
Cmpldday:	12	Cmpldyear:	2005
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.8411111111		
Longdd:	-96.6766666667		
Calcgps:	0	Site id:	NE5000000063381

Map ID:	26		
Oid :	0	Wellid:	195335
Regnum:	G-151145	Replacemen:	0
Status:	I	Useid:	G
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	17
Subsection:	AB	Footage:	568S 2451W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	300
Stwaterlev:	0	Pwaterlev:	0
Wedrilic:	19259	Ownernumbe:	93110
Compname:	M E Group Inc		
Citystzip:	Lincoln, NE 68504		
Address1:	2820 N 48th St Suite 200		
Address2:	Not Reported		
Fildate:	05-NOV-08	Cmpldmonth:	10
Cmpldday:	15	Cmpldyear:	2008
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.841025		

Longdd:	-96.6530888889		
Calcgps:	0	Site id:	NE5000000063368

Map ID:	24		
Oid :	0	Wellid:	123319
Regnum:	G-103881B	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	18
Subsection:	BA	Footage:	625S 1675E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	33
Stwaterlev:	21	Pwaterlev:	0
Wedrilic:	39325	Ownernumbe:	55254
Compname:	ContiGroup Companies		
Citystzip:	New York, NY 10172		
Address1:	277 Park Avenue		
Address2:	Not Reported		
Fildate:	07-FEB-00	Cmpldmonth:	4
Cmpldday:	16	Cmpldyear:	1999
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.840883		
Longdd:	-96.676221		
Calcgps:	-1	Site id:	NE5000000063350

Map ID:	27		
Oid :	0	Wellid:	147886
Regnum:	G-120243B	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	6
Rangelet:	E	Section:	13
Subsection:	BA	Footage:	697S 2183E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	25
Stwaterlev:	21.6000003814697	Pwaterlev:	0
Wedrilic:	89034	Ownernumbe:	62902
Compname:	Capital City Service		
Citystzip:	Lincoln, NE 68521		
Address1:	1925 Yolande		
Address2:	Not Reported		
Fildate:	27-FEB-03	Cmpldmonth:	1
Cmpldday:	31	Cmpldyear:	2003
Lastchgdat:	30-DEC-99	Xdate2:	5/2003
Latdd:	40.840862		

Longdd:	-96.693289		
Calcgps:	-1	Site id:	NE5000000063348

Map ID:	24		
Oid :	0	Wellid:	172331
Regnum:	G-137203B	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	18
Subsection:	BA	Footage:	Not Reported
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	53
Stwaterlev:	21	Pwaterlev:	0
Wedrilic:	39402	Ownernumbe:	76893
Compname:	ContiGroup Companies		
Citystzip:	Lincoln, NE 68510		
Address1:	3100 Cornhusker Hwy		
Address2:	Dan Decker		
Fildate:	01-NOV-05	Cmpldmonth:	8
Cmpldday:	10	Cmpldyear:	2005
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.8408333333		
Longdd:	-96.6763888889		
Calcgps:	0	Site id:	NE5000000063342

Map ID:	24		
Oid :	0	Wellid:	172333
Regnum:	G-137203D	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	18
Subsection:	BA	Footage:	Not Reported
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	38
Stwaterlev:	22	Pwaterlev:	0
Wedrilic:	39402	Ownernumbe:	76893
Compname:	ContiGroup Companies		
Citystzip:	Lincoln, NE 68510		
Address1:	3100 Cornhusker Hwy		
Address2:	Dan Decker		
Fildate:	01-NOV-05	Cmpldmonth:	8
Cmpldday:	9	Cmpldyear:	2005
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.8408333333		

Longdd:	-96.6763888889		
Calcgps:	0	Site id:	NE5000000063343

Map ID:	28		
Oid :	0	Wellid:	119678
Regnum:	G-101452C	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwmum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	6
Rangelet:	E	Section:	13
Subsection:	AA	Footage:	650S 162W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	12
Stwaterlev:	3	Pwaterlev:	0
Wedrilic:	39349	Ownernumbe:	53829
Compname:	Interstate Brands Corporation		
Citystzip:	Lincoln, NE 68521		
Address1:	2711 North 27 Street		
Address2:	Not Reported		
Fildate:	30-JUL-99	Cmpldmonth:	5
Cmpldday:	28	Cmpldyear:	1999
Lastchgdat:	30-DEC-99	Xdate2:	8/2001
Latdd:	40.840824		
Longdd:	-96.682859		
Calcgps:	-1	Site id:	NE5000000063339

Map ID:	24		
Oid :	0	Wellid:	123322
Regnum:	G-103881E	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwmum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	18
Subsection:	BA	Footage:	650S 1775E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	35
Stwaterlev:	20	Pwaterlev:	0
Wedrilic:	39325	Ownernumbe:	55254
Compname:	ContiGroup Companies		
Citystzip:	New York, NY 10172		
Address1:	277 Park Avenue		
Address2:	Not Reported		
Fildate:	07-FEB-00	Cmpldmonth:	4
Cmpldday:	17	Cmpldyear:	1999
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.840815		

Longdd:	-96.67586		
Calcgps:	-1	Site id:	NE5000000063337

Map ID:	27		
Oid :	0	Wellid:	147916
Regnum:	G-120243C	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	6
Rangelet:	E	Section:	13
Subsection:	BA	Footage:	717S 2183E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	25
Stwaterlev:	22	Pwaterlev:	0
Wedrilic:	89034	Ownernumbe:	62902
Compname:	Capital City Service		
Citystzip:	Lincoln, NE 68521		
Address1:	1925 Yolande		
Address2:	Not Reported		
Fildate:	27-FEB-03	Cmpldmonth:	1
Cmpldday:	31	Cmpldyear:	2003
Lastchgdat:	30-DEC-99	Xdate2:	5/2003
Latdd:	40.840807		
Longdd:	-96.69329		
Calcgps:	-1	Site id:	NE5000000063333

Map ID:	27		
Oid :	0	Wellid:	147885
Regnum:	G-120243A	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	6
Rangelet:	E	Section:	13
Subsection:	BA	Footage:	717S 2263E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	27.5
Stwaterlev:	20.7999992370605	Pwaterlev:	0
Wedrilic:	89034	Ownernumbe:	62902
Compname:	Capital City Service		
Citystzip:	Lincoln, NE 68521		
Address1:	1925 Yolande		
Address2:	Not Reported		
Fildate:	27-FEB-03	Cmpldmonth:	1
Cmpldday:	31	Cmpldyear:	2003
Lastchgdat:	30-DEC-99	Xdate2:	5/2003
Latdd:	40.840803		

Longdd:	-96.693001		
Calcgps:	-1	Site id:	NE5000000063330

Map ID:	28		
Oid :	0	Wellid:	119680
Regnum:	G-101452E	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	6
Rangelet:	E	Section:	13
Subsection:	AA	Footage:	675S 113W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	12
Stwaterlev:	0	Pwaterlev:	0
Wedrilic:	39349	Ownernumbe:	53829
Compname:	Interstate Brands Corporation		
Citystzip:	Lincoln, NE 68521		
Address1:	2711 North 27 Street		
Address2:	Not Reported		
Fildate:	30-JUL-99	Cmpldmonth:	6
Cmpldday:	3	Cmpldyear:	1999
Lastchgdat:	30-DEC-99	Xdate2:	8/2001
Latdd:	40.840752		
Longdd:	-96.682682		
Calcgps:	-1	Site id:	NE5000000063324

Map ID:	28		
Oid :	0	Wellid:	119679
Regnum:	G-101452D	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	6
Rangelet:	E	Section:	13
Subsection:	AA	Footage:	681S 184W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	12
Stwaterlev:	4	Pwaterlev:	0
Wedrilic:	39349	Ownernumbe:	53829
Compname:	Interstate Brands Corporation		
Citystzip:	Lincoln, NE 68521		
Address1:	2711 North 27 Street		
Address2:	Not Reported		
Fildate:	30-JUL-99	Cmpldmonth:	6
Cmpldday:	1	Cmpldyear:	1999
Lastchgdat:	30-DEC-99	Xdate2:	8/2001
Latdd:	40.84074		

Longdd:	-96.682939		
Calcgps:	-1	Site id:	NE5000000063321

Map ID:	28		
Oid :	0	Wellid:	119675
Regnum:	G-101452A	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	6
Rangelet:	E	Section:	13
Subsection:	AA	Footage:	680S 133W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	15
Stwaterlev:	10	Pwaterlev:	0
Wedrilic:	39349	Ownernumbe:	53829
Compname:	Interstate Brands Corporation		
Citystzip:	Lincoln, NE 68521		
Address1:	2711 North 27 Street		
Address2:	Not Reported		
Fildate:	30-JUL-99	Cmpldmonth:	5
Cmpldday:	28	Cmpldyear:	1999
Lastchgdat:	30-DEC-99	Xdate2:	8/2001
Latdd:	40.84074		
Longdd:	-96.682755		
Calcgps:	-1	Site id:	NE5000000063322

Map ID:	28		
Oid :	0	Wellid:	119681
Regnum:	G-101452F	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	6
Rangelet:	E	Section:	13
Subsection:	AA	Footage:	694S 148W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	12
Stwaterlev:	6	Pwaterlev:	0
Wedrilic:	39349	Ownernumbe:	53829
Compname:	Interstate Brands Corporation		
Citystzip:	Lincoln, NE 68521		
Address1:	2711 North 27 Street		
Address2:	Not Reported		
Fildate:	30-JUL-99	Cmpldmonth:	6
Cmpldday:	3	Cmpldyear:	1999
Lastchgdat:	30-DEC-99	Xdate2:	8/2001
Latdd:	40.840702		

Longdd:	-96.682809		
Calcgps:	-1	Site id:	NE5000000063313

Map ID:	24		
Oid :	0	Wellid:	123321
Regnum:	G-103881D	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	18
Subsection:	BA	Footage:	700S 1600E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	35
Stwaterlev:	19	Pwaterlev:	0
Wedrilic:	39325	Ownernumbe:	55254
Compname:	ContiGroup Companies		
Citystzip:	New York, NY 10172		
Address1:	277 Park Avenue		
Address2:	Not Reported		
Fildate:	07-FEB-00	Cmpldmonth:	4
Cmpldday:	17	Cmpldyear:	1999
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.840677		
Longdd:	-96.676492		
Calcgps:	-1	Site id:	NE5000000063307

Map ID:	28		
Oid :	0	Wellid:	119676
Regnum:	G-101452B	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	6
Rangelet:	E	Section:	13
Subsection:	AA	Footage:	708S 100W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	18
Stwaterlev:	0	Pwaterlev:	0
Wedrilic:	39349	Ownernumbe:	53829
Compname:	Interstate Brands Corporation		
Citystzip:	Lincoln, NE 68521		
Address1:	2711 North 27 Street		
Address2:	Not Reported		
Fildate:	30-JUL-99	Cmpldmonth:	5
Cmpldday:	28	Cmpldyear:	1999
Lastchgdat:	30-DEC-99	Xdate2:	8/2001
Latdd:	40.840661		

Longdd:	-96.682635		
Calcgps:	-1	Site id:	NE5000000063303

Map ID:	24		
Oid :	0	Wellid:	123320
Regnum:	G-103881C	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	18
Subsection:	BA	Footage:	850S 1450E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	36
Stwaterlev:	18	Pwaterlev:	0
Wedrilic:	39325	Ownernumbe:	55254
Compname:	ContiGroup Companies		
Citystzip:	New York, NY 10172		
Address1:	277 Park Avenue		
Address2:	Not Reported		
Fildate:	07-FEB-00	Cmpldmonth:	4
Cmpldday:	17	Cmpldyear:	1999
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.840266		
Longdd:	-96.677034		
Calcgps:	-1	Site id:	NE5000000063244

Map ID:	24		
Oid :	0	Wellid:	123318
Regnum:	G-103881A	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	18
Subsection:	BA	Footage:	900S 1375E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	38
Stwaterlev:	17	Pwaterlev:	0
Wedrilic:	39325	Ownernumbe:	55254
Compname:	ContiGroup Companies		
Citystzip:	New York, NY 10172		
Address1:	277 Park Avenue		
Address2:	Not Reported		
Fildate:	07-FEB-00	Cmpldmonth:	4
Cmpldday:	16	Cmpldyear:	1999
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.840128		

Longdd:	-96.677305		
Calcgps:	-1	Site id:	NE5000000063221

Map ID:	30		
Oid :	0	Wellid:	180919
Regnum:	Not Reported	Replacemen:	0
Status:	U	Useid:	W
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	6
Rangelet:	E	Section:	13
Subsection:	AB	Footage:	1158N 1440E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	0
Stwaterlev:	0	Pwaterlev:	0
Wedrilic:	0	Ownernumbe:	60279
Compname:	City of Lincoln		
Citystzip:	Lincoln, NE 68508		
Address1:	440 S 8th Street Suite 200		
Address2:	Not Reported		
Fildate:	13-DEC-06	Cmpldmonth:	0
Cmpldday:	0	Cmpldyear:	0
Lastchgdat:	30-DEC-99	Xdate2:	10/2006
Latdd:	40.8395		
Longdd:	-96.6874722222		
Calcgps:	0	Site id:	NE5000000063121

Map ID:	30		
Oid :	0	Wellid:	180916
Regnum:	Not Reported	Replacemen:	0
Status:	U	Useid:	W
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	6
Rangelet:	E	Section:	13
Subsection:	AB	Footage:	1217N 1739E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	0
Stwaterlev:	0	Pwaterlev:	0
Wedrilic:	0	Ownernumbe:	60279
Compname:	City of Lincoln		
Citystzip:	Lincoln, NE 68508		
Address1:	440 S 8th Street Suite 200		
Address2:	Not Reported		
Fildate:	13-DEC-06	Cmpldmonth:	0
Cmpldday:	0	Cmpldyear:	0
Lastchgdat:	30-DEC-99	Xdate2:	10/2006
Latdd:	40.8393611111		

Longdd:	-96.6885555556		
Calcgps:	0	Site id:	NE5000000063114

Map ID:	30		
Oid :	0	Wellid:	180918
Regnum:	Not Reported	Replacemen:	0
Status:	U	Useid:	W
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	6
Rangelet:	E	Section:	13
Subsection:	AC	Footage:	1421N 1391E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	0
Stwaterlev:	0	Pwaterlev:	0
Wedrilic:	0	Ownernumbe:	60279
Compname:	City of Lincoln		
Citystzip:	Lincoln, NE 68508		
Address1:	440 S 8th Street Suite 200		
Address2:	Not Reported		
Fildate:	13-DEC-06	Cmpldmonth:	0
Cmpldday:	0	Cmpldyear:	0
Lastchgdat:	30-DEC-99	Xdate2:	10/2006
Latdd:	40.8387777778		
Longdd:	-96.6873055556		
Calcgps:	0	Site id:	NE5000000063058

Map ID:	30		
Oid :	0	Wellid:	180917
Regnum:	Not Reported	Replacemen:	0
Status:	U	Useid:	W
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	6
Rangelet:	E	Section:	13
Subsection:	AC	Footage:	1549N 1670E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	0
Stwaterlev:	0	Pwaterlev:	0
Wedrilic:	0	Ownernumbe:	60279
Compname:	City of Lincoln		
Citystzip:	Lincoln, NE 68508		
Address1:	440 S 8th Street Suite 200		
Address2:	Not Reported		
Fildate:	13-DEC-06	Cmpldmonth:	0
Cmpldday:	0	Cmpldyear:	0
Lastchgdat:	30-DEC-99	Xdate2:	10/2006
Latdd:	40.8384444444		

Longdd:	-96.6883055556		
Calcgps:	0	Site id:	NE5000000063022

Map ID:	31		
Oid :	0	Wellid:	126022
Regnum:	G-105961C	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	17
Subsection:	AC	Footage:	1750S 2400W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	35
Stwaterlev:	26	Pwaterlev:	0
Wedrilic:	19196	Ownernumbe:	12346
Compname:	Amoco Corporation		
Citystzip:	Golden, CO 80401		
Address1:	400 Corporate Circle Suite V		
Address2:	Not Reported		
Fildate:	12-JUN-00	Cmpldmonth:	4
Cmpldday:	25	Cmpldyear:	2000
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.83778		
Longdd:	-96.652893		
Calcgps:	-1	Site id:	NE5000000062937

Map ID:	31		
Oid :	0	Wellid:	126020
Regnum:	G-105961A	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	17
Subsection:	AC	Footage:	1800S 2450W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	35
Stwaterlev:	26	Pwaterlev:	0
Wedrilic:	19196	Ownernumbe:	12346
Compname:	Amoco Corporation		
Citystzip:	Golden, CO 80401		
Address1:	400 Corporate Circle Suite V		
Address2:	Not Reported		
Fildate:	12-JUN-00	Cmpldmonth:	4
Cmpldday:	25	Cmpldyear:	2000
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.837643		

Longdd:	-96.653073		
Calcgps:	-1	Site id:	NE5000000062910

Map ID:	31		
Oid :	0	Wellid:	126021
Regnum:	G-105961B	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	17
Subsection:	AC	Footage:	1850S 2480W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	33
Stwaterlev:	25	Pwaterlev:	0
Wedrilic:	19196	Ownernumbe:	12346
Compname:	Amoco Corporation		
Citystzip:	Golden, CO 80401		
Address1:	400 Corporate Circle Suite V		
Address2:	Not Reported		
Fildate:	12-JUN-00	Cmpldmonth:	4
Cmpldday:	25	Cmpldyear:	2000
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.837506		
Longdd:	-96.653181		
Calcgps:	-1	Site id:	NE5000000062893

Map ID:	32		
Oid :	0	Wellid:	143790
Regnum:	G-122686	Replacemen:	0
Status:	A	Useid:	I
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	18
Subsection:	BC	Footage:	2350S 1250E
Areapermit:	LPS-020119		
Acres:	15		
Gpm:	175	Pcoldiam:	3
Pdepth:	58	Totaldepth:	92
Stwaterlev:	20	Pwaterlev:	31.5
Wedrilic:	39266	Ownernumbe:	61959
Compname:	Joint Antelope Valley Authority		
Citystzip:	Lincoln, NE 68528		
Address1:	531 Westgate Blvd Suite 100		
Address2:	Not Reported		
Fildate:	31-JUL-03	Cmpldmonth:	1
Cmpldday:	7	Cmpldyear:	2003
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.836149		

GEOCHECK VERSION 2.1
STATE DATABASE WELL INFORMATION

Longdd:	-96.677757		
Calcgps:	-1	Site id:	NE5000000062740

Map ID:	33		
Oid :	0	Wellid:	164832
Regnum:	G-131749G	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	17
Subsection:	DB	Footage:	Not Reported
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	30
Stwaterlev:	24	Pwaterlev:	0
Wedrilic:	19240	Ownernumbe:	71349
Compname:	Holiday Companies		
Citystzip:	Bloomington, MN 55437		
Address1:	4567 West 80th Street		
Address2:	Not Reported		
Fildate:	03-JAN-05	Cmpldmonth:	3
Cmpldday:	25	Cmpldyear:	2004
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.8347222222		
Longdd:	-96.6527777778		
Calcgps:	0	Site id:	NE5000000062621

Map ID:	33		
Oid :	0	Wellid:	164821
Regnum:	G-131749A	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	17
Subsection:	DB	Footage:	Not Reported
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	26
Stwaterlev:	21.5	Pwaterlev:	0
Wedrilic:	19240	Ownernumbe:	71349
Compname:	Holiday Companies		
Citystzip:	Bloomington, MN 55437		
Address1:	4567 West 80th Street		
Address2:	Not Reported		
Fildate:	03-JAN-05	Cmpldmonth:	9
Cmpldday:	10	Cmpldyear:	2003
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.8344444444		

Longdd:	-96.6530555556		
Calcgps:	0	Site id:	NE5000000062601

Map ID:	33		
Oid :	0	Wellid:	164823
Regnum:	G-131749C	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	17
Subsection:	DB	Footage:	Not Reported
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	30
Stwaterlev:	22	Pwaterlev:	0
Wedrilic:	19240	Ownernumbe:	71349
Compname:	Holiday Companies		
Citystzip:	Bloomington, MN 55437		
Address1:	4567 West 80th Street		
Address2:	Not Reported		
Fildate:	03-JAN-05	Cmpldmonth:	10
Cmpldday:	16	Cmpldyear:	2003
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.8344444444		
Longdd:	-96.6527777778		
Calcgps:	0	Site id:	NE5000000062602

Map ID:	33		
Oid :	0	Wellid:	164822
Regnum:	G-131749B	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	17
Subsection:	DB	Footage:	Not Reported
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	27.5
Stwaterlev:	22	Pwaterlev:	0
Wedrilic:	19240	Ownernumbe:	71349
Compname:	Holiday Companies		
Citystzip:	Bloomington, MN 55437		
Address1:	4567 West 80th Street		
Address2:	Not Reported		
Fildate:	03-JAN-05	Cmpldmonth:	9
Cmpldday:	10	Cmpldyear:	2003
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.8344444444		

Longdd:	-96.6525		
Calcgps:	0	Site id:	NE5000000062603

Map ID:	33		
Oid :	0	Wellid:	164831
Regnum:	G-131749F	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	17
Subsection:	DB	Footage:	Not Reported
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	26
Stwaterlev:	22	Pwaterlev:	0
Wedrilic:	19240	Ownernumbe:	71349
Compname:	Holiday Companies		
Citystzip:	Bloomington, MN 55437		
Address1:	4567 West 80th Street		
Address2:	Not Reported		
Fildate:	03-JAN-05	Cmpldmonth:	3
Cmpldday:	24	Cmpldyear:	2004
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.8344444444		
Longdd:	-96.6522222222		
Calcgps:	0	Site id:	NE5000000062604

Map ID:	33		
Oid :	0	Wellid:	164825
Regnum:	G-131749D	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	17
Subsection:	DB	Footage:	Not Reported
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	27
Stwaterlev:	21	Pwaterlev:	0
Wedrilic:	19240	Ownernumbe:	71349
Compname:	Holiday Companies		
Citystzip:	Bloomington, MN 55437		
Address1:	4567 West 80th Street		
Address2:	Not Reported		
Fildate:	03-JAN-05	Cmpldmonth:	10
Cmpldday:	16	Cmpldyear:	2003
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.8341666667		

Longdd:	-96.6530555556		
Calcgps:	0	Site id:	NE5000000062554

Map ID:	33		
Oid :	0	Wellid:	164834
Regnum:	G-131749I	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwmum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	17
Subsection:	DB	Footage:	Not Reported
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	25
Stwaterlev:	22	Pwaterlev:	0
Wedrilic:	19240	Ownernumbe:	71349
Compname:	Holiday Companies		
Citystzip:	Bloomington, MN 55437		
Address1:	4567 West 80th Street		
Address2:	Not Reported		
Fildate:	03-JAN-05	Cmpldmonth:	6
Cmpldday:	30	Cmpldyear:	2004
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.8341666667		
Longdd:	-96.6527777778		
Calcgps:	0	Site id:	NE5000000062555

Map ID:	33		
Oid :	0	Wellid:	164830
Regnum:	G-131749E	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwmum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	17
Subsection:	DB	Footage:	Not Reported
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	25.5
Stwaterlev:	22	Pwaterlev:	0
Wedrilic:	19240	Ownernumbe:	71349
Compname:	Holiday Companies		
Citystzip:	Bloomington, MN 55437		
Address1:	4567 West 80th Street		
Address2:	Not Reported		
Fildate:	03-JAN-05	Cmpldmonth:	3
Cmpldday:	24	Cmpldyear:	2004
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.8341666667		

Longdd:	-96.6525		
Calcgps:	0	Site id:	NE5000000062556

Map ID:	33		
Oid :	0	Wellid:	164833
Regnum:	G-131749H	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	17
Subsection:	DB	Footage:	Not Reported
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	25
Stwaterlev:	20	Pwaterlev:	0
Wedrilic:	19240	Ownernumbe:	71349
Compname:	Holiday Companies		
Citystzip:	Bloomington, MN 55437		
Address1:	4567 West 80th Street		
Address2:	Not Reported		
Fildate:	03-JAN-05	Cmpldmonth:	6
Cmpldday:	29	Cmpldyear:	2004
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.8338888889		
Longdd:	-96.6530555556		
Calcgps:	0	Site id:	NE5000000062528

Map ID:	35		
Oid :	0	Wellid:	126194
Regnum:	G-106079	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	18
Subsection:	DB	Footage:	1725N 2075W
Areapermit:	LPS-990043		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	66
Stwaterlev:	27	Pwaterlev:	0
Wedrilic:	39051	Ownernumbe:	41151
Compname:	University of Nebraska		
Citystzip:	Lincoln, NE 68588		
Address1:	INTERAGENCY		
Address2:	Conservation & Survey Division		
Fildate:	20-JUN-00	Cmpldmonth:	10
Cmpldday:	5	Cmpldyear:	1999
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.832771		

Longdd:	-96.670935		
Calcgps:	-1	Site id:	NE5000000062413

Map ID:	36		
Oid :	0	Wellid:	154576
Regnum:	G-124576	Replacemen:	0
Status:	A	Useid:	G
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	16
Subsection:	CD	Footage:	1122N 1460E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	300
Stwaterlev:	0	Pwaterlev:	0
Wedrilic:	19168	Ownernumbe:	65962
Compname:	Lincoln Public Schools		
Citystzip:	Lincoln, NE 68501		
Address1:	PO Box 82889		
Address2:	Not Reported		
Fildate:	24-NOV-03	Cmpldmonth:	9
Cmpldday:	30	Cmpldyear:	2003
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.831113		
Longdd:	-96.638914		
Calcgps:	-1	Site id:	NE5000000062230

Map ID:	37		
Oid :	0	Wellid:	167885
Regnum:	G-135039	Replacemen:	0
Status:	A	Useid:	I
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	6
Rangelet:	E	Section:	13
Subsection:	DD	Footage:	791N 108W
Areapermit:	LPS-050186		
Acres:	2		
Gpm:	150	Pcoldiam:	6
Pdepth:	71	Totaldepth:	103
Stwaterlev:	17	Pwaterlev:	20
Wedrilic:	3919403	Ownernumbe:	60279
Compname:	City of Lincoln		
Citystzip:	Lincoln, NE 68508		
Address1:	440 S 8th Street Suite 200		
Address2:	Not Reported		
Fildate:	03-AUG-05	Cmpldmonth:	7
Cmpldday:	7	Cmpldyear:	2005
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.83025		

Longdd:	-96.6826666667		
Calcgps:	0	Site id:	NE5000000062130

Map ID:	36		
Oid :	0	Wellid:	183205
Regnum:	Not Reported	Replacemen:	0
Status:	U	Useid:	D
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	16
Subsection:	DC	Footage:	784N 1581E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	0
Stwaterlev:	0	Pwaterlev:	0
Wedrilic:	0	Ownernumbe:	84106
Compname:	Steven McCoy		
Citystzip:	Lincoln, NE 68505		
Address1:	1703 N Cotner Blvd		
Address2:	Not Reported		
Fildate:	28-FEB-07	Cmpldmonth:	0
Cmpldday:	0	Cmpldyear:	0
Lastchgdat:	30-DEC-99	Xdate2:	11/2006
Latdd:	40.830182		
Longdd:	-96.638472		
Calcgps:	-1	Site id:	NE5000000062125

Map ID:	38		
Oid :	0	Wellid:	183193
Regnum:	Not Reported	Replacemen:	0
Status:	U	Useid:	D
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	16
Subsection:	CD	Footage:	797N 1663W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	0
Stwaterlev:	0	Pwaterlev:	0
Wedrilic:	0	Ownernumbe:	84106
Compname:	Steven McCoy		
Citystzip:	Lincoln, NE 68505		
Address1:	1703 N Cotner Blvd		
Address2:	Not Reported		
Fildate:	28-FEB-07	Cmpldmonth:	0
Cmpldday:	0	Cmpldyear:	0
Lastchgdat:	30-DEC-99	Xdate2:	11/2006
Latdd:	40.830166		

Longdd:	-96.630833		
Calcgps:	-1	Site id:	NE5000000062121

Map ID:	38		
Oid :	0	Wellid:	105842
Regnum:	G-090643B	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	16
Subsection:	DC	Footage:	780N 1360W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	20
Stwaterlev:	14	Pwaterlev:	0
Wedrilic:	89005	Ownernumbe:	40873
Compname:	Kerr McGee Refining		
Citystzip:	Oklahoma City, OK 73102		
Address1:	123 Robert South Kerr Suite MT 2004		
Address2:	Not Reported		
Fildate:	18-FEB-97	Cmpldmonth:	10
Cmpldday:	29	Cmpldyear:	1996
Lastchgdat:	30-DEC-99	Xdate2:	4/2001
Latdd:	40.830111		
Longdd:	-96.629738		
Calcgps:	-1	Site id:	NE5000000062112

Map ID:	38		
Oid :	0	Wellid:	105841
Regnum:	G-090643A	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	16
Subsection:	DC	Footage:	750N 1375W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	20
Stwaterlev:	14	Pwaterlev:	0
Wedrilic:	89005	Ownernumbe:	40873
Compname:	Kerr McGee Refining		
Citystzip:	Oklahoma City, OK 73102		
Address1:	123 Robert South Kerr Suite MT 2004		
Address2:	Not Reported		
Fildate:	18-FEB-97	Cmpldmonth:	10
Cmpldday:	29	Cmpldyear:	1996
Lastchgdat:	30-DEC-99	Xdate2:	4/2001
Latdd:	40.830029		

Longdd:	-96.629793		
Calcgps:	-1	Site id:	NE5000000062104

Map ID:	37		
Oid :	0	Wellid:	166077
Regnum:	G-132543	Replacemen:	0
Status:	I	Useid:	O
Nrdname:	Lower Platte South	Nrddwmum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	6
Rangelet:	E	Section:	13
Subsection:	DD	Footage:	600N 39W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	104
Stwaterlev:	18	Pwaterlev:	21
Wedrilic:	3919403	Ownernumbe:	56280
Compname:	City of Lincoln		
Citystzip:	Lincoln, NE 68503		
Address1:	2021 North 27 Street		
Address2:	Public Works & Utilities		
Fildate:	28-FEB-05	Cmpldmonth:	1
Cmpldday:	11	Cmpldyear:	2005
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.829719		
Longdd:	-96.682415		
Calcgps:	-1	Site id:	NE5000000062032

Map ID:	40		
Oid :	0	Wellid:	137217
Regnum:	G-113552	Replacemen:	0
Status:	A	Useid:	G
Nrdname:	Lower Platte South	Nrddwmum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	18
Subsection:	CC	Footage:	177N 758E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	190
Stwaterlev:	0	Pwaterlev:	0
Wedrilic:	19168	Ownernumbe:	61925
Compname:	Lincoln Public Schools		
Citystzip:	Lincoln, NE 68510		
Address1:	5900 O Street		
Address2:	Not Reported		
Fildate:	26-DEC-01	Cmpldmonth:	12
Cmpldday:	14	Cmpldyear:	2001
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.82855		

Longdd:	-96.6795333333		
Calcgps:	0	Site id:	NE5000000061885

Map ID:	41		
Oid :	0	Wellid:	131124
Regnum:	G-109361A	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwmum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	19
Subsection:	BA	Footage:	45S 2570E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	23
Stwaterlev:	16	Pwaterlev:	0
Wedrilic:	39395	Ownernumbe:	40900
Compname:	Whitehead Oil Company		
Citystzip:	Lincoln, NE 68503		
Address1:	2537 Randolph Street Box 30211		
Address2:	Mark Whitehead		
Fildate:	19-MAR-01	Cmpldmonth:	6
Cmpldday:	19	Cmpldyear:	2000
Lastchgdat:	30-DEC-99	Xdate2:	5/2001
Latdd:	40.82792		
Longdd:	-96.67299		
Calcgps:	-1	Site id:	NE5000000061821

Map ID:	42		
Oid :	0	Wellid:	86743
Regnum:	G-078080	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwmum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	AA	Footage:	40S 1470W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	25
Stwaterlev:	0	Pwaterlev:	0
Wedrilic:	39246	Ownernumbe:	40806
Compname:	McCartney Automotive		
Citystzip:	Lincoln, NE 68507		
Address1:	1440 North Cotner Boulevard		
Address2:	Not Reported		
Fildate:	19-AUG-93	Cmpldmonth:	11
Cmpldday:	17	Cmpldyear:	1992
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.827864		

Longdd:	-96.630151		
Calcgps:	-1	Site id:	NE5000000061813

Map ID:	42		
Oid :	0	Wellid:	86744
Regnum:	G-078081	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	AA	Footage:	75S 1140W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	15
Stwaterlev:	9	Pwaterlev:	0
Wedrilic:	39246	Ownernumbe:	40806
Compname:	McCartney Automotive		
Citystzip:	Lincoln, NE 68507		
Address1:	1440 North Cotner Boulevard		
Address2:	Not Reported		
Fildate:	19-AUG-93	Cmpldmonth:	4
Cmpldday:	25	Cmpldyear:	1991
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.827759		
Longdd:	-96.62896		
Calcgps:	-1	Site id:	NE5000000061801

Map ID:	41		
Oid :	0	Wellid:	131125
Regnum:	G-109361B	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	19
Subsection:	BA	Footage:	125S 2535E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	23
Stwaterlev:	17	Pwaterlev:	0
Wedrilic:	39395	Ownernumbe:	40900
Compname:	Whitehead Oil Company		
Citystzip:	Lincoln, NE 68503		
Address1:	2537 Randolph Street Box 30211		
Address2:	Mark Whitehead		
Fildate:	19-MAR-01	Cmpldmonth:	6
Cmpldday:	19	Cmpldyear:	2000
Lastchgdat:	30-DEC-99	Xdate2:	5/2001
Latdd:	40.827701		

Longdd:	-96.673118		
Calcgps:	-1	Site id:	NE5000000061797

Map ID:	41		
Oid :	0	Wellid:	131126
Regnum:	G-109361C	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	19
Subsection:	BA	Footage:	130S 2620E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	21
Stwaterlev:	15	Pwaterlev:	0
Wedrilic:	39395	Ownernumbe:	40900
Compname:	Whitehead Oil Company		
Citystzip:	Lincoln, NE 68503		
Address1:	2537 Randolph Street Box 30211		
Address2:	Mark Whitehead		
Fildate:	19-MAR-01	Cmpldmonth:	6
Cmpldday:	19	Cmpldyear:	2000
Lastchgdat:	30-DEC-99	Xdate2:	5/2001
Latdd:	40.827686		
Longdd:	-96.672811		
Calcgps:	-1	Site id:	NE5000000061792

Map ID:	42		
Oid :	0	Wellid:	86745
Regnum:	G-078082	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	AA	Footage:	160S 1263W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	25
Stwaterlev:	12	Pwaterlev:	0
Wedrilic:	39246	Ownernumbe:	40806
Compname:	McCartney Automotive		
Citystzip:	Lincoln, NE 68507		
Address1:	1440 North Cotner Boulevard		
Address2:	Not Reported		
Fildate:	19-AUG-93	Cmpldmonth:	11
Cmpldday:	16	Cmpldyear:	1992
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.827529		

Longdd:	-96.629406		
Calcgps:	-1	Site id:	NE5000000061778

Map ID:	42		
Oid :	0	Wellid:	86748
Regnum:	G-078085	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	AB	Footage:	185S 1380W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	20
Stwaterlev:	14	Pwaterlev:	0
Wedrilic:	39246	Ownernumbe:	40806
Compname:	McCartney Automotive		
Citystzip:	Lincoln, NE 68507		
Address1:	1440 North Cotner Boulevard		
Address2:	Not Reported		
Fildate:	19-AUG-93	Cmpldmonth:	11
Cmpldday:	16	Cmpldyear:	1992
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.827463		
Longdd:	-96.62983		
Calcgps:	-1	Site id:	NE5000000061770

Map ID:	42		
Oid :	0	Wellid:	86749
Regnum:	G-078086	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	AB	Footage:	225S 1450W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	20
Stwaterlev:	14	Pwaterlev:	0
Wedrilic:	39246	Ownernumbe:	40806
Compname:	McCartney Automotive		
Citystzip:	Lincoln, NE 68507		
Address1:	1440 North Cotner Boulevard		
Address2:	Not Reported		
Fildate:	19-AUG-93	Cmpldmonth:	11
Cmpldday:	17	Cmpldyear:	1992
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.827355		

Longdd:	-96.630084		
Calcgps:	-1	Site id:	NE5000000061763

Map ID:	42		
Oid :	0	Wellid:	86746
Regnum:	G-078083	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwmum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	AA	Footage:	245S 1275W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	20
Stwaterlev:	12	Pwaterlev:	0
Wedrilic:	39246	Ownernumbe:	40806
Compname:	McCartney Automotive		
Citystzip:	Lincoln, NE 68507		
Address1:	1440 North Cotner Boulevard		
Address2:	Not Reported		
Fildate:	19-AUG-93	Cmpldmonth:	11
Cmpldday:	16	Cmpldyear:	1992
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.827296		
Longdd:	-96.629452		
Calcgps:	-1	Site id:	NE5000000061758

Map ID:	42		
Oid :	0	Wellid:	86747
Regnum:	G-078084	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwmum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	AA	Footage:	249S 1150W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	20
Stwaterlev:	12	Pwaterlev:	0
Wedrilic:	39246	Ownernumbe:	40806
Compname:	McCartney Automotive		
Citystzip:	Lincoln, NE 68507		
Address1:	1440 North Cotner Boulevard		
Address2:	Not Reported		
Fildate:	19-AUG-93	Cmpldmonth:	11
Cmpldday:	16	Cmpldyear:	1992
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.827282		

Longdd:	-96.629		
Calcgps:	-1	Site id:	NE5000000061757

Map ID:	42		
Oid :	0	Wellid:	86750
Regnum:	G-078087	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	AB	Footage:	315S 1380W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	20
Stwaterlev:	11	Pwaterlev:	0
Wedrilic:	39246	Ownernumbe:	40806
Compname:	McCartney Automotive		
Citystzip:	Lincoln, NE 68507		
Address1:	1440 North Cotner Boulevard		
Address2:	Not Reported		
Fildate:	19-AUG-93	Cmpldmonth:	11
Cmpldday:	17	Cmpldyear:	1992
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.827107		
Longdd:	-96.629833		
Calcgps:	-1	Site id:	NE5000000061726

Map ID:	43		
Oid :	0	Wellid:	153372
Regnum:	G-124033A	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	AA	Footage:	385S 279W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	50
Stwaterlev:	38	Pwaterlev:	0
Wedrilic:	39246	Ownernumbe:	45153
Compname:	Ameritas Life Insurance Company		
Citystzip:	Lincoln, NE 68501		
Address1:	5900 O Street		
Address2:	Not Reported		
Fildate:	22-OCT-03	Cmpldmonth:	8
Cmpldday:	14	Cmpldyear:	2003
Lastchgdat:	30-DEC-99	Xdate2:	6/2008
Latdd:	40.826887		

Longdd:	-96.625857		
Calcgps:	-1	Site id:	NE5000000061688

Map ID:	43		
Oid :	0	Wellid:	153373
Regnum:	G-124033B	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	AA	Footage:	430S 316W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	50
Stwaterlev:	38	Pwaterlev:	0
Wedrilic:	39246	Ownernumbe:	45153
Compname:	Ameritas Life Insurance Company		
Citystzip:	Lincoln, NE 68501		
Address1:	5900 O Street		
Address2:	Not Reported		
Fildate:	22-OCT-03	Cmpldmonth:	8
Cmpldday:	15	Cmpldyear:	2003
Lastchgdat:	30-DEC-99	Xdate2:	6/2008
Latdd:	40.826764		
Longdd:	-96.625991		
Calcgps:	-1	Site id:	NE5000000061673

Map ID:	44		
Oid :	0	Wellid:	153374
Regnum:	G-124033C	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	BB	Footage:	481S 227E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	50
Stwaterlev:	38	Pwaterlev:	0
Wedrilic:	39246	Ownernumbe:	45153
Compname:	Ameritas Life Insurance Company		
Citystzip:	Lincoln, NE 68501		
Address1:	5900 O Street		
Address2:	Not Reported		
Fildate:	22-OCT-03	Cmpldmonth:	8
Cmpldday:	15	Cmpldyear:	2003
Lastchgdat:	30-DEC-99	Xdate2:	6/2008
Latdd:	40.826744		

Longdd:	-96.643359		
Calcgps:	-1	Site id:	NE5000000061671

Map ID:	45		
Oid :	0	Wellid:	200337
Regnum:	G-153833D	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	6
Rangelet:	E	Section:	24
Subsection:	AA	Footage:	528S 143W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	16
Stwaterlev:	10.1999998092651	Pwaterlev:	0
Wedrilic:	39325	Ownernumbe:	40369
Compname:	Nebraska Department of Environmental Quality		
Citystzip:	Lincoln, NE 68509		
Address1:	INTERAGENCY		
Address2:	Phil Hargis		
Fildate:	31-AUG-09	Cmpldmonth:	7
Cmpldday:	28	Cmpldyear:	2009
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.826629		
Longdd:	-96.682802		
Calcgps:	-1	Site id:	NE5000000061660

Map ID:	46		
Oid :	0	Wellid:	178529
Regnum:	G-141280	Replacemen:	0
Status:	A	Useid:	G
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	BB	Footage:	591S 1234E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	170
Stwaterlev:	0	Pwaterlev:	0
Wedrilic:	39252	Ownernumbe:	81146
Compname:	Mike Stueck		
Citystzip:	Lincoln, NE 68505		
Address1:	5901 Tangeman Terrace		
Address2:	Not Reported		
Fildate:	14-AUG-06	Cmpldmonth:	5
Cmpldday:	30	Cmpldyear:	2006
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.8264166667		

Longdd:	-96.6397222222		
Calcgps:	0	Site id:	NE5000000061638

Map ID:	45		
Oid :	0	Wellid:	200335
Regnum:	G-153833B	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	6
Rangelet:	E	Section:	24
Subsection:	AA	Footage:	607S 55W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	16
Stwaterlev:	10	Pwaterlev:	0
Wedrilic:	39325	Ownernumbe:	40369
Compname:	Nebraska Department of Environmental Quality		
Citystzip:	Lincoln, NE 68509		
Address1:	INTERAGENCY		
Address2:	Phil Hargis		
Fildate:	31-AUG-09	Cmpldmonth:	7
Cmpldday:	28	Cmpldyear:	2009
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.826407		
Longdd:	-96.682486		
Calcgps:	-1	Site id:	NE5000000061637

Map ID:	45		
Oid :	0	Wellid:	200336
Regnum:	G-153833C	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	6
Rangelet:	E	Section:	24
Subsection:	AA	Footage:	628S 99W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	16
Stwaterlev:	10	Pwaterlev:	0
Wedrilic:	39325	Ownernumbe:	40369
Compname:	Nebraska Department of Environmental Quality		
Citystzip:	Lincoln, NE 68509		
Address1:	INTERAGENCY		
Address2:	Phil Hargis		
Fildate:	31-AUG-09	Cmpldmonth:	7
Cmpldday:	28	Cmpldyear:	2009
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.826352		

Longdd:	-96.682645		
Calcgps:	-1	Site id:	NE5000000061627

Map ID:	45		
Oid :	0	Wellid:	200334
Regnum:	G-153833A	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	6
Rangelet:	E	Section:	24
Subsection:	AA	Footage:	638S 49W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	16
Stwaterlev:	10.6000003814697	Pwaterlev:	0
Wedrilic:	39325	Ownernumbe:	40369
Compname:	Nebraska Department of Environmental Quality		
Citystzip:	Lincoln, NE 68509		
Address1:	INTERAGENCY		
Address2:	Phil Hargis		
Fildate:	31-AUG-09	Cmpldmonth:	7
Cmpldday:	27	Cmpldyear:	2009
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.826322		
Longdd:	-96.682465		
Calcgps:	-1	Site id:	NE5000000061624

Map ID:	47		
Oid :	0	Wellid:	118558
Regnum:	G-100808	Replacemen:	0
Status:	A	Useid:	D
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	BA	Footage:	800S 2100E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	40	Pcoldiam:	2
Pdepth:	80	Totaldepth:	95
Stwaterlev:	30	Pwaterlev:	50
Wedrilic:	19033	Ownernumbe:	28747
Compname:	Chateau Development		
Citystzip:	Lincoln, NE 68505		
Address1:	1025 North 63		
Address2:	Not Reported		
Fildate:	03-JUN-99	Cmpldmonth:	2
Cmpldday:	17	Cmpldyear:	1998
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.825822		

Longdd:	-96.636596		
Calcgps:	-1	Site id:	NE5000000061540

Map ID:	48		
Oid :	0	Wellid:	86752
Regnum:	G-078089	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	6
Rangelet:	E	Section:	24
Subsection:	AD	Footage:	1350S 560W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	2
Pdepth:	0	Totaldepth:	28
Stwaterlev:	0	Pwaterlev:	0
Wedrilic:	39246	Ownernumbe:	40807
Compname:	A B C Electric		
Citystzip:	Lincoln, NE 68501		
Address1:	1012 North 25th Street Box 82466		
Address2:	Not Reported		
Fildate:	19-AUG-93	Cmpldmonth:	11
Cmpldday:	5	Cmpldyear:	1992
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.824395		
Longdd:	-96.684326		
Calcgps:	-1	Site id:	NE5000000061340

Map ID:	48		
Oid :	0	Wellid:	86751
Regnum:	G-078088	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	6
Rangelet:	E	Section:	24
Subsection:	AD	Footage:	1350S 510W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	2
Pdepth:	0	Totaldepth:	28
Stwaterlev:	0	Pwaterlev:	0
Wedrilic:	39246	Ownernumbe:	40807
Compname:	A B C Electric		
Citystzip:	Lincoln, NE 68501		
Address1:	1012 North 25th Street Box 82466		
Address2:	Not Reported		
Fildate:	19-AUG-93	Cmpldmonth:	11
Cmpldday:	5	Cmpldyear:	1992
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.824392		

Longdd:	-96.684145		
Calcgps:	-1	Site id:	NE5000000061339

Map ID:	50		
Oid :	0	Wellid:	118557
Regnum:	G-100807	Replacemen:	0
Status:	A	Useid:	D
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	BD	Footage:	1750S 2400E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	20	Pcoldiam:	1
Pdepth:	90	Totaldepth:	103
Stwaterlev:	27	Pwaterlev:	75
Wedrilic:	19033	Ownernumbe:	28747
Compname:	Chateau Development		
Citystzip:	Lincoln, NE 68505		
Address1:	1025 North 63		
Address2:	Not Reported		
Fildate:	03-JUN-99	Cmpldmonth:	2
Cmpldday:	16	Cmpldyear:	1998
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.823208		
Longdd:	-96.635521		
Calcgps:	-1	Site id:	NE5000000061224

Map ID:	51		
Oid :	0	Wellid:	175578
Regnum:	G-139270	Replacemen:	0
Status:	A	Useid:	G
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	22
Subsection:	BD	Footage:	1991S 1499E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	200
Stwaterlev:	0	Pwaterlev:	0
Wedrilic:	39252	Ownernumbe:	61925
Compname:	Lincoln Public Schools		
Citystzip:	Lincoln, NE 68510		
Address1:	5900 O Street		
Address2:	Not Reported		
Fildate:	24-MAR-06	Cmpldmonth:	2
Cmpldday:	24	Cmpldyear:	2006
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.8225		

Longdd:	-96.6194722222		
Calcgps:	0	Site id:	NE5000000061112

Map ID:	51		
Oid :	0	Wellid:	166616
Regnum:	G-133062	Replacemen:	0
Status:	I	Useid:	O
Nrdname:	Lower Platte South	Nrddwmum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	22
Subsection:	BC	Footage:	2031S 1214E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	198
Stwaterlev:	0	Pwaterlev:	0
Wedrilic:	19226	Ownernumbe:	61925
Compname:	Lincoln Public Schools		
Citystzip:	Lincoln, NE 68510		
Address1:	5900 O Street		
Address2:	Not Reported		
Fildate:	05-APR-05	Cmpldmonth:	2
Cmpldday:	25	Cmpldyear:	2005
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.8223888889		
Longdd:	-96.6205		
Calcgps:	0	Site id:	NE5000000061094

Map ID:	52		
Oid :	0	Wellid:	118559
Regnum:	G-100809	Replacemen:	0
Status:	A	Useid:	D
Nrdname:	Lower Platte South	Nrddwmum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	BC	Footage:	2100S 1300E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	40	Pcoldiam:	2
Pdepth:	100	Totaldepth:	131
Stwaterlev:	48	Pwaterlev:	70
Wedrilic:	19033	Ownernumbe:	28747
Compname:	Chateau Development		
Citystzip:	Lincoln, NE 68505		
Address1:	1025 North 63		
Address2:	Not Reported		
Fildate:	03-JUN-99	Cmpldmonth:	2
Cmpldday:	19	Cmpldyear:	1998
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.822274		

Longdd:	-96.639498		
Calcgps:	-1	Site id:	NE5000000061081

Map ID:	53		
Oid :	0	Wellid:	165486
Regnum:	G-132167A	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwmum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	20
Subsection:	BD	Footage:	Not Reported
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	30.5
Stwaterlev:	16.5	Pwaterlev:	0
Wedrilic:	39436	Ownernumbe:	71691
Compname:	Julian Branker		
Citystzip:	Lincoln, NE 68506		
Address1:	2300 South 48th Street		
Address2:	Not Reported		
Fildate:	31-JAN-05	Cmpldmonth:	6
Cmpldday:	29	Cmpldyear:	2004
Lastchgdat:	30-DEC-99	Xdate2:	11/2005
Latdd:	40.8213888889		
Longdd:	-96.6541666667		
Calcgps:	0	Site id:	NE5000000061001

Map ID:	53		
Oid :	0	Wellid:	165487
Regnum:	G-132167B	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwmum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	20
Subsection:	BD	Footage:	Not Reported
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	25
Stwaterlev:	15.6000003814697	Pwaterlev:	0
Wedrilic:	39436	Ownernumbe:	71691
Compname:	Julian Branker		
Citystzip:	Lincoln, NE 68506		
Address1:	2300 South 48th Street		
Address2:	Not Reported		
Fildate:	31-JAN-05	Cmpldmonth:	6
Cmpldday:	30	Cmpldyear:	2004
Lastchgdat:	30-DEC-99	Xdate2:	11/2005
Latdd:	40.8211111111		

Longdd:	-96.6544444444		
Calcgps:	0	Site id:	NE5000000060976

Map ID:	53		
Oid :	0	Wellid:	165488
Regnum:	G-132167C	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	20
Subsection:	BD	Footage:	Not Reported
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	27
Stwaterlev:	15.8999996185303	Pwaterlev:	0
Wedrilic:	39436	Ownernumbe:	71691
Compname:	Julian Branker		
Citystzip:	Lincoln, NE 68506		
Address1:	2300 South 48th Street		
Address2:	Not Reported		
Fildate:	31-JAN-05	Cmpldmonth:	6
Cmpldday:	29	Cmpldyear:	2004
Lastchgdat:	30-DEC-99	Xdate2:	11/2005
Latdd:	40.8211111111		
Longdd:	-96.6541666667		
Calcgps:	0	Site id:	NE5000000060977

Map ID:	53		
Oid :	0	Wellid:	165489
Regnum:	G-132167D	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	20
Subsection:	BD	Footage:	Not Reported
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	30
Stwaterlev:	15	Pwaterlev:	0
Wedrilic:	39436	Ownernumbe:	71691
Compname:	Julian Branker		
Citystzip:	Lincoln, NE 68506		
Address1:	2300 South 48th Street		
Address2:	Not Reported		
Fildate:	31-JAN-05	Cmpldmonth:	6
Cmpldday:	28	Cmpldyear:	2004
Lastchgdat:	30-DEC-99	Xdate2:	11/2005
Latdd:	40.8208333333		

Longdd:	-96.6538888889		
Calcgps:	0	Site id:	NE5000000060963

Map ID:	54		
Oid :	0	Wellid:	88825
Regnum:	G-080168	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwmum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	DA	Footage:	2146N 434W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	48
Stwaterlev:	20	Pwaterlev:	0
Wedrilic:	39271	Ownernumbe:	41342
Compname:	Center Ridge Design Services Inc		
Citystzip:	Cleveland, OH 44145		
Address1:	25425 Center Ridge Road		
Address2:	Not Reported		
Fildate:	01-FEB-94	Cmpldmonth:	4
Cmpldday:	2	Cmpldyear:	1993
Lastchgdat:	30-DEC-99	Xdate2:	4/1993
Latdd:	40.819325		
Longdd:	-96.626486		
Calcgps:	-1	Site id:	NE5000000060808

Map ID:	54		
Oid :	0	Wellid:	88824
Regnum:	G-080167	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwmum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	DA	Footage:	2142N 435W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	27
Stwaterlev:	22	Pwaterlev:	0
Wedrilic:	39271	Ownernumbe:	41342
Compname:	Center Ridge Design Services Inc		
Citystzip:	Cleveland, OH 44145		
Address1:	25425 Center Ridge Road		
Address2:	Not Reported		
Fildate:	01-FEB-94	Cmpldmonth:	3
Cmpldday:	10	Cmpldyear:	1993
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.819314		

Longdd:	-96.62649		
Calcgps:	-1	Site id:	NE5000000060806

Map ID:	54		
Oid :	0	Wellid:	88827
Regnum:	G-080170	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	DA	Footage:	2142N 435W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	17
Stwaterlev:	0	Pwaterlev:	0
Wedrilic:	39271	Ownernumbe:	41342
Compname:	Center Ridge Design Services Inc		
Citystzip:	Cleveland, OH 44145		
Address1:	25425 Center Ridge Road		
Address2:	Not Reported		
Fildate:	01-FEB-94	Cmpldmonth:	3
Cmpldday:	24	Cmpldyear:	1993
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.819314		
Longdd:	-96.62649		
Calcgps:	-1	Site id:	NE5000000060807

Map ID:	54		
Oid :	0	Wellid:	88821
Regnum:	G-080164	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	DA	Footage:	2140N 430W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	14
Stwaterlev:	0	Pwaterlev:	0
Wedrilic:	39271	Ownernumbe:	41342
Compname:	Center Ridge Design Services Inc		
Citystzip:	Cleveland, OH 44145		
Address1:	25425 Center Ridge Road		
Address2:	Not Reported		
Fildate:	01-FEB-94	Cmpldmonth:	11
Cmpldday:	16	Cmpldyear:	1993
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.819309		

Longdd:	-96.626472		
Calcgps:	-1	Site id:	NE5000000060805

Map ID:	54		
Oid :	0	Wellid:	88820
Regnum:	G-080163	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	DA	Footage:	2119N 409W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	19
Stwaterlev:	0	Pwaterlev:	0
Wedrilic:	39271	Ownernumbe:	41342
Compname:	Center Ridge Design Services Inc		
Citystzip:	Cleveland, OH 44145		
Address1:	25425 Center Ridge Road		
Address2:	Not Reported		
Fildate:	01-FEB-94	Cmpldmonth:	11
Cmpldday:	16	Cmpldyear:	1993
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.819251		
Longdd:	-96.626397		
Calcgps:	-1	Site id:	NE5000000060796

Map ID:	55		
Oid :	0	Wellid:	128028
Regnum:	G-107311	Replacemen:	0
Status:	A	Useid:	G
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	20
Subsection:	DB	Footage:	2000N 930W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	175
Stwaterlev:	0	Pwaterlev:	0
Wedrilic:	19168	Ownernumbe:	56904
Compname:	Lincoln Public Schools		
Citystzip:	Lincoln, NE 68510		
Address1:	800 S 24 Street		
Address2:	Not Reported		
Fildate:	10-OCT-00	Cmpldmonth:	7
Cmpldday:	31	Cmpldyear:	2000
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.819009		

Longdd:	-96.647565		
Calcgps:	-1	Site id:	NE5000000060753

Map ID:	56		
Oid :	0	Wellid:	95437
Regnum:	G-084668A	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	20
Subsection:	DB	Footage:	1968N 2353W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	25
Stwaterlev:	15	Pwaterlev:	0
Wedrilic:	19027	Ownernumbe:	43830
Compname:	Boston Chicken		
Citystzip:	Omaha, NE 68137		
Address1:	5332 South 138 Street		
Address2:	Not Reported		
Fildate:	24-MAY-95	Cmpldmonth:	3
Cmpldday:	7	Cmpldyear:	1995
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.818929		
Longdd:	-96.652706		
Calcgps:	-1	Site id:	NE5000000060735

Map ID:	56		
Oid :	0	Wellid:	95438
Regnum:	G-084668B	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	20
Subsection:	DB	Footage:	1928N 2498W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	25
Stwaterlev:	20	Pwaterlev:	0
Wedrilic:	19027	Ownernumbe:	43830
Compname:	Boston Chicken		
Citystzip:	Omaha, NE 68137		
Address1:	5332 South 138 Street		
Address2:	Not Reported		
Fildate:	24-MAY-95	Cmpldmonth:	3
Cmpldday:	6	Cmpldyear:	1995
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.81882		

Longdd:	-96.65323		
Calcgps:	-1	Site id:	NE5000000060707

Map ID:	56		
Oid :	0	Wellid:	95440
Regnum:	G-084668D	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	20
Subsection:	DB	Footage:	1874N 2524W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	24
Stwaterlev:	21	Pwaterlev:	0
Wedrilic:	19027	Ownernumbe:	43830
Compname:	Boston Chicken		
Citystzip:	Omaha, NE 68137		
Address1:	5332 South 138 Street		
Address2:	Not Reported		
Fildate:	24-MAY-95	Cmpldmonth:	3
Cmpldday:	6	Cmpldyear:	1995
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.818672		
Longdd:	-96.653324		
Calcgps:	-1	Site id:	NE5000000060680

Map ID:	54		
Oid :	0	Wellid:	88819
Regnum:	G-080162	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	DA	Footage:	1878N 491W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	21
Stwaterlev:	16	Pwaterlev:	0
Wedrilic:	39271	Ownernumbe:	41342
Compname:	Center Ridge Design Services Inc		
Citystzip:	Cleveland, OH 44145		
Address1:	25425 Center Ridge Road		
Address2:	Not Reported		
Fildate:	01-FEB-94	Cmpldmonth:	11
Cmpldday:	5	Cmpldyear:	1993
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.818591		

Longdd:	-96.626699		
Calcgps:	-1	Site id:	NE5000000060672

Map ID:	54		
Oid :	0	Wellid:	88818
Regnum:	G-080161	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwmum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	DA	Footage:	1876N 486W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	26
Stwaterlev:	0	Pwaterlev:	0
Wedrilic:	39271	Ownernumbe:	41342
Compname:	Center Ridge Design Services Inc		
Citystzip:	Cleveland, OH 44145		
Address1:	25425 Center Ridge Road		
Address2:	Not Reported		
Fildate:	01-FEB-94	Cmpldmonth:	9
Cmpldday:	17	Cmpldyear:	1993
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.818585		
Longdd:	-96.626681		
Calcgps:	-1	Site id:	NE5000000060671

Map ID:	54		
Oid :	0	Wellid:	88817
Regnum:	G-080160	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwmum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	DA	Footage:	1873N 489W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	26
Stwaterlev:	23	Pwaterlev:	0
Wedrilic:	39271	Ownernumbe:	41342
Compname:	Center Ridge Design Services Inc		
Citystzip:	Cleveland, OH 44145		
Address1:	25425 Center Ridge Road		
Address2:	Not Reported		
Fildate:	01-FEB-94	Cmpldmonth:	9
Cmpldday:	17	Cmpldyear:	1993
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.818577		

Longdd:	-96.626692		
Calcgps:	-1	Site id:	NE5000000060665

Map ID:	54		
Oid :	0	Wellid:	88816
Regnum:	G-080159	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	DA	Footage:	1863N 478W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	26
Stwaterlev:	24	Pwaterlev:	0
Wedrilic:	39271	Ownernumbe:	41342
Compname:	Center Ridge Design Services Inc		
Citystzip:	Cleveland, OH 44145		
Address1:	25425 Center Ridge Road		
Address2:	Not Reported		
Fildate:	01-FEB-94	Cmpldmonth:	9
Cmpldday:	17	Cmpldyear:	1993
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.818549		
Longdd:	-96.626652		
Calcgps:	-1	Site id:	NE5000000060656

Map ID:	54		
Oid :	0	Wellid:	88815
Regnum:	G-080158	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	DA	Footage:	1862N 478W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	21
Stwaterlev:	0	Pwaterlev:	0
Wedrilic:	39271	Ownernumbe:	41342
Compname:	Center Ridge Design Services Inc		
Citystzip:	Cleveland, OH 44145		
Address1:	25425 Center Ridge Road		
Address2:	Not Reported		
Fildate:	01-FEB-94	Cmpldmonth:	11
Cmpldday:	5	Cmpldyear:	1993
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.818546		

Longdd:	-96.626652		
Calcgps:	-1	Site id:	NE5000000060655

Map ID:	54		
Oid :	0	Wellid:	88823
Regnum:	G-080166	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	DA	Footage:	1861N 462W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	17
Stwaterlev:	10	Pwaterlev:	0
Wedrilic:	39271	Ownernumbe:	41342
Compname:	Center Ridge Design Services Inc		
Citystzip:	Cleveland, OH 44145		
Address1:	25425 Center Ridge Road		
Address2:	Not Reported		
Fildate:	01-FEB-94	Cmpldmonth:	2
Cmpldday:	1	Cmpldyear:	1993
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.818543		
Longdd:	-96.626595		
Calcgps:	-1	Site id:	NE5000000060654

Map ID:	56		
Oid :	0	Wellid:	95439
Regnum:	G-084668C	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	20
Subsection:	DB	Footage:	1827N 2422W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	25
Stwaterlev:	19	Pwaterlev:	0
Wedrilic:	19027	Ownernumbe:	43830
Compname:	Boston Chicken		
Citystzip:	Omaha, NE 68137		
Address1:	5332 South 138 Street		
Address2:	Not Reported		
Fildate:	24-MAY-95	Cmpldmonth:	3
Cmpldday:	6	Cmpldyear:	1995
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.818542		

Longdd:	-96.652956		
Calcgps:	-1	Site id:	NE5000000060653

Map ID:	54		
Oid :	0	Wellid:	88826
Regnum:	G-080169	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	DA	Footage:	1712N 453W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	43
Stwaterlev:	39	Pwaterlev:	0
Wedrilic:	39271	Ownernumbe:	41342
Compname:	Center Ridge Design Services Inc		
Citystzip:	Cleveland, OH 44145		
Address1:	25425 Center Ridge Road		
Address2:	Not Reported		
Fildate:	01-FEB-94	Cmpldmonth:	3
Cmpldday:	10	Cmpldyear:	1993
Lastchgdat:	30-DEC-99	Xdate2:	3/1993
Latdd:	40.818134		
Longdd:	-96.626566		
Calcgps:	-1	Site id:	NE5000000060559

Map ID:	54		
Oid :	0	Wellid:	88814
Regnum:	G-080157	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	DA	Footage:	1661N 391W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	21
Stwaterlev:	19	Pwaterlev:	0
Wedrilic:	39271	Ownernumbe:	41342
Compname:	Center Ridge Design Services Inc		
Citystzip:	Cleveland, OH 44145		
Address1:	25425 Center Ridge Road		
Address2:	Not Reported		
Fildate:	01-FEB-94	Cmpldmonth:	6
Cmpldday:	9	Cmpldyear:	1993
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.817993		

Longdd:	-96.626343		
Calcgps:	-1	Site id:	NE5000000060527

Map ID:	57		
Oid :	0	Wellid:	170804
Regnum:	G-135905B	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	20
Subsection:	CA	Footage:	Not Reported
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	48
Stwaterlev:	32.4000015258789	Pwaterlev:	0
Wedrilic:	39246	Ownernumbe:	75450
Compname:	Mike Branker		
Citystzip:	Lincoln, NE 68520		
Address1:	10205 A Street		
Address2:	Mike Branker		
Fildate:	14-SEP-05	Cmpldmonth:	8
Cmpldday:	24	Cmpldyear:	2005
Lastchgdat:	30-DEC-99	Xdate2:	12/2005
Latdd:	40.8178916667		
Longdd:	-96.6547888889		
Calcgps:	0	Site id:	NE5000000060499

Map ID:	54		
Oid :	0	Wellid:	88813
Regnum:	G-080156	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	DA	Footage:	1590N 482W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	21
Stwaterlev:	19	Pwaterlev:	0
Wedrilic:	39271	Ownernumbe:	41342
Compname:	Center Ridge Design Services Inc		
Citystzip:	Cleveland, OH 44145		
Address1:	25425 Center Ridge Road		
Address2:	Not Reported		
Fildate:	01-FEB-94	Cmpldmonth:	6
Cmpldday:	9	Cmpldyear:	1993
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.8178		

Longdd:	-96.626674		
Calcgps:	-1	Site id:	NE5000000060487

Map ID:	57		
Oid :	0	Wellid:	170803
Regnum:	G-135905A	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	20
Subsection:	CA	Footage:	Not Reported
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	60
Stwaterlev:	30.1000003814697	Pwaterlev:	0
Wedrilic:	39246	Ownernumbe:	75450
Compname:	Mike Branker		
Citystzip:	Lincoln, NE 68520		
Address1:	10205 A Street		
Address2:	Mike Branker		
Fildate:	14-SEP-05	Cmpldmonth:	8
Cmpldday:	24	Cmpldyear:	2005
Lastchgdat:	30-DEC-99	Xdate2:	12/2005
Latdd:	40.8177111111		
Longdd:	-96.6550527778		
Calcgps:	0	Site id:	NE5000000060476

Map ID:	58		
Oid :	0	Wellid:	117822
Regnum:	G-100097	Replacemen:	0
Status:	A	Useid:	O
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	DA	Footage:	1500N 1200W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	15	Pcoldiam:	2
Pdepth:	80	Totaldepth:	100
Stwaterlev:	15	Pwaterlev:	60
Wedrilic:	39022	Ownernumbe:	53183
Compname:	Finke Gardens & Nursery		
Citystzip:	Lincoln, NE 68505		
Address1:	500 North 66th Street		
Address2:	Cindy Heemann		
Fildate:	02-APR-99	Cmpldmonth:	3
Cmpldday:	24	Cmpldyear:	1999
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.817565		

Longdd:	-96.62927		
Calcgps:	-1	Site id:	NE5000000060451

Map ID:	57		
Oid :	0	Wellid:	170805
Regnum:	G-135905C	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	20
Subsection:	CA	Footage:	Not Reported
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	60
Stwaterlev:	26.2999992370605	Pwaterlev:	0
Wedrilic:	39246	Ownernumbe:	75450
Compname:	Mike Branker		
Citystzip:	Lincoln, NE 68520		
Address1:	10205 A Street		
Address2:	Mike Branker		
Fildate:	14-SEP-05	Cmpldmonth:	8
Cmpldday:	24	Cmpldyear:	2005
Lastchgdat:	30-DEC-99	Xdate2:	12/2005
Latdd:	40.8173416667		
Longdd:	-96.6551527778		
Calcgps:	0	Site id:	NE5000000060424

Map ID:	54		
Oid :	0	Wellid:	88822
Regnum:	G-080165	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	DD	Footage:	1316N 420W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	21
Stwaterlev:	16	Pwaterlev:	0
Wedrilic:	39271	Ownernumbe:	41342
Compname:	Center Ridge Design Services Inc		
Citystzip:	Cleveland, OH 44145		
Address1:	25425 Center Ridge Road		
Address2:	Not Reported		
Fildate:	01-FEB-94	Cmpldmonth:	6
Cmpldday:	24	Cmpldyear:	1993
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.817047		

Longdd:	-96.626457		
Calcgps:	-1	Site id:	NE5000000060373

Map ID:	59		
Oid :	0	Wellid:	76154
Regnum:	G-068076B	Replacemen:	0
Status:	A	Useid:	I
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	CC	Footage:	Not Reported
Areapermit:	Not Reported		
Acres:	11		
Gpm:	65	Pcoldiam:	3
Pdepth:	0	Totaldepth:	138
Stwaterlev:	108	Pwaterlev:	120
Wedrilic:	0	Ownernumbe:	39182
Compname:	Bankers Life of Lincoln		
Citystzip:	Lincoln, NE 68501		
Address1:	Cotner & O Streets		
Address2:	Not Reported		
Fildate:	01-JUN-82	Cmpldmonth:	4
Cmpldday:	1	Cmpldyear:	1982
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.815315		
Longdd:	-96.641645		
Calcgps:	-1	Site id:	NE5000000060076

Map ID:	59		
Oid :	0	Wellid:	76155
Regnum:	G-068076C	Replacemen:	0
Status:	A	Useid:	I
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	CC	Footage:	Not Reported
Areapermit:	Not Reported		
Acres:	11		
Gpm:	35	Pcoldiam:	3
Pdepth:	0	Totaldepth:	141
Stwaterlev:	109	Pwaterlev:	130
Wedrilic:	0	Ownernumbe:	39182
Compname:	Bankers Life of Lincoln		
Citystzip:	Lincoln, NE 68501		
Address1:	Cotner & O Streets		
Address2:	Not Reported		
Fildate:	01-JUN-82	Cmpldmonth:	4
Cmpldday:	1	Cmpldyear:	1982
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.815315		

Longdd:	-96.641645		
Calcgps:	-1	Site id:	NE5000000060077

Map ID:	60		
Oid :	0	Wellid:	76153
Regnum:	G-068076A	Replacemen:	0
Status:	A	Useid:	I
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	CD	Footage:	Not Reported
Areapermit:	Not Reported		
Acres:	11		
Gpm:	125	Pcoldiam:	3
Pdepth:	0	Totaldepth:	160
Stwaterlev:	109	Pwaterlev:	128
Wedrilic:	0	Ownernumbe:	39182
Compname:	Bankers Life of Lincoln		
Citystzip:	Lincoln, NE 68501		
Address1:	Cotner & O Streets		
Address2:	Not Reported		
Fildate:	01-JUN-82	Cmpldmonth:	3
Cmpldday:	31	Cmpldyear:	1982
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.815294		
Longdd:	-96.636877		
Calcgps:	-1	Site id:	NE5000000060071

Map ID:	61		
Oid :	0	Wellid:	106112
Regnum:	G-090752G	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	DD	Footage:	500N 332W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	45
Stwaterlev:	22	Pwaterlev:	0
Wedrilic:	39246	Ownernumbe:	45153
Compname:	Ameritas Life Insurance Company		
Citystzip:	Lincoln, NE 68501		
Address1:	5900 O Street		
Address2:	Not Reported		
Fildate:	27-FEB-97	Cmpldmonth:	9
Cmpldday:	4	Cmpldyear:	1992
Lastchgdat:	30-DEC-99	Xdate2:	6/2008
Latdd:	40.814806		

Longdd:	-96.626159		
Calcgps:	-1	Site id:	NE5000000060023

Map ID:	61		
Oid :	0	Wellid:	106106
Regnum:	G-090752B	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwmum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	DD	Footage:	486N 250W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	90	Pcoldiam:	0
Pdepth:	0	Totaldepth:	67
Stwaterlev:	22	Pwaterlev:	35
Wedrilic:	39246	Ownernumbe:	45153
Compname:	Ameritas Life Insurance Company		
Citystzip:	Lincoln, NE 68501		
Address1:	5900 O Street		
Address2:	Not Reported		
Fildate:	27-FEB-97	Cmpldmonth:	3
Cmpldday:	0	Cmpldyear:	1989
Lastchgdat:	30-DEC-99	Xdate2:	6/2008
Latdd:	40.814766		
Longdd:	-96.625863		
Calcgps:	-1	Site id:	NE5000000060017

Map ID:	62		
Oid :	0	Wellid:	176305
Regnum:	G-139863B	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwmum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	20
Subsection:	DD	Footage:	Not Reported
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	34.5
Stwaterlev:	6.80000019073486	Pwaterlev:	0
Wedrilic:	39351	Ownernumbe:	79936
Compname:	Gateway Manor		
Citystzip:	Lincoln, NE 68504		
Address1:	225 North 56th Street		
Address2:	Linda Tisdel		
Fildate:	05-MAY-06	Cmpldmonth:	4
Cmpldday:	5	Cmpldyear:	2006
Lastchgdat:	30-DEC-99	Xdate2:	6/2006
Latdd:	40.8147222222		

Longdd:	-96.6471944444		
Calcgps:	0	Site id:	NE5000000060011

Map ID:	62		
Oid :	0	Wellid:	176304
Regnum:	G-139863A	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwmum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	20
Subsection:	DD	Footage:	Not Reported
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	36
Stwaterlev:	7.19999980926514	Pwaterlev:	0
Wedrilic:	39351	Ownernumbe:	79936
Compname:	Gateway Manor		
Citystzip:	Lincoln, NE 68504		
Address1:	225 North 56th Street		
Address2:	Linda Tisdel		
Fildate:	05-MAY-06	Cmpldmonth:	4
Cmpldday:	5	Cmpldyear:	2006
Lastchgdat:	30-DEC-99	Xdate2:	6/2006
Latdd:	40.8147222222		
Longdd:	-96.6471666667		
Calcgps:	0	Site id:	NE5000000060012

Map ID:	62		
Oid :	0	Wellid:	176306
Regnum:	G-139863C	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwmum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	20
Subsection:	DD	Footage:	Not Reported
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	38.5
Stwaterlev:	33.0999984741211	Pwaterlev:	0
Wedrilic:	39351	Ownernumbe:	79936
Compname:	Gateway Manor		
Citystzip:	Lincoln, NE 68504		
Address1:	225 North 56th Street		
Address2:	Linda Tisdel		
Fildate:	05-MAY-06	Cmpldmonth:	4
Cmpldday:	5	Cmpldyear:	2006
Lastchgdat:	30-DEC-99	Xdate2:	6/2006
Latdd:	40.8146944444		

Longdd:	-96.6473611111		
Calcgps:	0	Site id:	NE5000000060001

Map ID:	61		
Oid :	0	Wellid:	97140
Regnum:	G-085777	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	DD	Footage:	400N 300W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	32
Stwaterlev:	26	Pwaterlev:	0
Wedrilic:	39246	Ownernumbe:	45153
Compname:	Ameritas Life Insurance Company		
Citystzip:	Lincoln, NE 68501		
Address1:	5900 O Street		
Address2:	Not Reported		
Fildate:	10-OCT-95	Cmpldmonth:	9
Cmpldday:	11	Cmpldyear:	1995
Lastchgdat:	30-DEC-99	Xdate2:	6/2008
Latdd:	40.814531		
Longdd:	-96.626046		
Calcgps:	-1	Site id:	NE5000000059968

Map ID:	61		
Oid :	0	Wellid:	106110
Regnum:	G-090752F	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	DD	Footage:	366N 166W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	45
Stwaterlev:	24	Pwaterlev:	0
Wedrilic:	39246	Ownernumbe:	45153
Compname:	Ameritas Life Insurance Company		
Citystzip:	Lincoln, NE 68501		
Address1:	5900 O Street		
Address2:	Not Reported		
Fildate:	27-FEB-97	Cmpldmonth:	9
Cmpldday:	3	Cmpldyear:	1992
Lastchgdat:	30-DEC-99	Xdate2:	6/2008
Latdd:	40.814436		

GEOCHECK VERSION 2.1
STATE DATABASE WELL INFORMATION

Longdd:	-96.625563		
Calcgps:	-1	Site id:	NE5000000059951

Map ID:	61		
Oid :	0	Wellid:	106109
Regnum:	G-090752E	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	DD	Footage:	354N 336W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	46
Stwaterlev:	27	Pwaterlev:	0
Wedrilic:	39246	Ownernumbe:	45153
Compname:	Ameritas Life Insurance Company		
Citystzip:	Lincoln, NE 68501		
Address1:	5900 O Street		
Address2:	Not Reported		
Fildate:	27-FEB-97	Cmpldmonth:	9
Cmpldday:	2	Cmpldyear:	1992
Lastchgdat:	30-DEC-99	Xdate2:	6/2008
Latdd:	40.814406		
Longdd:	-96.626177		
Calcgps:	-1	Site id:	NE5000000059943

Map ID:	61		
Oid :	0	Wellid:	149407
Regnum:	G-090752H	Replacemen:	0
Status:	X	Useid:	R
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	DD	Footage:	348N 226W
Areapermit:	LPS-030130		
Acres:	0		
Gpm:	60	Pcoldiam:	1.5
Pdepth:	55	Totaldepth:	63
Stwaterlev:	33	Pwaterlev:	38
Wedrilic:	39374	Ownernumbe:	45153
Compname:	Ameritas Life Insurance Company		
Citystzip:	Lincoln, NE 68501		
Address1:	5900 O Street		
Address2:	Not Reported		
Fildate:	22-MAY-03	Cmpldmonth:	1
Cmpldday:	12	Cmpldyear:	2003
Lastchgdat:	30-DEC-99	Xdate2:	6/2008
Latdd:	40.8143888889		

Longdd:	-96.6257777778		
Calcgps:	0	Site id:	NE5000000059938

Map ID:	61		
Oid :	0	Wellid:	170584
Regnum:	G-135776	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwmum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	22
Subsection:	CC	Footage:	298N 158E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	42
Stwaterlev:	35	Pwaterlev:	0
Wedrilic:	39374	Ownernumbe:	64103
Compname:	Rahns Amoco		
Citystzip:	Lincoln, NE 68506		
Address1:	8131 Brookfield Drive		
Address2:	Albert & Shirley Rahn		
Fildate:	09-SEP-05	Cmpldmonth:	7
Cmpldday:	25	Cmpldyear:	2005
Lastchgdat:	30-DEC-99	Xdate2:	10/2007
Latdd:	40.814246		
Longdd:	-96.624394		
Calcgps:	-1	Site id:	NE5000000059882

Map ID:	61		
Oid :	0	Wellid:	193497
Regnum:	Not Reported	Replacemen:	0
Status:	U	Useid:	O
Nrdname:	Lower Platte South	Nrddwmum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	DD	Footage:	295N 131W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	0
Stwaterlev:	0	Pwaterlev:	0
Wedrilic:	0	Ownernumbe:	45153
Compname:	Ameritas Life Insurance Company		
Citystzip:	Lincoln, NE 68501		
Address1:	5900 O Street		
Address2:	Not Reported		
Fildate:	30-JUL-08	Cmpldmonth:	0
Cmpldday:	0	Cmpldyear:	0
Lastchgdat:	30-DEC-99	Xdate2:	6/2008
Latdd:	40.8142416667		

Longdd:	-96.6254388889		
Calcgps:	0	Site id:	NE5000000059881

Map ID:	61		
Oid :	0	Wellid:	106108
Regnum:	G-090752D	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	DD	Footage:	294N 60W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	42
Stwaterlev:	20	Pwaterlev:	0
Wedrilic:	39246	Ownernumbe:	45153
Compname:	Ameritas Life Insurance Company		
Citystzip:	Lincoln, NE 68501		
Address1:	5900 O Street		
Address2:	Not Reported		
Fildate:	27-FEB-97	Cmpldmonth:	9
Cmpldday:	3	Cmpldyear:	1992
Lastchgdat:	30-DEC-99	Xdate2:	6/2008
Latdd:	40.814236		
Longdd:	-96.625182		
Calcgps:	-1	Site id:	NE5000000059879

Map ID:	61		
Oid :	0	Wellid:	106107
Regnum:	G-090752C	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	DD	Footage:	276N 194W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	47
Stwaterlev:	28	Pwaterlev:	0
Wedrilic:	39246	Ownernumbe:	45153
Compname:	Ameritas Life Insurance Company		
Citystzip:	Lincoln, NE 68501		
Address1:	5900 O Street		
Address2:	Not Reported		
Fildate:	27-FEB-97	Cmpldmonth:	9
Cmpldday:	3	Cmpldyear:	1992
Lastchgdat:	30-DEC-99	Xdate2:	6/2008
Latdd:	40.814189		

Longdd:	-96.625667		
Calcgps:	-1	Site id:	NE5000000059869

Map ID:	61		
Oid :	0	Wellid:	193498
Regnum:	Not Reported	Replacemen:	0
Status:	U	Useid:	O
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	DD	Footage:	276N 417W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	0
Stwaterlev:	0	Pwaterlev:	0
Wedrilic:	0	Ownernumbe:	45153
Compname:	Ameritas Life Insurance Company		
Citystzip:	Lincoln, NE 68501		
Address1:	5900 O Street		
Address2:	Not Reported		
Fildate:	30-JUL-08	Cmpldmonth:	0
Cmpldday:	0	Cmpldyear:	0
Lastchgdat:	30-DEC-99	Xdate2:	6/2008
Latdd:	40.8141888889		
Longdd:	-96.6264722222		
Calcgps:	0	Site id:	NE5000000059868

Map ID:	61		
Oid :	0	Wellid:	120483
Regnum:	G-102128	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	DD	Footage:	200N 600W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	14
Stwaterlev:	3	Pwaterlev:	0
Wedrilic:	19030	Ownernumbe:	33831
Compname:	Goodyear Tire & Rubber Company		
Citystzip:	Akron, OH 44313		
Address1:	1144 East Market Street		
Address2:	Susan Lunt		
Fildate:	27-SEP-99	Cmpldmonth:	7
Cmpldday:	9	Cmpldyear:	1999
Lastchgdat:	30-DEC-99	Xdate2:	9/2001
Latdd:	40.813987		

Longdd:	-96.627135		
Calcgps:	-1	Site id:	NE5000000059823

Map ID:	63		
Oid :	0	Wellid:	86519
Regnum:	G-077856	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	20
Subsection:	DC	Footage:	150N 2535W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	23
Stwaterlev:	14	Pwaterlev:	0
Wedrilic:	39271	Ownernumbe:	40780
Compname:	Amoco Station #5182		
Citystzip:	Lincoln, NE 68510		
Address1:	4800 O Street		
Address2:	Not Reported		
Fildate:	03-AUG-93	Cmpldmonth:	6
Cmpldday:	15	Cmpldyear:	1993
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.81394		
Longdd:	-96.653379		
Calcgps:	-1	Site id:	NE5000000059812

Map ID:	61		
Oid :	0	Wellid:	168538
Regnum:	G-134340D	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	22
Subsection:	CC	Footage:	180N 282E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	40
Stwaterlev:	34	Pwaterlev:	0
Wedrilic:	39374	Ownernumbe:	64103
Compname:	Rahns Amoco		
Citystzip:	Lincoln, NE 68506		
Address1:	8131 Brookfield Drive		
Address2:	Albert & Shirley Rahn		
Fildate:	24-JUN-05	Cmpldmonth:	5
Cmpldday:	25	Cmpldyear:	2005
Lastchgdat:	30-DEC-99	Xdate2:	10/2007
Latdd:	40.813923		

Longdd:	-96.62395		
Calcgps:	-1	Site id:	NE5000000059808

Map ID:	61		
Oid :	0	Wellid:	151419
Regnum:	G-122752A	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	22
Subsection:	CC	Footage:	168N 177E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	37
Stwaterlev:	32.2999992370605	Pwaterlev:	0
Wedrilic:	39374	Ownernumbe:	64103
Compname:	Rahns Amoco		
Citystzip:	Lincoln, NE 68506		
Address1:	8131 Brookfield Drive		
Address2:	Albert & Shirley Rahn		
Fildate:	06-AUG-03	Cmpldmonth:	6
Cmpldday:	19	Cmpldyear:	2003
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.81389		
Longdd:	-96.624329		
Calcgps:	-1	Site id:	NE5000000059800

Map ID:	61		
Oid :	0	Wellid:	190038
Regnum:	Not Reported	Replacemen:	0
Status:	U	Useid:	O
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	22
Subsection:	CC	Footage:	163N 185E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	0
Stwaterlev:	0	Pwaterlev:	0
Wedrilic:	0	Ownernumbe:	64103
Compname:	Rahns Amoco		
Citystzip:	Lincoln, NE 68506		
Address1:	8131 Brookfield Drive		
Address2:	Albert & Shirley Rahn		
Fildate:	10-JAN-08	Cmpldmonth:	0
Cmpldday:	0	Cmpldyear:	0
Lastchgdat:	30-DEC-99	Xdate2:	10/2007
Latdd:	40.813876		

Longdd:	-96.6243		
Calcgps:	-1	Site id:	NE5000000059794

Map ID:	63		
Oid :	0	Wellid:	86518
Regnum:	G-077855	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	20
Subsection:	DC	Footage:	120N 2490W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	23
Stwaterlev:	18	Pwaterlev:	0
Wedrilic:	39271	Ownernumbe:	40780
Compname:	Amoco Station #5182		
Citystzip:	Lincoln, NE 68510		
Address1:	4800 O Street		
Address2:	Not Reported		
Fildate:	03-AUG-93	Cmpldmonth:	6
Cmpldday:	14	Cmpldyear:	1993
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.813858		
Longdd:	-96.653217		
Calcgps:	-1	Site id:	NE5000000059787

Map ID:	61		
Oid :	0	Wellid:	168536
Regnum:	G-134340B	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	22
Subsection:	CC	Footage:	155N 223E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	40
Stwaterlev:	34	Pwaterlev:	0
Wedrilic:	39374	Ownernumbe:	64103
Compname:	Rahns Amoco		
Citystzip:	Lincoln, NE 68506		
Address1:	8131 Brookfield Drive		
Address2:	Albert & Shirley Rahn		
Fildate:	24-JUN-05	Cmpldmonth:	5
Cmpldday:	25	Cmpldyear:	2005
Lastchgdat:	30-DEC-99	Xdate2:	10/2007
Latdd:	40.813854		

Longdd:	-96.624163		
Calcgps:	-1	Site id:	NE5000000059785

Map ID:	61		
Oid :	0	Wellid:	168537
Regnum:	G-134340C	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	22
Subsection:	CC	Footage:	150N 270E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	40
Stwaterlev:	34	Pwaterlev:	0
Wedrilic:	39374	Ownernumbe:	64103
Compname:	Rahns Amoco		
Citystzip:	Lincoln, NE 68506		
Address1:	8131 Brookfield Drive		
Address2:	Albert & Shirley Rahn		
Fildate:	24-JUN-05	Cmpldmonth:	5
Cmpldday:	25	Cmpldyear:	2005
Lastchgdat:	30-DEC-99	Xdate2:	10/2007
Latdd:	40.81384		
Longdd:	-96.623994		
Calcgps:	-1	Site id:	NE5000000059782

Map ID:	61		
Oid :	0	Wellid:	106105
Regnum:	G-090752A	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	21
Subsection:	DD	Footage:	146N 200W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	46
Stwaterlev:	29	Pwaterlev:	0
Wedrilic:	39246	Ownernumbe:	45153
Compname:	Ameritas Life Insurance Company		
Citystzip:	Lincoln, NE 68501		
Address1:	5900 O Street		
Address2:	Not Reported		
Fildate:	27-FEB-97	Cmpldmonth:	9
Cmpldday:	4	Cmpldyear:	1992
Lastchgdat:	30-DEC-99	Xdate2:	6/2008
Latdd:	40.813833		

Longdd:	-96.625691		
Calcgps:	-1	Site id:	NE5000000059779

Map ID:	61		
Oid :	0	Wellid:	151420
Regnum:	G-122752B	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	22
Subsection:	CC	Footage:	146N 177E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	37
Stwaterlev:	31.8999996185303	Pwaterlev:	0
Wedrilic:	39374	Ownernumbe:	64103
Compname:	Rahns Amoco		
Citystzip:	Lincoln, NE 68506		
Address1:	8131 Brookfield Drive		
Address2:	Albert & Shirley Rahn		
Fildate:	06-AUG-03	Cmpldmonth:	6
Cmpldday:	19	Cmpldyear:	2003
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.813829		
Longdd:	-96.62433		
Calcgps:	-1	Site id:	NE5000000059777

Map ID:	61		
Oid :	0	Wellid:	151427
Regnum:	G-122752D	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	22
Subsection:	CC	Footage:	146N 205E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	37
Stwaterlev:	31.2999992370605	Pwaterlev:	0
Wedrilic:	39374	Ownernumbe:	64103
Compname:	Rahns Amoco		
Citystzip:	Lincoln, NE 68506		
Address1:	8131 Brookfield Drive		
Address2:	Albert & Shirley Rahn		
Fildate:	06-AUG-03	Cmpldmonth:	6
Cmpldday:	20	Cmpldyear:	2003
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.813829		

Longdd:	-96.624229		
Calcgps:	-1	Site id:	NE5000000059778

Map ID:	61		
Oid :	0	Wellid:	190040
Regnum:	Not Reported	Replacemen:	0
Status:	U	Useid:	O
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	22
Subsection:	CC	Footage:	143N 218E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	0
Stwaterlev:	0	Pwaterlev:	0
Wedrilic:	0	Ownernumbe:	64103
Compname:	Rahns Amoco		
Citystzip:	Lincoln, NE 68506		
Address1:	8131 Brookfield Drive		
Address2:	Albert & Shirley Rahn		
Fildate:	10-JAN-08	Cmpldmonth:	0
Cmpldday:	0	Cmpldyear:	0
Lastchgdat:	30-DEC-99	Xdate2:	10/2007
Latdd:	40.813821		
Longdd:	-96.624182		
Calcgps:	-1	Site id:	NE5000000059774

Map ID:	61		
Oid :	0	Wellid:	190041
Regnum:	Not Reported	Replacemen:	0
Status:	U	Useid:	L
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	22
Subsection:	CC	Footage:	137N 222E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	0
Stwaterlev:	0	Pwaterlev:	0
Wedrilic:	0	Ownernumbe:	64103
Compname:	Rahns Amoco		
Citystzip:	Lincoln, NE 68506		
Address1:	8131 Brookfield Drive		
Address2:	Albert & Shirley Rahn		
Fildate:	10-JAN-08	Cmpldmonth:	0
Cmpldday:	0	Cmpldyear:	0
Lastchgdat:	30-DEC-99	Xdate2:	10/2007
Latdd:	40.813805		

Longdd:	-96.624167		
Calcgps:	-1	Site id:	NE5000000059770

Map ID:	61		
Oid :	0	Wellid:	151426
Regnum:	G-122752C	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwmum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	22
Subsection:	CC	Footage:	133N 193E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	37
Stwaterlev:	31.2000007629395	Pwaterlev:	0
Wedrilic:	39374	Ownernumbe:	64103
Compname:	Rahns Amoco		
Citystzip:	Lincoln, NE 68506		
Address1:	8131 Brookfield Drive		
Address2:	Albert & Shirley Rahn		
Fildate:	06-AUG-03	Cmpldmonth:	6
Cmpldday:	18	Cmpldyear:	2003
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.813794		
Longdd:	-96.624272		
Calcgps:	-1	Site id:	NE5000000059769

Map ID:	63		
Oid :	0	Wellid:	86517
Regnum:	G-077854	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwmum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	20
Subsection:	DC	Footage:	90N 2580W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	23
Stwaterlev:	13	Pwaterlev:	0
Wedrilic:	39271	Ownernumbe:	40780
Compname:	Amoco Station #5182		
Citystzip:	Lincoln, NE 68510		
Address1:	4800 O Street		
Address2:	Not Reported		
Fildate:	03-AUG-93	Cmpldmonth:	6
Cmpldday:	15	Cmpldyear:	1993
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.813776		

Longdd:	-96.653542		
Calcgps:	-1	Site id:	NE5000000059763

Map ID:	61		
Oid :	0	Wellid:	151428
Regnum:	G-122752E	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	22
Subsection:	CC	Footage:	117N 225E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	37
Stwaterlev:	30.7999992370605	Pwaterlev:	0
Wedrilic:	39374	Ownernumbe:	64103
Compname:	Rahns Amoco		
Citystzip:	Lincoln, NE 68506		
Address1:	8131 Brookfield Drive		
Address2:	Albert & Shirley Rahn		
Fildate:	06-AUG-03	Cmpldmonth:	6
Cmpldday:	19	Cmpldyear:	2003
Lastchgdat:	30-DEC-99	Xdate2:	10/2007
Latdd:	40.81375		
Longdd:	-96.624157		
Calcgps:	-1	Site id:	NE5000000059757

Map ID:	61		
Oid :	0	Wellid:	190039
Regnum:	Not Reported	Replacemen:	0
Status:	U	Useid:	O
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	22
Subsection:	CC	Footage:	114N 187E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	0
Stwaterlev:	0	Pwaterlev:	0
Wedrilic:	0	Ownernumbe:	64103
Compname:	Rahns Amoco		
Citystzip:	Lincoln, NE 68506		
Address1:	8131 Brookfield Drive		
Address2:	Albert & Shirley Rahn		
Fildate:	10-JAN-08	Cmpldmonth:	0
Cmpldday:	0	Cmpldyear:	0
Lastchgdat:	30-DEC-99	Xdate2:	10/2007
Latdd:	40.813741		

Longdd:	-96.624294		
Calcgps:	-1	Site id:	NE5000000059755

Map ID:	63		
Oid :	0	Wellid:	86516
Regnum:	G-077853	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	20
Subsection:	DC	Footage:	75N 2445W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	24
Stwaterlev:	15	Pwaterlev:	0
Wedrilic:	39271	Ownernumbe:	40780
Compname:	Amoco Station #5182		
Citystzip:	Lincoln, NE 68510		
Address1:	4800 O Street		
Address2:	Not Reported		
Fildate:	03-AUG-93	Cmpldmonth:	6
Cmpldday:	14	Cmpldyear:	1993
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.813734		
Longdd:	-96.653055		
Calcgps:	-1	Site id:	NE5000000059753

Map ID:	61		
Oid :	0	Wellid:	156524
Regnum:	G-125798	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	22
Subsection:	CC	Footage:	105N 253E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	38
Stwaterlev:	33.4000015258789	Pwaterlev:	0
Wedrilic:	39374	Ownernumbe:	64103
Compname:	Rahns Amoco		
Citystzip:	Lincoln, NE 68506		
Address1:	8131 Brookfield Drive		
Address2:	Albert & Shirley Rahn		
Fildate:	02-FEB-04	Cmpldmonth:	10
Cmpldday:	22	Cmpldyear:	2003
Lastchgdat:	30-DEC-99	Xdate2:	6/2005
Latdd:	40.813717		

Longdd:	-96.624056		
Calcgps:	-1	Site id:	NE5000000059749

Map ID:	63		
Oid :	0	Wellid:	86515
Regnum:	G-077852	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	20
Subsection:	DC	Footage:	60N 2520W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	23
Stwaterlev:	11	Pwaterlev:	0
Wedrilic:	39271	Ownernumbe:	40780
Compname:	Amoco Station #5182		
Citystzip:	Lincoln, NE 68510		
Address1:	4800 O Street		
Address2:	Not Reported		
Fildate:	03-AUG-93	Cmpldmonth:	6
Cmpldday:	14	Cmpldyear:	1993
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.813693		
Longdd:	-96.653326		
Calcgps:	-1	Site id:	NE5000000059742

Map ID:	61		
Oid :	0	Wellid:	168535
Regnum:	G-134340A	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	22
Subsection:	CC	Footage:	95N 258E
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	40
Stwaterlev:	34	Pwaterlev:	0
Wedrilic:	39374	Ownernumbe:	64103
Compname:	Rahns Amoco		
Citystzip:	Lincoln, NE 68506		
Address1:	8131 Brookfield Drive		
Address2:	Albert & Shirley Rahn		
Fildate:	24-JUN-05	Cmpldmonth:	5
Cmpldday:	24	Cmpldyear:	2005
Lastchgdat:	30-DEC-99	Xdate2:	10/2007
Latdd:	40.813689		

Longdd:	-96.624038		
Calcgps:	-1	Site id:	NE5000000059741

Map ID:	63		
Oid :	0	Wellid:	86514
Regnum:	G-077851	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	20
Subsection:	DC	Footage:	30N 2535W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	23
Stwaterlev:	11	Pwaterlev:	0
Wedrilic:	39271	Ownernumbe:	40780
Compname:	Amoco Station #5182		
Citystzip:	Lincoln, NE 68510		
Address1:	4800 O Street		
Address2:	Not Reported		
Fildate:	03-AUG-93	Cmpldmonth:	6
Cmpldday:	11	Cmpldyear:	1993
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.813611		
Longdd:	-96.65338		
Calcgps:	-1	Site id:	NE5000000059728

Map ID:	63		
Oid :	0	Wellid:	86513
Regnum:	G-077850	Replacemen:	0
Status:	A	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	20
Subsection:	DC	Footage:	30N 2490W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	23
Stwaterlev:	12	Pwaterlev:	0
Wedrilic:	39271	Ownernumbe:	40780
Compname:	Amoco Station #5182		
Citystzip:	Lincoln, NE 68510		
Address1:	4800 O Street		
Address2:	Not Reported		
Fildate:	03-AUG-93	Cmpldmonth:	6
Cmpldday:	11	Cmpldyear:	1993
Lastchgdat:	30-DEC-99	Xdate2:	0
Latdd:	40.813611		

Longdd:	-96.653218		
Calcgps:	-1	Site id:	NE5000000059729

Map ID:	64		
Oid :	0	Wellid:	145154
Regnum:	G-118577G	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	29
Subsection:	AA	Footage:	30S 830W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	15
Stwaterlev:	8.89999961853027	Pwaterlev:	0
Wedrilic:	89024	Ownernumbe:	60589
Compname:	Coastal Mart Inc		
Citystzip:	Houston, TX 77002		
Address1:	1001 Louisiana Street		
Address2:	Not Reported		
Fildate:	25-NOV-02	Cmpldmonth:	10
Cmpldday:	3	Cmpldyear:	2002
Lastchgdat:	30-DEC-99	Xdate2:	5/2003
Latdd:	40.8136		
Longdd:	-96.6472166667		
Calcgps:	0	Site id:	NE5000000059727

Map ID:	64		
Oid :	0	Wellid:	149457
Regnum:	G-118577J	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	29
Subsection:	AA	Footage:	60S 800W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	15
Stwaterlev:	7.19999980926514	Pwaterlev:	0
Wedrilic:	19231	Ownernumbe:	60589
Compname:	Coastal Mart Inc		
Citystzip:	Houston, TX 77002		
Address1:	1001 Louisiana Street		
Address2:	Not Reported		
Fildate:	24-APR-03	Cmpldmonth:	2
Cmpldday:	12	Cmpldyear:	1992
Lastchgdat:	30-DEC-99	Xdate2:	5/2003
Latdd:	40.813355		

Longdd:	-96.647115		
Calcgps:	-1	Site id:	NE5000000059667

Map ID:	64		
Oid :	0	Wellid:	145145
Regnum:	G-118577D	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	29
Subsection:	AA	Footage:	62S 866W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	15
Stwaterlev:	6.59999990463257	Pwaterlev:	0
Wedrilic:	89024	Ownernumbe:	60589
Compname:	Coastal Mart Inc		
Citystzip:	Houston, TX 77002		
Address1:	1001 Louisiana Street		
Address2:	Not Reported		
Fildate:	25-NOV-02	Cmpldmonth:	10
Cmpldday:	2	Cmpldyear:	2002
Lastchgdat:	30-DEC-99	Xdate2:	5/2003
Latdd:	40.81335		
Longdd:	-96.64735		
Calcgps:	0	Site id:	NE5000000059662

Map ID:	64		
Oid :	0	Wellid:	145147
Regnum:	G-118577E	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	29
Subsection:	AA	Footage:	62S 787W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	15
Stwaterlev:	6.19999980926514	Pwaterlev:	0
Wedrilic:	89024	Ownernumbe:	60589
Compname:	Coastal Mart Inc		
Citystzip:	Houston, TX 77002		
Address1:	1001 Louisiana Street		
Address2:	Not Reported		
Fildate:	25-NOV-02	Cmpldmonth:	10
Cmpldday:	3	Cmpldyear:	2002
Lastchgdat:	30-DEC-99	Xdate2:	5/2003
Latdd:	40.81335		

Longdd:	-96.6470666667		
Calcgps:	0	Site id:	NE5000000059663

Map ID:	64		
Oid :	0	Wellid:	145149
Regnum:	G-118577F	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	29
Subsection:	AA	Footage:	62S 745W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	15
Stwaterlev:	6.19999980926514	Pwaterlev:	0
Wedrilic:	89024	Ownernumbe:	60589
Compname:	Coastal Mart Inc		
Citystzip:	Houston, TX 77002		
Address1:	1001 Louisiana Street		
Address2:	Not Reported		
Fildate:	25-NOV-02	Cmpldmonth:	10
Cmpldday:	3	Cmpldyear:	2002
Lastchgdat:	30-DEC-99	Xdate2:	5/2003
Latdd:	40.81335		
Longdd:	-96.6469166667		
Calcgps:	0	Site id:	NE5000000059661

Map ID:	64		
Oid :	0	Wellid:	149460
Regnum:	G-118577L	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	29
Subsection:	AA	Footage:	65S 866W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	14.1999998092651
Stwaterlev:	9	Pwaterlev:	0
Wedrilic:	89007	Ownernumbe:	60589
Compname:	Coastal Mart Inc		
Citystzip:	Houston, TX 77002		
Address1:	1001 Louisiana Street		
Address2:	Not Reported		
Fildate:	24-APR-03	Cmpldmonth:	5
Cmpldday:	19	Cmpldyear:	2000
Lastchgdat:	30-DEC-99	Xdate2:	5/2003
Latdd:	40.813341		

Longdd:	-96.647354		
Calcgps:	-1	Site id:	NE5000000059659

Map ID:	64		
Oid :	0	Wellid:	149456
Regnum:	G-118577I	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	29
Subsection:	AA	Footage:	67S 700W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	15
Stwaterlev:	8.69999980926514	Pwaterlev:	0
Wedrilic:	19231	Ownernumbe:	60589
Compname:	Coastal Mart Inc		
Citystzip:	Houston, TX 77002		
Address1:	1001 Louisiana Street		
Address2:	Not Reported		
Fildate:	24-APR-03	Cmpldmonth:	2
Cmpldday:	12	Cmpldyear:	1992
Lastchgdat:	30-DEC-99	Xdate2:	5/2003
Latdd:	40.813335		
Longdd:	-96.646754		
Calcgps:	-1	Site id:	NE5000000059656

Map ID:	64		
Oid :	0	Wellid:	149461
Regnum:	G-118577M	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	29
Subsection:	AA	Footage:	90S 788W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	14.1999998092651
Stwaterlev:	10.5	Pwaterlev:	0
Wedrilic:	89007	Ownernumbe:	60589
Compname:	Coastal Mart Inc		
Citystzip:	Houston, TX 77002		
Address1:	1001 Louisiana Street		
Address2:	Not Reported		
Fildate:	24-APR-03	Cmpldmonth:	5
Cmpldday:	19	Cmpldyear:	2000
Lastchgdat:	30-DEC-99	Xdate2:	5/2003
Latdd:	40.813272		

Longdd:	-96.647072		
Calcgps:	-1	Site id:	NE5000000059633

Map ID:	64		
Oid :	0	Wellid:	149458
Regnum:	G-118577K	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	29
Subsection:	AA	Footage:	90S 711W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	14.1999998092651
Stwaterlev:	10	Pwaterlev:	0
Wedrilic:	89007	Ownernumbe:	60589
Compname:	Coastal Mart Inc		
Citystzip:	Houston, TX 77002		
Address1:	1001 Louisiana Street		
Address2:	Not Reported		
Fildate:	24-APR-03	Cmpldmonth:	5
Cmpldday:	19	Cmpldyear:	2000
Lastchgdat:	30-DEC-99	Xdate2:	5/2003
Latdd:	40.813272		
Longdd:	-96.646794		
Calcgps:	-1	Site id:	NE5000000059634

Map ID:	64		
Oid :	0	Wellid:	145140
Regnum:	G-118577C	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	29
Subsection:	AA	Footage:	112S 869W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	15
Stwaterlev:	6.59999990463257	Pwaterlev:	0
Wedrilic:	89024	Ownernumbe:	60589
Compname:	Coastal Mart Inc		
Citystzip:	Houston, TX 77002		
Address1:	1001 Louisiana Street		
Address2:	Not Reported		
Fildate:	25-NOV-02	Cmpldmonth:	10
Cmpldday:	1	Cmpldyear:	2002
Lastchgdat:	30-DEC-99	Xdate2:	5/2003
Latdd:	40.8132166667		

Longdd:	-96.6473666667		
Calcgps:	0	Site id:	NE5000000059621

Map ID:	64		
Oid :	0	Wellid:	145138
Regnum:	G-118577A	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	29
Subsection:	AA	Footage:	148S 801W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	15
Stwaterlev:	7.30000019073486	Pwaterlev:	0
Wedrilic:	89024	Ownernumbe:	60589
Compname:	Coastal Mart Inc		
Citystzip:	Houston, TX 77002		
Address1:	1001 Louisiana Street		
Address2:	Not Reported		
Fildate:	25-NOV-02	Cmpldmonth:	10
Cmpldday:	1	Cmpldyear:	2002
Lastchgdat:	30-DEC-99	Xdate2:	5/2003
Latdd:	40.8131166667		
Longdd:	-96.6471166667		
Calcgps:	0	Site id:	NE5000000059604

Map ID:	64		
Oid :	0	Wellid:	149455
Regnum:	G-118577H	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	29
Subsection:	AA	Footage:	150S 705W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	15
Stwaterlev:	9.89999961853027	Pwaterlev:	0
Wedrilic:	19231	Ownernumbe:	60589
Compname:	Coastal Mart Inc		
Citystzip:	Houston, TX 77002		
Address1:	1001 Louisiana Street		
Address2:	Not Reported		
Fildate:	24-APR-03	Cmpldmonth:	2
Cmpldday:	12	Cmpldyear:	1992
Lastchgdat:	30-DEC-99	Xdate2:	5/2003
Latdd:	40.813107		

Longdd:	-96.646773		
Calcgps:	-1	Site id:	NE5000000059603

Map ID:	64		
Oid :	0	Wellid:	145139
Regnum:	G-118577B	Replacemen:	0
Status:	X	Useid:	Q
Nrdname:	Lower Platte South	Nrddwrnum:	20
Countyname:	Lancaster	Countynum:	55
Township:	10	Rangenum:	7
Rangelet:	E	Section:	29
Subsection:	AA	Footage:	157S 758W
Areapermit:	Not Reported		
Acres:	0		
Gpm:	0	Pcoldiam:	0
Pdepth:	0	Totaldepth:	15
Stwaterlev:	8.60000038146973	Pwaterlev:	0
Wedrilic:	89024	Ownernumbe:	60589
Compname:	Coastal Mart Inc		
Citystzip:	Houston, TX 77002		
Address1:	1001 Louisiana Street		
Address2:	Not Reported		
Fildate:	25-NOV-02	Cmpldmonth:	10
Cmpldday:	1	Cmpldyear:	2002
Lastchgdat:	30-DEC-99	Xdate2:	5/2003
Latdd:	40.8130833333		
Longdd:	-96.6469666667		
Calcgps:	0	Site id:	NE5000000059601

US Army Corps of Engineers ®
Omaha District

DEADMANS RUN
LINCOLN, NEBRASKA

SECTION 205 – FLOOD RISK MANAGEMENT

FEASIBILITY REPORT

APPENDICES VOLUME V:
APPENDIX L
PART 2 OF 2

AUGUST 2018

US Army Corps
of Engineers ®
Omaha District

DEADMANS RUN
LINCOLN, NEBRASKA

SECTION 205 – FLOOD RISK MANAGEMENT

FEASIBILITY REPORT

APPENDIX L
PHASE I ENVIRONMENTAL CONDITION OF PROPERTY DETERMINATION
PART 2 OF 2

AUGUST 2018

Appendix B

EDR Database Search Report

Part 2 of 2

PWS SUMMARY:

Map ID: 29

GEOCHECK VERSION 2.1
STATE DATABASE WELL INFORMATION

PWS Water Well Information:

Epa region:	07	State:	NE
Pwsid:	NE3150400		
Pwsname:	FAT NAPPYS		
City served:	Not Reported	State served:	NE
Zip served:	Not Reported	Fips county:	31109
Status:	Closed	Pop srvd:	25
Pwssvcconn:	1	Source:	Groundwater
Pws type:	TNCWS	Owner:	Private
Contact:	LAMP, NATHAN		
Contactor gname:	LAMP, NATHAN		
Contact phone:	402-466-6644	Contact address1:	C/O FAT NAPPYS
Contact address2:	5100 NORTH 48TH STREET	Contact city:	LINCOLN
Contact state:	NE	Contact zip:	68521
Activity code:	I		

Location Information:

Name:	FAT NAPPYS		
Pwstypcd:	TNCWS	Primsrccd:	GW
Popserved:	25		
Add1:	C/O FAT NAPPYS		
Add2:	5100 NORTH 48TH STREET		
City:	LINCOLN	State:	NE
Zip:	68521	Phone:	402-466-6644
Cityserv:	LINCOLN	Cntyserv:	Lancaster
Stateserv:	NE	Zipserv:	Not Reported

Enforcement Information:

Violation id:	440509	Orig cd:	S
Enf fy:	2008	Enf act date:	08/14/2008
Enf act detail:	St Compliance achieved	Enf act cat:	Resolving

Enforcement Information:

Violation id:	440308	Orig cd:	S
Enf fy:	2008	Enf act date:	08/14/2008
Enf act detail:	St Public Notif received	Enf act cat:	Informal

Enforcement Information:

Violation id:	440308	Orig cd:	S
Enf fy:	2008	Enf act date:	06/26/2008
Enf act detail:	St Public Notif requested	Enf act cat:	Informal

Enforcement Information:

Violation id:	440308	Orig cd:	S
Enf fy:	2008	Enf act date:	06/26/2008
Enf act detail:	St Violation/Reminder Notice	Enf act cat:	Informal

Enforcement Information:			
Violation id:	440208	Orig cd:	S
Enf fy:	2008	Enf act date:	08/14/2008
Enf act detail:	St Public Notif received	Enf act cat:	Informal
Enforcement Information:			
Violation id:	440208	Orig cd:	S
Enf fy:	2008	Enf act date:	06/26/2008
Enf act detail:	St Violation/Reminder Notice	Enf act cat:	Informal
Enforcement Information:			
Violation id:	440208	Orig cd:	S
Enf fy:	2008	Enf act date:	06/26/2008
Enf act detail:	St Public Notif requested	Enf act cat:	Informal
Enforcement Information:			
Violation id:	440005	Orig cd:	S
Enf fy:	2005	Enf act date:	12/06/2004
Enf act detail:	St Compliance achieved	Enf act cat:	Resolving
Enforcement Information:			
Violation id:	439905	Orig cd:	S
Enf fy:	2005	Enf act date:	10/18/2004
Enf act detail:	St Public Notif requested	Enf act cat:	Informal
Enforcement Information:			
Violation id:	439905	Orig cd:	S
Enf fy:	2005	Enf act date:	12/07/2004
Enf act detail:	St Public Notif received	Enf act cat:	Informal
Enforcement Information:			
Violation id:	439905	Orig cd:	S
Enf fy:	2005	Enf act date:	10/18/2004
Enf act detail:	St Violation/Reminder Notice	Enf act cat:	Informal
Violations Information:			
Violoation id:	440509	Orig cd:	S
State:	NE	Viol fy:	2008
Contamcd:	7500		
Contamnm:	Public Notice		
Viol code:	75		
Viol name:	PN Violation for NPDWR Violation		
Rule code:	410		
Rule name:	PN rule		
Violmeasur:	Not Reported	Unitmeasur:	Not Reported
State mcl:	Not Reported	Cmpbdt:	07/08/2008
Cmpedt:	Not Reported		
Violations Information:			
Violoation id:	440308	Orig cd:	S
State:	NE	Viol fy:	2008
Contamcd:	3100		
Contamnm:	Coliform (TCR)		
Viol code:	22		
Viol name:	MCL, Monthly (TCR)		
Rule code:	110		
Rule name:	TCR		
Violmeasur:	Not Reported	Unitmeasur:	Not Reported

State mcl:	Not Reported	Cmpbdt:	06/01/2008
Cmpedt:	06/30/2008		

Violations Information:			
Violoation id:	440208	Orig cd:	S
State:	NE	Viol fy:	2008
Contamcd:	3100		
Contamnm:	Coliform (TCR)		
Viol code:	21		
Viol name:	MCL, Acute (TCR)		
Rule code:	110		
Rule name:	TCR		
Violmeasur:	Not Reported	Unitmeasur:	Not Reported
State mcl:	Not Reported	Cmpbdt:	06/01/2008
Cmpedt:	06/30/2008		

Violations Information:			
Violoation id:	440005	Orig cd:	S
State:	NE	Viol fy:	2004
Contamcd:	7500		
Contamnm:	Public Notice		
Viol code:	75		
Viol name:	PN Violation for NPDWR Violation		
Rule code:	410		
Rule name:	PN rule		
Violmeasur:	Not Reported	Unitmeasur:	Not Reported
State mcl:	Not Reported	Cmpbdt:	11/21/2004
Cmpedt:	Not Reported		

Violations Information:			
Violoation id:	439905	Orig cd:	S
State:	NE	Viol fy:	2004
Contamcd:	3100		
Contamnm:	Coliform (TCR)		
Viol code:	23		
Viol name:	Monitoring, Routine Major (TCR)		
Rule code:	110		
Rule name:	TCR		
Violmeasur:	Not Reported	Unitmeasur:	Not Reported
State mcl:	Not Reported	Cmpbdt:	07/01/2004
Cmpedt:	09/30/2004		

PWS ID:	NE3150400		
Date Initiated:	Not Reported	Date Deactivated:	Not Reported
PWS Name:	BJS HIDEAWAY 5100 N 48 ST LINCOLN, NE 68504		

Addressee / Facility: Not Reported

Facility Latitude:	40 50 26	Facility Longitude:	096 39 18
City Served:	Not Reported		
Treatment Class:	Untreated	Population:	00000025

PWS currently has or had major violation(s) or enforcement: YES

VIOLATIONS INFORMATION:

Violation ID:	9401136	Source ID:	Not Reported	PWS Phone:	Not Reported
Vio. beginning Date:	10/01/93	Vio. end Date:	12/31/93	Vio. Period:	003 Months
Num required Samples:	Not Reported	Number of Samples Taken:		Not Reported	
Analysis Result:	Not Reported	Maximum Contaminant Level:		Not Reported	
Analysis Method:	Not Reported				
Violation Type:	Monitoring, Routine Major (TCR)				
Contaminant:	COLIFORM (TCR)				
Vio. Awareness Date:	012094				

GEOCHECK VERSION 2.1
PUBLIC WATER SUPPLY SYSTEM INFORMATION

PWS SUMMARY:

Violation ID:	9402043	Source ID:	Not Reported	PWS Phone:	Not Reported
Vio. beginning Date:	10/01/93	Vio. end Date:	12/31/93	Vio. Period:	003 Months
Num required Samples:	Not Reported	Number of Samples Taken:		Not Reported	
Analysis Result:	Not Reported	Maximum Contaminant Level:		Not Reported	
Analysis Method:	Not Reported				
Violation Type:	Notification, Public				
Contaminant:	COLIFORM (TCR)				
Vio. Awareness Date:	030894				

ENFORCEMENT INFORMATION:

Truedate:	03/31/2009	Pwsid:	NE3150400
Pwsname:	FAT NAPPYS		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	439905	Contaminant:	COLIFORM (TCR)
Viol. Type:	Monitoring, Routine Major (TCR)		
Complperbe:	7/1/2004 0:00:00		
Complperen:	9/30/2004 0:00:00	Enfdate:	10/18/2004 0:00:00
Enf action:	State Violation/Reminder Notice		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NE3150400
Pwsname:	FAT NAPPYS		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	439905	Contaminant:	COLIFORM (TCR)
Viol. Type:	Monitoring, Routine Major (TCR)		
Complperbe:	7/1/2004 0:00:00		
Complperen:	9/30/2004 0:00:00	Enfdate:	10/18/2004 0:00:00
Enf action:	State Public Notif Requested		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NE3150400
Pwsname:	FAT NAPPYS		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	439905	Contaminant:	COLIFORM (TCR)
Viol. Type:	Monitoring, Routine Major (TCR)		
Complperbe:	7/1/2004 0:00:00		
Complperen:	9/30/2004 0:00:00	Enfdate:	12/7/2004 0:00:00
Enf action:	State Public Notif Received		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NE3150400
Pwsname:	FAT NAPPYS		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	440005	Contaminant:	7500
Viol. Type:	PN Violation for NPDWR Violation		
Complperbe:	11/21/2004 0:00:00		
Complperen:	12/6/2004 0:00:00	Enfdate:	12/6/2004 0:00:00
Enf action:	State Compliance Achieved		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NE3150400
Pwsname:	FAT NAPPYS		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	440208	Contaminant:	COLIFORM (TCR)
Viol. Type:	MCL, Acute (TCR)		
Complperbe:	6/1/2008 0:00:00		
Complperen:	6/30/2008 0:00:00	Enfdate:	6/26/2008 0:00:00
Enf action:	State Violation/Reminder Notice		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NE3150400
Pwsname:	FAT NAPPYS		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	440208	Contaminant:	COLIFORM (TCR)
Viol. Type:	MCL, Acute (TCR)		
Complperbe:	6/1/2008 0:00:00		
Complperen:	6/30/2008 0:00:00	Enfdate:	6/26/2008 0:00:00
Enf action:	State Public Notif Requested		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NE3150400
Pwsname:	FAT NAPPYS		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	440208	Contaminant:	COLIFORM (TCR)
Viol. Type:	MCL, Acute (TCR)		
Complperbe:	6/1/2008 0:00:00		
Complperen:	6/30/2008 0:00:00	Enfdate:	8/14/2008 0:00:00
Enf action:	State Public Notif Received		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NE3150400
Pwsname:	FAT NAPPYS		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	440308	Contaminant:	COLIFORM (TCR)
Viol. Type:	MCL, Monthly (TCR)		
Complperbe:	6/1/2008 0:00:00		
Complperen:	6/30/2008 0:00:00	Enfdate:	6/26/2008 0:00:00
Enf action:	State Violation/Reminder Notice		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NE3150400
Pwsname:	FAT NAPPYS		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	440308	Contaminant:	COLIFORM (TCR)
Viol. Type:	MCL, Monthly (TCR)		
Complperbe:	6/1/2008 0:00:00		
Complperen:	6/30/2008 0:00:00	Enfdate:	6/26/2008 0:00:00
Enf action:	State Public Notif Requested		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NE3150400
Pwsname:	FAT NAPPYS		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	440308	Contaminant:	COLIFORM (TCR)
Viol. Type:	MCL, Monthly (TCR)		
Complperbe:	6/1/2008 0:00:00		
Complperen:	6/30/2008 0:00:00	Enfdate:	8/14/2008 0:00:00
Enf action:	State Public Notif Received		
Violmeasur:	Not Reported		

Truedate:	03/31/2009	Pwsid:	NE3150400
Pwsname:	FAT NAPPYS		
Retpopsrvd:	25	Pwstypecod:	NC
Vioid:	440509	Contaminant:	7500
Viol. Type:	PN Violation for NPDWR Violation		
Complperbe:	7/8/2008 0:00:00		
Complperen:	8/14/2008 0:00:00	Enfdate:	8/14/2008 0:00:00
Enf action:	State Compliance Achieved		
Violmeasur:	Not Reported		

System Name:	FAT NAPPYS		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	7/1/2004 0:00:00 - 9/30/2004 0:00:00		
Violation ID:	439905		
Enforcement Date:	10/18/2004 0:00:00	Enf. Action:	State Violation/Reminder Notice
System Name:	FAT NAPPYS		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	7/1/2004 0:00:00 - 9/30/2004 0:00:00		
Violation ID:	439905		
Enforcement Date:	10/18/2004 0:00:00	Enf. Action:	State Public Notif Requested
System Name:	FAT NAPPYS		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	07/01/04 - 09/30/04		
Violation ID:	439905		
Enforcement Date:	12/07/04	Enf. Action:	State Public Notif Received
System Name:	FAT NAPPYS		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	07/01/04 - 09/30/04		
Violation ID:	439905		
Enforcement Date:	10/18/04	Enf. Action:	State Public Notif Requested
System Name:	FAT NAPPYS		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	07/01/04 - 09/30/04		
Violation ID:	439905		
Enforcement Date:	10/18/04	Enf. Action:	State Violation/Reminder Notice
System Name:	FAT NAPPYS		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	7/1/2004 0:00:00 - 9/30/2004 0:00:00		
Violation ID:	439905		
Enforcement Date:	12/7/2004 0:00:00	Enf. Action:	State Public Notif Received
System Name:	FAT NAPPYS		
Violation Type:	PN Violation for NPDWR Violation		
Contaminant:	7500		
Compliance Period:	11/21/2004 0:00:00 - 12/6/2004 0:00:00		
Violation ID:	440005		
Enforcement Date:	12/6/2004 0:00:00	Enf. Action:	State Compliance Achieved

GEOCHECK VERSION 2.1
PUBLIC WATER SUPPLY SYSTEM INFORMATION

PWS SUMMARY:

ENFORCEMENT INFORMATION:

System Name:	FAT NAPPYS		
Violation Type:	PN Violation for NPDWR Violation		
Contaminant:	7500		
Compliance Period:	11/21/04 - 12/06/04		
Violation ID:	440005		
Enforcement Date:	12/06/04	Enf. Action:	State Compliance Achieved
System Name:	BJS HIDEAWAY		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	1994-07-01 - 1994-09-30		
Violation ID:	9404246		
Enforcement Date:	1994-10-26	Enf. Action:	State Violation/Reminder Notice
System Name:	BJS HIDEAWAY		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	1994-07-01 - 1994-09-30		
Violation ID:	9404246		
Enforcement Date:	1994-10-26	Enf. Action:	State Public Notif Requested
System Name:	BJS HIDEAWAY		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	1994-07-01 - 1994-09-30		
Violation ID:	9404246		
Enforcement Date:	1994-11-30	Enf. Action:	State Violation/Reminder Notice
System Name:	BJS HIDEAWAY		
Violation Type:	Notification, Public		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	1994-07-01 - 1994-09-30		
Violation ID:	9501056		
Enforcement Date:	1994-11-30	Enf. Action:	State Violation/Reminder Notice
System Name:	BJ'S HIDEAWAY		
Violation Type:	Monitoring, Routine Major (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	1998-01-01 - 1998-03-31		
Violation ID:	98003029		
Enforcement Date:	Not Reported	Enf. Action:	Not Reported
System Name:	BJ'S HIDEAWAY		
Violation Type:	Notification, Public		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	1998-01-01 - 1998-03-31		
Violation ID:	98004009		
Enforcement Date:	Not Reported	Enf. Action:	Not Reported
System Name:	BJ'S HIDEAWAY		
Violation Type:	MCL, Monthly (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	1998-09-01 - 1998-09-30		
Violation ID:	98004396		
Enforcement Date:	1998-10-08	Enf. Action:	State Violation/Reminder Notice

PWS SUMMARY:

ENFORCEMENT INFORMATION:

System Name:	BJ'S HIDEAWAY		
Violation Type:	MCL, Monthly (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	1998-09-01 - 1998-09-30		
Violation ID:	98004396		
Enforcement Date:	Not Reported	Enf. Action:	Not Reported
System Name:	BJ'S HIDEAWAY		
Violation Type:	Notification, Public		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	1998-09-01 - 1998-09-30		
Violation ID:	99001171		
Enforcement Date:	1998-10-08	Enf. Action:	State Violation/Reminder Notice
System Name:	BJ'S HIDEAWAY		
Violation Type:	MCL, Monthly (TCR)		
Contaminant:	COLIFORM (TCR)		
Compliance Period:	1998-09-01 - 1998-09-30		
Violation ID:	99001171		
Enforcement Date:	1998-10-08	Enf. Action:	State Public Notif Requested

CONTACT INFORMATION:

Name:	FAT NAPPYS		
Population:	25		
Contact:	LAMP, NATHAN	Phone:	402-466-6644
Address:	C/O FAT NAPPYS		
Address 2:	5100 NORTH 48TH STREET		
	LINCOLN, NE 68521		

Map ID: 49

Epa region:	07	State:	NE
Pwsid:	NE3150090		
Pwsname:	GREENWOOD EB REST AREA		
City served:	Not Reported	State served:	NE
Zip served:	Not Reported	Fips county:	31109
Status:	Closed	Pop srvd:	25
Pwssvcconn:	0	Source:	Groundwater
Pws type:	TNCWS	Owner:	State_Govt
Contact:	GREENWOOD EB REST AREA		
Contactor gname:	Not Reported		
Contact phone:	402-474-4987	Contact address1:	Not Reported
Contact address2:	BOX 94759 STATEHOUSE STN	Contact city:	LINCOLN
Contact state:	NE	Contact zip:	68509
Activity code:	I		

GEOCHECK VERSION 2.1
STATE DATABASE WELL INFORMATION

Location Information:			
Name:	GREENWOOD EB REST AREA		
Pwstypcd:	TNCWS	Primsrccd:	GW
Popserved:	25		
Add1:	Not Reported		
Add2:	BOX 94759 STATEHOUSE STN		
City:	LINCOLN	State:	NE
Zip:	68509	Phone:	402-474-4987
Cityserv:	Not Reported	Cntyserv:	Not Reported
Stateserv:	NE	Zipserv:	Not Reported

PWS ID:	NE3150090		
Date Initiated:	7706	Date Deactivated:	Not Reported
PWS Name:	GREENWOOD EB REST AREA BOX 94759 STATEHOUSE STN LINCOLN, NE 68509		
Addressee / Facility:	Not Reported		
Facility Latitude:	40 49 24	Facility Longitude:	096 41 06
City Served:	Not Reported		
Treatment Class:	Untreated	Population:	00000025

Violations information not reported.

NEBRASKA GOVERNMENT WELL RECORDS SEARCHED

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

State Database: NE Radon
Source: Department of Environmental Quality
Telephone: 402-471-0594
Summary of Radon Data

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

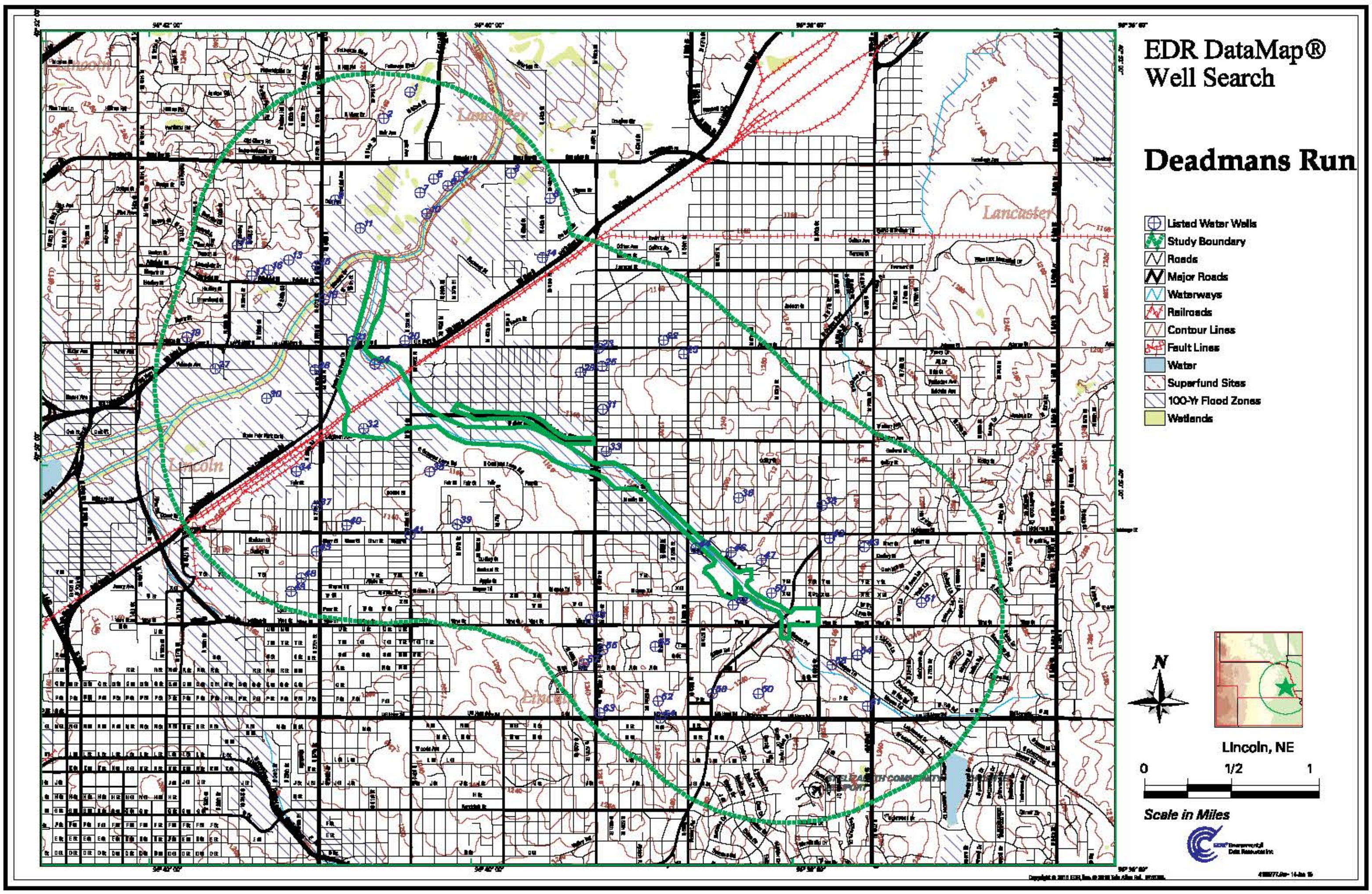
USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

State Wetlands Data: National Wetlands Inventory
Source: Department of Natural Resources
Telephone: 402-471-2363

Registered Groundwater Wells Database
Source: Department of Natural Resources
Telephone: 402-471-2363
Water use types include Aquaculture, Commercial/Industrial, Domestic, Ground Heat Exchanger, Heat Pump (Ground Water Source), Irrigation, Injection, Observation (Ground Water Levels); Other - Lake Supply, Fountain, Geothermal, Wildlife, Wetlands, Recreation, Plant and Lagoon, Sprinkler, Test, Vapor Monitoring; Public Water Supply with Spacing Protection, Monitoring (Ground Water Quality), Recovery, Livestock, Geothermal, Public Water Supply without Spacing Protection, Dewatering (Over 90 Days).

Oil and Gas Well Data
Source: Oil and Gas Conservation Commission
Telephone: 308-254-6919

STREET AND ADDRESS INFORMATION


EDR DataMap®
Well Search
Deadmans Run
Listed Water Wells
Study Boundary
Roads
Major Roads
Waterways
Railroads
Contour Lines
Fault Lines
Water
Superfund Sites
100-Yr Flood Zones
Wetlands
Lancaster
Lincoln
N
Lincoln, NE
0
1/2
1
Scale in Miles

Deadman S Run

Deadman S Run

Lincoln, NE 68583

Inquiry Number: 4181817.1

January 14, 2015

Certified Sanborn® Map Report

EDR®

6 Armstrong Road, 4th Floor
Shelton, Connecticut 06484
Toll Free: 800.352.0050
www.edrnet.com

Certified Sanborn® Map Report

1/14/15

Site Name:	Client Name:
Deadman S Run	CDM
Deadman S Run	9200 Ward Parkway
Lincoln, NE 68583	Kansas City, MO 64114
EDR Inquiry # 4181817.1	Contact: Laura Splichal

The Sanborn Library has been searched by EDR and maps covering the target property location as provided by CDM were identified for the years listed below. The Sanborn Library is the largest, most complete collection of fire insurance maps. The collection includes maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow, and others. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by the Sanborn Library LLC, the copyright holder for the collection. Results can be authenticated by visiting www.edrnet.com/sanborn.

The Sanborn Library is continually enhanced with newly identified map archives. This report accesses all maps in the collection as of the day this report was generated.

Certified Sanborn Results:

Site Name:	Deadman S Run
Address:	Deadman S Run
City, State, Zip:	Lincoln, NE 68583
Cross Street:	
P.O. #	NA
Project:	Deadman s Run
Certification #	FD94-4EEB-A6E6

Maps Provided:

1964

Sanborn® Library search results
Certification # FD94-4EEB-A6E6

The Sanborn Library includes more than 1.2 million fire insurance maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow and others which track historical property usage in approximately 12,000 American cities and towns. Collections searched:

- ✔ Library of Congress
- ✔ University Publications of America
- ✔ EDR Private Collection

The Sanborn Library LLC Since 1866™

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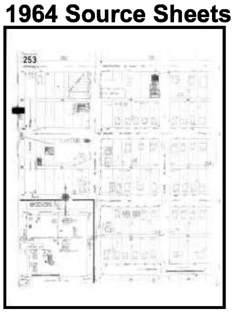
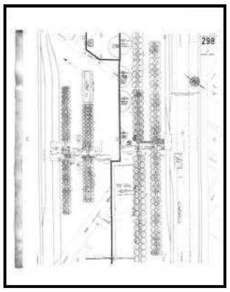
Sanborn Sheet Thumbnails

This Certified Sanborn Map Report is based upon the following Sanborn Fire Insurance map sheets.

1964 Source Sheets

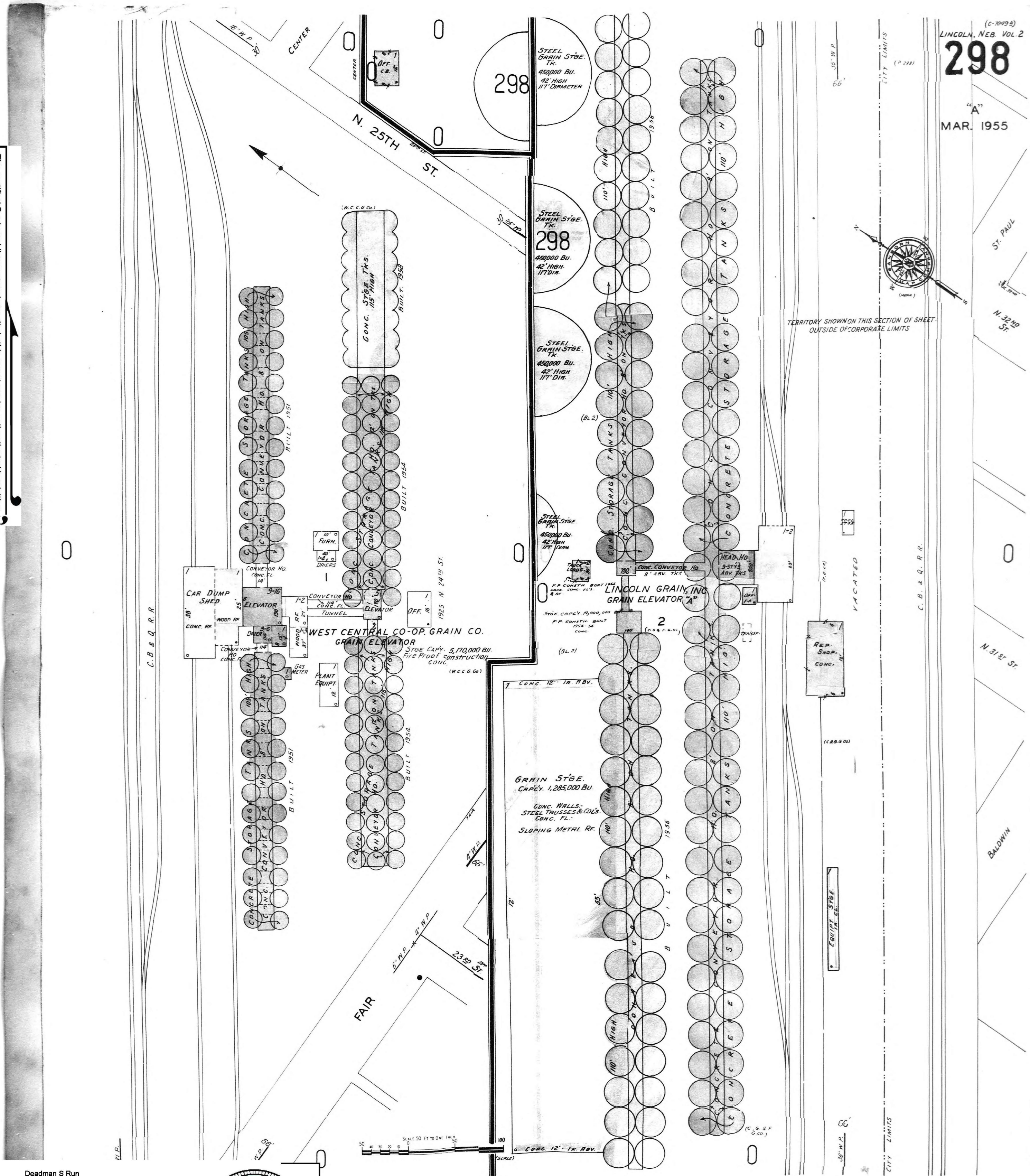


Volume 2, Sheet 253



Volume 2, Sheet 298

1964 Certified Sanborn Map



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Certification # FD94-4EEB-A6E6

Site Name: Deadman S Run
Address: Deadman S Run
City, ST, ZIP: Lincoln NE 68583
Client: CDM
EDR Inquiry: 4181817.1
Order Date: 1/14/2015 7:10:00 PM
Certification # FD94-4EEB-A6E6
Copyright: 1964

Appendix C

Site Reconnaissance Material

List of Sites for Reconnaissance Task

			LINCOLN, NE 68504	FEDERAL										STATE & LOCAL													EDR		
EDR (Map_ID)	GIS Map ID	Site	Address	CORRACTS	RCRA-TSDF	RCRA-LQG	RCRA-SQG	RCRA-CESQG	RCRA NonGen/NLR	US ENG CONTROLS	FINDS	US AIRS	2020 COR ACTION	NE SHWS	NE LUST	NE UST	NE HIST UST	NE LAST	WI MANIFEST	NE SPILLS	NE INST CONTROL	NE DRYCLEANERS	NE BROWNFIELDS	NE NPDES	NE AIRS	NE TIER 2	EDR US Hist Auto Stat	EDR US Hist Cleaners	NE RGA LUST
8	14	CORNHUSKER INTERNATIONAL TRUCK	3131 CORNHUSKER HWY					1							1	1										1			
8	15	LINCOLN GRAIN INC	31ST & CORNHUSKER HWY													1													
8	46	KWIK SHOP	3301 N 33RD ST*												1														
8	51	MAPES INDUSTRIES INC	2929 CORNHUSKER HWY			1					1	1												1	1	1			
8	52	WENTZ PLUMBING & HEATING CO	2949 CORNHUSKER HWY								1				1	1													1
9	24	HOME DEPOT & PENSKE AUTO CENTER	3300 N 27TH ST				1		1									1		1							1		
20	49	STAR CITY AUTO SALVAGE	2705 N 33RD ST								1													1					
25	50	CITY OF LINCOLN MAINT DIV	3200 BALDWIN								1				1	1	1												
26	12	RAUSCH ENTERPRISES/UNI 66 SERVICE	2304 N 48TH (48TH												1	1											1		
26	25	WILLIAMS CLEANERS & LAUNDERERS	2541 N 48TH ST				1				1	1			1	1						1			1			1	
28	9	OLSTONS IMPORT AUTO	2435 N 33 ST					1			1																1		
28	28	CRASHBUSTER BODY & PAINT INC	3221 HUNTINGTON					1			1								1								1		
28	35	BLUM'S AUTO REPAIR	2415 N 33RD ST					1	1										1								1		
28	54	JOE'S BODY SHOP	2505 NORTH 33RD					1			1																1		
31	34	FAST BREAK - UNIVERSITY PLACE	2200 N 48TH ST												1	1	1												
32	41	LINCOLN PUBLIC WORKS	5145 COLBY ST.												1														
33	19	ANIMAL RESEARCH FARM	3940 FAIR ST (ANIM												1														
44	13	KWIK SHOP #650	5600 HOLDREGE												1	1	1			1									
44	20		1440 N 56TH ST																									1	
44		ANDERSEN SERVICE/AUTO CONNECTION	1445 N 56TH STREET												1	1													1
53	26	LINCOLN LUTHERAN SCHOOL ASSOC	1100 N 56TH ST												1	1													
54	31	SKOROHOD CONOCO	6236 VINE ST												1	1	1							1					
8	42	HINKLE MACHINE SHOP INC	2939 CORNHUSKER HWY								1													1					
8	47		2920 CORNHUSKER HWY																								1		
8	48	YAMAHA MOTORSPORTS SALES	2940 CORNHUSKER HWY						1		1																1		
8		PITTMANS 66 SERVICE	3248 CORNHUSKER HWY												1	1													
26	21		4740 HUNTINGTON AVE																									1	
28	40	FLEMING FIELDS	3300 HUNTINGTON AVE								1													1					
31	36	J & I CARWASH	2110 NORTH 48TH ST																	1									
45		UNIVERSITY OF NEBRASKA	43RD AND HOLDREGE												1														

* This address was incorrect in the EDR database. The correct address is 3301 N. Holdrege Street

Photo #1 Blum's Auto, view from west to east. 2/11/2015

Photo #2 Blum's Auto, view from northwest to southeast. 2/11/2015

Photo #3 Blum's Auto, view from northeast to southwest. 2/11/2015

Photo #4 Blum's Auto, view from southeast to northwest. 2/11/2015

Photo #1 East side of Cornhusker Int. Truck. View from north to south. 2/11/2015

Photo #2 East side of Cornhusker Int. Truck. View from northeast to southwest. 2/11/2015

Photo #3 North side of Cornhusker Int. Truck. View from east to west. 2/11/2015

Photo #4 West side of Cornhusker Int. Truck. View from north to south. 2/11/2015

Photo #5 South side of Cornhusker Int. Truck property with south side of neighboring property. Tank is on neighboring property. View from southwest to northeast. 2/11/2015

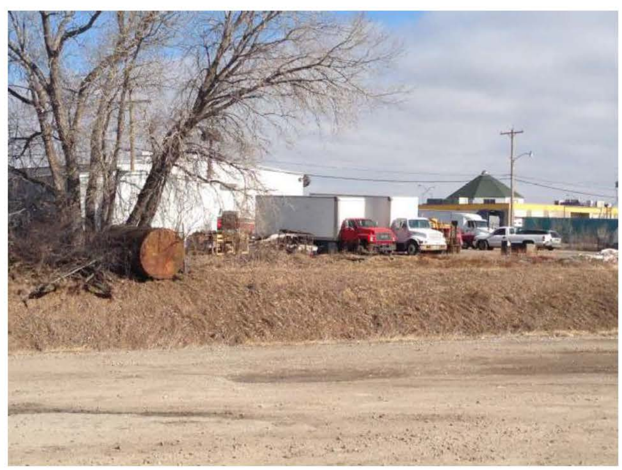

Photo #6 South side of Cornhusker Int. Truck with tank on neighboring property. View from southwest to northeast. 2/11/2015

Photo #1 Crashbuster Body, view from south to north. 2/11/2015

Photo #2 Crashbuster Body storage yard with AST. View from southeast to northwest. 2/11/2015

Photo #3 Crashbuster Body east entrance. View from southeast to northwest. 2/11/2015

Photo #4 Crashbuster Body storage area and south wall. View from east to west. 2/11/2015

Photo #5 Crashbuster Body, view from northeast to southwest. 2/11/2015

Photo #6 Crashbuster Body storage yard. View from northwest to southeast. 2/11/2015

Photo #1 Former Fast Break facility. View from north to south. 2/13/2015

Photo #2 Former Fast Break facility. View from northwest to southeast. 2/13/2015

Photo #1 Parking lot and area east and southeast of Fleming Fields. 2/11/2015

Photo #2 Fleming Fields, view from east to west. 2/11/2015

Photo #3 Fleming Fields, view from east to west. 2/11/2015

Photo #1 Hinkle Shop, view from southeast to northwest. 2/11/2015

Photo #2 Deadmans Run east of Hinkle Shop with Star City Auto Sales in background. View from west to east. 2/11/2015

Photo #3 Hinkle Shop storage area. View from southwest to northeast. 2/11/2015

Photo #4 Hinkle shop and storage area. View from southeast to northwest. 2/11/2015

Photo #5 Hinkle Shop and adjacent access road. View from northeast to southwest. 2/11/2015

Photo #6 Hinkle Shop with Deadmans Run past road barrier. View from northwest to southeast.

Photo #1 South Home Depot parking lot and garden area. View from southeast to northwest. 2/11/2015

Photo #2 Southeast corner and east side of Home Depot adjacent to Deadmans Run. View from south to north. 2/11/2015

Photo #3 Deadmans Run adjacent to Home Depot. View from southwest to northeast. 2/11/2015

Photo #4 Deadmans Run and Bridge southeast of Home Depot. View from northwest to southeast. 2/11/2015

Photo #5 Deadmans Run southeast of Home Depot. View from southwest to northeast. 2/11/2015

Photo #6 East side of Home Depot adjacent to Deadmans Run. View from south to north. 2/11/2015

Photo #7 Broken electrical/communications box near southeast corner of Home Depot.

Photo #8 East side of Home Depot adjacent to Deadmans Run. View from southeast to northwest. 2/11/2015

Photo #9 Deadmans Run adjacent to Home Depot. Temporary groundwater monitoring wells were located along here. View is facing northeast. 2/11/2015

Photo #10 East side of Home Depot adjacent to Deadmans Run. View from southeast to northwest. 2/11/2015

Photo #11 Deadmans Run adjacent to Home Depot. View from southwest to northeast. 2/11/2015

Photo #12 Deadmans Run adjacent to Home Depot. View from northwest to southeast. 2/11/2015

Photo #13 East wall of Home Depot adjacent to Deadmans Run. View from east to west. 2/11/2015

Photo #14 Deadmans Run adjacent to Home Depot. View from west to east. 2/11/2015

Photo #15 Deadmans Run adjacent to Home Depot. View from north to south. 2/11/2015

Photo #16 Deadmans Run adjacent to Home Depot. View from north to south. 2/11/2015

Photo #17 Deadmans Run adjacent to Home Depot. View from south to north. 2/11/2015

Photo #1 House of Mufflers with Deadmans Run in foreground. View from west to east. 2/11/2015

Photo #2 Area behind House of Mufflers with Deadmans Run in foreground. View from northwest to southeast. 2/11/2015

Photo #3 House of Mufflers with Deadmans Run in foreground. View from west to east. 2/11/2015

Photo #4 House of Mufflers, view from southeast to northwest. 2/11/2015

Photo #5 Lot adjacent to House of Mufflers on east side. View from south to north. 2/11/2015

Photo #6 Area behind House of Mufflers, view from west to east. 2/11/2015

Photo #7 Storage area behing House of Mufflers and adjacent to Deadmans Run. View from southwest to northeast. 2/11/2015

Photo #8 Deadmans Run adjacent to House of Mufflers. View from south to north. 2/11/2015

Photo #9 Debris pile behind House of Mufflers storage area and adjacent to Deadmans Run. View from west to east. 2/11/2015

Photo #10 Storage area behind House of Mufflers. View from northwest to southeast. 2/11/2015

Photo #11 Deadmans Run adjacent to House of Mufflers. View from north to south. 2/11/2015

Photo #1 J&I Car Wash, view from east to west. 2/10/2015

Photo #2 Deadmans Run south of J&I Car Wash. View from northeast to southwest. 2/10/2015

Photo #3 J&I Car Wash, view from northeast to southwest. 2/10/2015

Photo #4 J&I Car Wash, view from northwest to southeast. 2/10/2015

Photo #5 Deadmans Run south of J&I Car Wash. View from west to east. 2/10/2015

Photo #6 Deadmans Run south of J&I Car Wash. View from east to west. 2/10/2015

Photo #1 Storage area on west side of Joe's Body Shop. View from southwest to northeast. 2/11/2015

Photo #2 Area on west side of Joe's Body Shop. View from south to north. 2/11/2015

Photo #3 Joe's Body Shop, view from southeast to northwest. 2/11/2015

Photo #4 East side of Joe's Body Shop. View from southeast to northwest. 2/11/2015

Photo #5 North wall of Joe's Body Shop and storage area. View from northeast to southwest. 2/11/2015

Photo #1 Kwik Shop #650 with Deadmans Run. View from south to north. 2/10/2015

Photo #2 Kwik Shop #650 fuel canopy. View from northeast to southwest. 2/10/2015

Photo #3 Kwik Shop, view from northwest to southeast. 2/10/2015

Photo #4 North side of Kwik Shop #650. View from northwest to southeast. 2/10/2015

Photo #5 Southwest corner of Kwik Shop #650. Vew from southeast to northwest. 2/10/2015

Photo #1 Kwik Shop #650, view from northwest to southeast. 2/13/2015

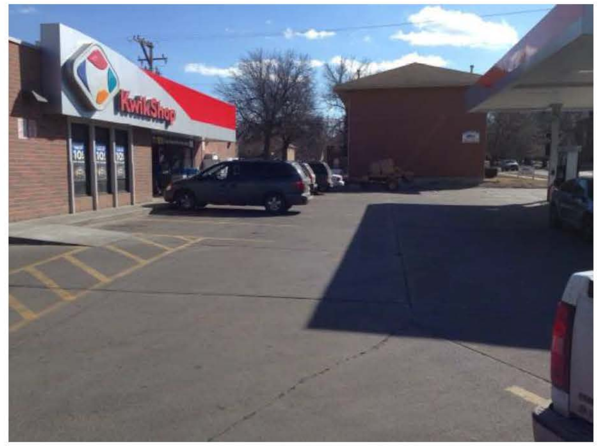

Photo #2 Kwik Shop #650, view from north to south. 2/13/2015

Photo #1 Laundry Land adjacent to Deadmans Run. View from northwest to southeast. 2/10/2015

Photo #2 Laundry Land adjacent to Deadmans Run. View from northwest to southeast. 2/10/2015

Photo #3 South side of Laundry Land. View from southeast to northwest. 2/10/2015

Photo #1 Eastern most grain bins. View from northwest to southeast. 2/11/2015

Photo #2 Central grain bins. View from northeast to southwest. 2/11/2015

Photo #3 Grain bins, view from northeast to southwest. 2/11/2015

Photo #4 Lincoln Grain offices. View from east to west. 2/11/2015

Photo #5 Storage area behind Lincoln Grain offices. View from east to west. 2/11/2015

Photo #1 Northeast corner of school building. View from east to west. 2/10/2015

Photo #2 Bus parking area. View from south to north. 2/10/2015

Photo #3 Field between school building and Deadmans Run. View from southwest to northeast. 2/10/2015

Photo #4 Field between school building and Deadmans Run. View from west to east. 2/10/2015

Photo #1 Facility east entrance with fuel pumps. View from northeast to southwest. 2/10/2015

Photo #2 Facility building and parking area. View from northeast to southwest. 2/10/2015

Photo #3 Facility storage area. View from northwest to southeast. 2/10/2015

Photo #4 Deadmans Run adjacent to facility. View from northeast to southwest. 2/10/2015

Photo #5 Deadmans Run adjacent to facility. View from northeast to southwest. 2/10/2015

Photo #1 Mapes facility, view from east to west. 2/11/2015

Photo #2 Mapes storage area. View from northeast to southwest. 2/11/2015

Photo #3 Mapes delivery and storage area. View from east to west. 2/11/2015

Photo #1 Back of Olstons building. View from southwest to northeast. 2/11/2015

Photo #2 North side of Olstons building. View from northwest to southeast. 2/11/2015

Photo #3 Northeast corner of Olstons building. View from northeast to southwest. 2/11/2015

Photo #4 East side of Olstons building with oil stain. View from southeast to northwest. 2/11/2015

Photo #1 City of Lincoln Maintenance Division salt sheds on south side of property. View from south to north. 2/11/2015

Photo #2 City of Lincoln Maintenance Division, view from southeast to northwest. 2/11/2015

Photo #3 City of Lincoln Maintenance Division salt sheds with brine tanks. View from east to west. 2/11/2015

Photo #4 City of Lincoln Maintenance Division, view from southeast to northwest. 2/11/2015

Photo #5 City of Lincoln Maintenance Division fuel pumps. View from southwest to northeast. 2/11/2015

Photo #6 City of Lincoln Maintenance Division fuel pumps adjacent to Deadmans Run. View from southeast to northwest. 2/11/2015

Photo #1 View of former Andersen Service facility. View from northeast to southwest. 2/13/15

Photo #2 View of former Andersen Service facility. View from northeast to southwest. 2/13/15

Photo #3 View of former Andersen Service facility. View from east to west. 2/13/15

Photo #1 Former Pittmans location. View from southwest to northeast. 2/11/2015

Photo #2 Former Pittmans location. View from southeast to northwest. 2/11/2015

Photo #3 North parking are of former Pittman property. View from southeast to northwest. 2/11/2015

Photo #4 North parking are of former Pittman property. View from southeast to northwest. 2/11/2015

Photo #5 Pipes on west side of former Pittman property. 2/11/2015

Photo #1 North side of Rausch facility. View from west to east. 2/10/2015

Photo #2 Rausch facility, view from west to east. 2/10/2015

Photo #3 South side of Rausch facility. View from northwest to southeast. 2/10/2015

Photo #4 Alley along north side of Rausch facility. View from west to east. 2/10/2015

Photo #5 Alley along north side of Rausch facility. View from east to west. 2/10/2015

Photo #6 Parking area and construction materials on east side of Rausch facility. View from north to south. 2/10/2015

Photo #1 East side of Skorohod property. View from south to north. 2/10/2015

Photo #2 Skorohod property, view from east to west. 2/10/2015

Photo #3 Skorohod property from parking lot of apartments to north. View from north to south. 2/10/2015

Photo #1 Star City Auto Salvage storage yard from west side of Deadmans Run. Veiw from southwest to northeast. 2/11/2015

Photo #2 Star City Auto Salvage storage yard from west side of Deadmans Run. Veiw from west to east. 2/11/2015

Photo #3 Star City Auto Salvage storage yard from west side of Deadmans Run. Veiw from northwest to southeast. 2/11/2015

Photo #4 East property line of Star City Auto Salvace. View from northeast to southwest. 2/11/2015

Photo #5 Entrance to Star City Auto Salvage. View from east to west. 2/11/2015

Photo #6 Entrance to Star City Auto Salvage. View from east to west. 2/11/2015

Photo #7 Star City Auto Salvage, view from east to west. 2/11/2015

Photo #8 Star City Auto Salvage, view from east to west. 2/11/2015

Photo #1 South portion of UNL ARF. View from west to east. 2/13/2015

Photo #2 UNL ARF central building area. View from southwest to northeast. 2/13/2015

Photo #3 UNL ARF west portion. View from south to north. 2/13/2015

Photo #4 View to open area west of UNL ARF. View from east to west. 2/13/2015

Photo #5 View to open area west of UNL ARF. View from east to west. 2/13/2015

Photo #6 UNL ARF, view from west to east. 2/13/2015

Photo #7 View to area behind UNL ARF from open area to west. View from southwest to northeast. 2/13/2015

Photo #8 View towards Deadmans Run from south portion of open area to west of UNL ARF. View from south to north. 2/13/2015

Photo #1 UNL Apartments, view from northeast to southwest. 2/13/2015

Photo #2 UNL Apartments, view from northeast to southwest. 2/13/2015

Photo #3 Open space on north side of UNL Apartments. View from southeast to northwest. 2/13/2015

Photo #4 Open space on north side of UNL Apartments. View from south to north. 2/13/2015

Photo #5 Open space on north side of UNL Apartments. View from southwest to northeast. 2/13/2015

Photo #6 UNL Apartments east building. 2/13/2015

Photo #7 UNL Apartments south building. 2/13/2015

Photo #8 UNL Apartments west building. 2/13/2015

Photo #9 UNL Apartments west building and parking area. View from south to north. 2/13/2015

Photo #10 UNL Apartmens north building. View from northeast to southwest. 2/13/2015

Photo #11 UNL Apartments north building and parking area. View from southeast to northwest. 2/13/2015

Photo #12 Debris pile between UNL Apartments east and south building. Appears to be mostly tree branches. 2/13/2015

Photo #1 Former Wentz facility. View from northwest to southeast. 2/11/2015

Photo #2 Former Wentz facility storage and parking area. View from northwest to southeast. 2/11/2015

Photo #3 Former Wentz facility storage and parking area. View from northwest to southeast. 2/11/2015

Photo #4 Former Wentz facility storage and parking area. View from northwest to southeast. 2/11/2015

Photo #5 Alley and main entrance way to former Wentz facility. View from southwest to northeast. 2/11/2015

Photo #1 Northeast entrance to Williams Cleaners facility. View from notheast to southwest. 2/11/2015

Photo #2 Williams Cleaners facility, view from northeast to southwest. 2/11/2015

Photo #3 Loading area on the north side of the Williams Cleaners buildings. View from northwest to southeast. 2/11/2015

Photo #4 Loading area on the north side of the Williams Cleaners buildings. View from northwest to southeast. 2/11/2015

Photo #5 Southeast corner of Williams Cleaners facility. View from southeast to northwest. 2/11/2015

Photo #6 Southwest corner of Williams Cleaners facility. View from southwest to northeast. 2/11/2015

Photo #7 Parking area and west side of Williams Cleaners facility. View from southwest to northeast. 2/11/2015

Photo #8 Dumpster area and west side of Williams Cleaners facility. View from southwest to northeast. 2/11/2015

Photo #9 Dumpster area and west side of Williams Cleaners facility. View from northwest to southeast. 2/11/2015

Photo #1 Former Yamaha Motorsports Facility. View from southwest to northeast. 2/11/2015

Photo #2 Former Yamaha Motorsports Facility. View from southwest to northeast. 2/11/2015

Photo #3 Former Yamaha Motorsports Facility. View from south to north. 2/11/2015

PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

1. Address of Property: 2110 N 48th St, Lincoln, NE

2. Name of Facility: J & I Carwash · GIS Map ID 36

3. Type of operation (e.g.: industrial, manufacturing, airport, railroad, retail, other commercial, school, residential, agricultural): Car Wash

4. Manufacturing facility: ☐ YES ☒ NO

5. If yes, SIC number (Standard Industrial Classification): ______

6. Currently operating: ☒ YES ☐ NO

7. Describe use and past usage of surrounding properties; any obvious problems? no obvious problems

   North: Restaurant / commercial

   South: Commercial followed by Deadmans Run

   East: Park

   West: Open Field

PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

8. How many buildings are on this site? 1

9. Describe the heating and cooling systems if visible: –

10. Main roadway access to facility: N 48th St

11. Any roads without apparent outlets on the property? —

Description of stream/river/pond: Deadmans Run Approx 125' S
Description of Terrain: Paved - Flat
Description of drainage/any indication of stress: Pavement is very Broken up

12. Source of potable water: City of Lincoln

13. Power company (name, if applicable to the property):
Gas:
Electric: LES
Fuel/Oil:
Other:

14. Are any of the following observed on-site:

▪ Landfills:	☐ YES	☒ NO
▪ Solid Waste:	☒ YES	☐ NO
▪ 55 Gallon Drums:	☒ YES	☐ NO Saw inside facility when door was open, chemicals stored in 55 Gallon drums
▪ Pits, Ponds, or Lagoons:	☐ YES	☒ NO
▪ Drains or Sumps	☒ YES	☐ NO
▪ Surface Impoundments:	☐ YES	☒ NO
▪ Waste Water:	☒ YES	☐ NO
▪ USTs/ASTs	☐ YES	☒ NO
▪ Injection/Production Monitoring Wells:	☐ YES	☒ NO
▪ Wastewater Treatment Units:	☐ YES	☒ NO
▪ Septic Tanks:	☐ YES	☒ NO
▪ PCB Containing Equipment:	☐ YES	☒ NO
▪ Asbestos:	☐ YES	☒ NO
▪ Incinerators:	☐ YES	☒ NO
▪ Equipment Containing Radioactive Material:	☐ YES	☒ NO
▪ Medical Waste:	☐ YES	☒ NO
▪ Explosive Material:	☐ YES	☒ NO
▪ Toxic Materials:	☐ YES	☒ NO:
▪ Stained Soil/Pavement	☒ YES	☐ NO:
▪ Piping protruding from the ground	☐ YES	☒ NO:

15. Were any recognized environmental conditions identified during this site visit? ☐ YES ☒ NO

16. Were photographs taken? ☒ YES ☐ NO

Nicolas Anderson - OA

Name of Person(s) Completing Observations and Affiliation

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PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

1. Address of Property: 5145 Colby St., Lincoln, NE

2. Name of Facility: Lincoln Public Works - GIS Map ID 41

3. Type of operation (e.g.: industrial, manufacturing, airport, railroad, retail, other commercial, school, residential, agricultural): Maintenance

4. Manufacturing facility: ☐ YES ☒ NO

5. If yes, SIC number (Standard Industrial Classification): ______

6. Currently operating: ☒ YES ☐ NO

7. Describe use and past usage of surrounding properties; any obvious problems? no obvious problems

   North: Community center

   South: Dead mans Run

   East: Residential

   West: Deadmans Run & Park

8. How many buildings are on this site? Two

9. Describe the heating and cooling systems if visible: —

10. Main roadway access to facility: Colby St

11. Any roads without apparent outlets on the property? —

Description of stream/river/pond: Deadmans Run Adjacent to SW
Description of Terrain: Paved/Gravel - Flat
Description of drainage/any indication of stress: —

12. Source of potable water: City of Lincoln

13. Power company (name, if applicable to the property):
Gas:
Electric: LES
Fuel/Oil:
Other:

14. Are any of the following observed on-site:

- Landfills: ☐ YES ☒ NO
- Solid Waste: ☒ YES ☐ NO
- 55 Gallon Drums: ☒ YES ☐ NO - Trash Drums
- Pits, Ponds, or Lagoons: ☐ YES ☒ NO
- Drains or Sumps ☐ YES ☒ NO
- Surface Impoundments: ☐ YES ☒ NO
- Waste Water: ☐ YES ☒ NO
- USTs/ASTs ☒ YES ☐ NO Saw Fuel pumps
- Injection/Production Monitoring Wells: ☐ YES ☒ NO
- Wastewater Treatment Units: ☐ YES ☒ NO
- Septic Tanks: ☐ YES ☒ NO
- PCB Containing Equipment: ☐ YES ☒ NO
- Asbestos: ☐ YES ☒ NO
- Incinerators: ☐ YES ☒ NO
- Equipment Containing Radioactive Material: ☐ YES ☒ NO
- Medical Waste: ☐ YES ☒ NO
- Explosive Material: ☐ YES ☒ NO
- Toxic Materials: ☐ YES ☒ NO:
- Stained Soil ☐ YES ☒ NO:
- Piping protruding from the ground ☐ YES ☒ NO:

15. Were any recognized environmental conditions identified during this site visit? ☐ YES ☒ NO

16. Were photographs taken? ☒ YES ☐ NO

Nicolas Anderson - OA

Name of Person(s) Completing Observations and Affiliation

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PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

1. Address of Property: 2304 N 48th

2. Name of Facility: Rausch Enterprises (now Car Wash)
GIS MAP ID 12

3. Type of operation (e.g.: industrial, manufacturing, airport, railroad, retail, other commercial, school, residential, agricultural): Commercial

4. Manufacturing facility: ☐ YES ☒ NO

5. If yes, SIC number (Standard Industrial Classification): ____

6. Currently operating: ☒ YES ☐ NO

7. Describe use and past usage of surrounding properties; any obvious problems? No obvious problems

North: Commercial

South: Commercial

East: Residential

West: Commercial

PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

8. How many buildings are on this site? 1

9. Describe the heating and cooling systems if visible: —

10. Main roadway access to facility: Lexington Ave

11. Any roads without apparent outlets on the property? —

    Description of stream/river/pond: Deadmans Run Approx 830' S
    Description of Terrain: Paved - Sloped
    Description of drainage/any indication of stress: —

12. Source of potable water: City of Lincoln

13. Power company (name, if applicable to the property):
    Gas:
    Electric: LES
    Fuel/Oil:
    Other:

14. Are any of the following observed on-site:

▪ Landfills:	☐ YES	☒ NO
▪ Solid Waste:	☒ YES	☐ NO
▪ 55 Gallon Drums:	☐ YES	☒ NO
▪ Pits, Ponds, or Lagoons:	☐ YES	☒ NO
▪ Drains or Sumps	☒ YES	☐ NO
▪ Surface Impoundments:	☐ YES	☒ NO
▪ Waste Water:	☒ YES	☐ NO
▪ USTs/ASTs	☐ YES	☒ NO
▪ Injection/Production Monitoring Wells:	☐ YES	☒ NO
▪ Wastewater Treatment Units:	☐ YES	☒ NO
▪ Septic Tanks:	☐ YES	☒ NO
▪ PCB Containing Equipment:	☐ YES	☒ NO
▪ Asbestos:	☐ YES	☒ NO
▪ Incinerators:	☐ YES	☒ NO
▪ Equipment Containing Radioactive Material:	☐ YES	☒ NO
▪ Medical Waste:	☐ YES	☒ NO
▪ Explosive Material:	☐ YES	☒ NO
▪ Toxic Materials:	☐ YES	☒ NO:
▪ Stained Soil	☐ YES	☒ NO:
▪ Piping protruding from the ground	☐ YES	☒ NO:

15. Were any recognized environmental conditions identified during this site visit? ☐ YES ☒ NO

16. Were photographs taken? ☒ YES ☐ NO

Nicolas Anderson - OA

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PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

1. Address of Property: 1100 N 56th St

2. Name of Facility: Lincoln LutheRTSN school Assoc - 26
GIS Map ID 26

3. Type of operation (e.g.: industrial, manufacturing, airport, railroad, retail, other commercial, school, residential, agricultural): School

4. Manufacturing facility: ☐ YES ☒ NO

5. If yes, SIC number (Standard Industrial Classification): ________

6. Currently operating: ☒ YES ☐ NO

7. Describe use and past usage of surrounding properties; any obvious problems? No obvious Problems

   North: School & Residential

   South: Residential

   East: Field & Residential

   West: Residential

PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

8. How many buildings are on this site? Five

9. Describe the heating and cooling systems if visible: —

10. Main roadway access to facility: N 56th St.

11. Any roads without apparent outlets on the property? —

Description of stream/river/pond: Deadmans Run Approx 600' NE

Description of Terrain: Paved & Fields - Flat

Description of drainage/any indication of stress: Soil & Veg Stress by Bus parking, See pics

12. Source of potable water: City of Lincoln

13. Power company (name, if applicable to the property):

Gas:

Electric: LES

Fuel/Oil:

Other:

14. Are any of the following observed on-site:

▪ Landfills:	☐ YES	☒ NO
▪ Solid Waste:	☒ YES	☐ NO
▪ 55 Gallon Drums:	☐ YES	☒ NO
▪ Pits, Ponds, or Lagoons:	☐ YES	☒ NO
▪ Drains or Sumps	☐ YES	☒ NO
▪ Surface Impoundments:	☐ YES	☒ NO
▪ Waste Water:	☐ YES	☒ NO
▪ USTs/ASTs	☐ YES	☒ NO
▪ Injection/Production Monitoring Wells:	☐ YES	☒ NO
▪ Wastewater Treatment Units:	☐ YES	☒ NO
▪ Septic Tanks:	☐ YES	☒ NO
▪ PCB Containing Equipment:	☐ YES	☒ NO
▪ Asbestos:	☐ YES	☒ NO
▪ Incinerators:	☐ YES	☒ NO
▪ Equipment Containing Radioactive Material:	☐ YES	☒ NO
▪ Medical Waste:	☐ YES	☒ NO
▪ Explosive Material:	☐ YES	☒ NO
▪ Toxic Materials:	☐ YES	☒ NO:
▪ Stained Soil /pavement	☒ YES	☐ NO: See photo 2 In photo log
▪ Piping protruding from the ground	☐ YES	☒ NO:

15. Were any recognized environmental conditions identified during this site visit? ☐ YES ☒ NO

16. Were photographs taken? ☒ YES ☐ NO

Nicolas Andersen - OA

Name of Person(s) Completing Observations and Affiliation

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PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

1. Address of Property: 6236 Vine St.

2. Name of Facility: Skorohod Conoco GIS Map ID 31

3. Type of operation (e.g.: industrial, manufacturing, airport, railroad, retail, other commercial, school, residential, agricultural): Fuel Station & convenience shop

4. Manufacturing facility: ☐ YES ☒ NO

5. If yes, SIC number (Standard Industrial Classification): ______

6. Currently operating: ☒ YES ☐ NO

7. Describe use and past usage of surrounding properties; any obvious problems? no obvious problems

   North: Residential

   South: Commercial

   East: Roadway & Park

   West: Residential

8. How many buildings are on this site? One

9. Describe the heating and cooling systems if visible: —

10. Main roadway access to facility: Vine St

11. Any roads without apparent outlets on the property? —

Description of stream/river/pond: Deadmans Run Approx 460' NE

Description of Terrain: Paved or Crushed Rock, - Flat

Description of drainage/any indication of stress:

12. Source of potable water: City of Lincoln

13. Power company (name, if applicable to the property):

Gas:

Electric: LES

Fuel/Oil:

Other:

14. Are any of the following observed on-site:

	YES	NO	
▪ Landfills:	☐ YES	☒ NO	
▪ Solid Waste:	☒ YES	☐ NO	
▪ 55 Gallon Drums:	☐ YES	☒ NO	
▪ Pits, Ponds, or Lagoons:	☐ YES	☒ NO	
▪ Drains or Sumps	☐ YES	☒ NO	
▪ Surface Impoundments:	☐ YES	☒ NO	
▪ Waste Water:	☐ YES	☒ NO	
▪ USTs/ASTs	☐ YES	☒ NO	not seen & no pumps but is listed as having a Regulated Tank
▪ Injection/Production Monitoring Wells:	☐ YES	☒ NO	
▪ Wastewater Treatment Units:	☐ YES	☒ NO	
▪ Septic Tanks:	☐ YES	☒ NO	
▪ PCB Containing Equipment:	☐ YES	☒ NO	
▪ Asbestos:	☐ YES	☒ NO	
▪ Incinerators:	☐ YES	☒ NO	
▪ Equipment Containing Radioactive Material:	☐ YES	☒ NO	
▪ Medical Waste:	☐ YES	☒ NO	
▪ Explosive Material:	☐ YES	☒ NO	
▪ Toxic Materials:	☐ YES	☒ NO:	
▪ Stained Soil / Pavement	☒ YES	☐ NO:	- Small Stains Associated w/ Gas Station
▪ Piping protruding from the ground	☐ YES	☒ NO:	

15. Were any recognized environmental conditions identified during this site visit? ☐ YES ☒ NO

16. Were photographs taken? ☒ YES ☐ NO

Nicolas Anderson - OA

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PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

1. Address of Property: 3200 Baldwin

2. Name of Facility: City of Lincoln Maint Div
GIS Map ID 50

3. Type of operation (e.g.: industrial, manufacturing, airport, railroad, retail, other commercial, school, residential, agricultural): Maintenance for City Streets

4. Manufacturing facility: ☐ YES ☒ NO

5. If yes, SIC number (Standard Industrial Classification): ______

6. Currently operating: ☒ YES ☐ NO

7. Describe use and past usage of surrounding properties; any obvious problems? surrounded by old Auto shops + Scrap yards

   North: Commercial

   South: Commercial + Base Ball Fields

   East: Commercial

   West: Commercial + Baseball Fields

PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

8. How many buildings are on this site? 3

9. Describe the heating and cooling systems if visible: —

10. Main roadway access to facility: Baldwin Ave

11. Any roads without apparent outlets on the property? —

Description of stream/river/pond: Adjacent to Deadmans Run

Description of Terrain: Flat - Pavement Grass & Gravel

Description of drainage/any indication of stress: –

12. Source of potable water: City of Lincoln

13. Power company (name, if applicable to the property):

Gas: ______

Electric: LES

Fuel/Oil: ______

Other: ______

14. Are any of the following observed on-site:

▪ Landfills:	☐ YES	☒ NO	
▪ Solid Waste:	☒ YES	☐ NO	
▪ 55 Gallon Drums:	☐ YES	☒ NO	
▪ Pits, Ponds, or Lagoons:	☐ YES	☒ NO	
▪ Drains or Sumps	☐ YES	☒ NO	
▪ Surface Impoundments:	☐ YES	☒ NO	
▪ Waste Water:	☐ YES	☒ NO	
▪ USTs/ASTs	☒ YES	☐ NO	
▪ Injection/Production Monitoring Wells:	☒ YES	☐ NO	Monitor Wells
▪ Wastewater Treatment Units:	☐ YES	☒ NO	
▪ Septic Tanks:	☐ YES	☒ NO	
▪ PCB Containing Equipment:	☐ YES	☒ NO	
▪ Asbestos:	☐ YES	☒ NO	
▪ Incinerators:	☐ YES	☒ NO	
▪ Equipment Containing Radioactive Material:	☐ YES	☒ NO	
▪ Medical Waste:	☐ YES	☒ NO	
▪ Explosive Material:	☐ YES	☒ NO	
▪ Toxic Materials:	☐ YES	☒ NO:	
▪ Stained Soil	☐ YES	☒ NO:	
▪ Piping protruding from the ground	☐ YES	☒ NO:	

PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

15. Were any recognized environmental conditions identified during this site visit? ☐ YES ☒ NO

16. Were photographs taken? ☒ YES ☐ NO

Nicolas Andersen - OA

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PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

1. Address of Property: 3300 Huntington Ave

2. Name of Facility: Fleming Fields GIS Map ID 40

3. Type of operation (e.g.: industrial, manufacturing, airport, railroad, retail, other commercial, school, residential, agricultural): Baseball Fields

4. Manufacturing facility: ☐ YES ☒ NO

5. If yes, SIC number (Standard Industrial Classification): ________

6. Currently operating: ☒ YES ☐ NO

7. Describe use and past usage of surrounding properties; any obvious problems? Surrounded by old Auto shops + Scrap yard

   North: commercial

   South: Residential

   East: Commercial

   West: Soccer Fields

PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

8. How many buildings are on this site? 1

9. Describe the heating and cooling systems if visible: —

10. Main roadway access to facility: Huntington Ave

11. Any roads without apparent outlets on the property? —

   Description of stream/river/pond: Deadmans Run Approx 700' NE

   Description of Terrain: Flat Baseball Fields & parking lot

   Description of drainage/any indication of stress: —

12. Source of potable water: City of Lincoln

13. Power company (name, if applicable to the property):

   Gas:

   Electric: LES

   Fuel/Oil:

   Other:

14. Are any of the following observed on-site:

▪ Landfills:	☐ YES	☒ NO
▪ Solid Waste:	☒ YES	☐ NO
▪ 55 Gallon Drums:	☐ YES	☒ NO
▪ Pits, Ponds, or Lagoons:	☐ YES	☒ NO
▪ Drains or Sumps	☐ YES	☒ NO
▪ Surface Impoundments:	☐ YES	☒ NO
▪ Waste Water:	☐ YES	☒ NO
▪ USTs/ASTs	☐ YES	☒ NO
▪ Injection/Production Monitoring Wells:	☐ YES	☒ NO
▪ Wastewater Treatment Units:	☐ YES	☒ NO
▪ Septic Tanks:	☐ YES	☒ NO
▪ PCB Containing Equipment:	☐ YES	☒ NO
▪ Asbestos:	☐ YES	☒ NO
▪ Incinerators:	☐ YES	☒ NO
▪ Equipment Containing Radioactive Material:	☐ YES	☒ NO
▪ Medical Waste:	☐ YES	☒ NO
▪ Explosive Material:	☐ YES	☒ NO
▪ Toxic Materials:	☐ YES	☒ NO:
▪ Stained Soil	☐ YES	☒ NO:
▪ Piping protruding from the ground	☐ YES	☒ NO:

15. Were any recognized environmental conditions identified during this site visit? ☐ YES ☒ NO

16. Were photographs taken? ☒ YES ☐ NO

Nicolas Anderson - OA

Name of Person(s) Completing Observations and Affiliation

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PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

1. Address of Property: 2505 N 33rd

2. Name of Facility: Joes body shop GIS Map ID 54

3. Type of operation (e.g.: industrial, manufacturing, airport, railroad, retail, other commercial, school, residential, agricultural): Auto Repair

4. Manufacturing facility: ☐ YES ☒ NO

5. If yes, SIC number (Standard Industrial Classification): ______

6. Currently operating: ☒ YES ☐ NO

7. Describe use and past usage of surrounding properties; any obvious problems? Surrounded by old Auto stations & scrap yards

   North: Commercial

   South: Commercial

   East: Commercial

   West: Commercial

8. How many buildings are on this site? 1

9. Describe the heating and cooling systems if visible: —

10. Main roadway access to facility: N 33rd St

11. Any roads without apparent outlets on the property? —

Description of stream/river/pond: Deadmans Run Approx 200' NE
Description of Terrain: Paved/Gravel - Flat
Description of drainage/any indication of stress:

12. Source of potable water: City of Lincoln

13. Power company (name, if applicable to the property):

Gas:
Electric: LES
Fuel/Oil:
Other:

PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

14. Are any of the following observed on-site:

▪ Landfills:	☐ YES	☒ NO
▪ Solid Waste:	☒ YES	☐ NO
▪ 55 Gallon Drums:	☐ YES	☒ NO
▪ Pits, Ponds, or Lagoons:	☐ YES	☒ NO
▪ Drains or Sumps	☐ YES	☒ NO
▪ Surface Impoundments:	☐ YES	☒ NO
▪ Waste Water:	☐ YES	☒ NO
▪ USTs/ASTs	☐ YES	☒ NO
▪ Injection/Production Monitoring Wells:	☐ YES	☒ NO
▪ Wastewater Treatment Units:	☐ YES	☒ NO
▪ Septic Tanks:	☐ YES	☒ NO
▪ PCB Containing Equipment:	☐ YES	☒ NO
▪ Asbestos:	☐ YES	☒ NO
▪ Incinerators:	☐ YES	☒ NO
▪ Equipment Containing Radioactive Material:	☐ YES	☒ NO
▪ Medical Waste:	☐ YES	☒ NO
▪ Explosive Material:	☐ YES	☒ NO
▪ Toxic Materials:	☐ YES	☒ NO:
▪ Stained Soil / Pavement	☒ YES	☐ NO: - Possible Soil Staining In Photo 5 of Photo Log
▪ Piping protruding from the ground	☐ YES	☒ NO:

15. Were any recognized environmental conditions identified during this site visit? ☐ YES ☒ NO

16. Were photographs taken? ☑ YES ☐ NO

Nicolas Anderson - OA

Name of Person(s) Completing Observations and Affiliation

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PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

1. Address of Property: 2435 N 33rd st

2. Name of Facility: Olstons import Autos GIS MAP FD 9

3. Type of operation (e.g.: industrial, manufacturing, airport, railroad, retail, other commercial, school, residential, agricultural): Auto Sales/repairs

4. Manufacturing facility: ☐ YES ☒ NO

5. If yes, SIC number (Standard Industrial Classification): ____________

6. Currently operating: ☒ YES ☐ NO

7. Describe use and past usage of surrounding properties; any obvious problems? Surrounded by old Auto stations, Scrap Storage

   North: Commercial

   South: Commercial

   East: Fields

   West: Commercial followed by Park & Baseball Fields

PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

8. How many buildings are on this site? 1

9. Describe the heating and cooling systems if visible: —

10. Main roadway access to facility: N 33rd St

11. Any roads without apparent outlets on the property? —

Description of stream/river/pond: Deadmans Run 360' NE
Description of Terrain: Paved/Gravel - flat
Description of drainage/any indication of stress: —

12. Source of potable water: City of Lincoln

13. Power company (name, if applicable to the property):
Gas:
Electric: LES
Fuel/Oil:
Other:

14. Are any of the following observed on-site:

▪ Landfills:	☐ YES	☑ NO
▪ Solid Waste:	☒ YES	☐ NO
▪ 55 Gallon Drums:	☐ YES	☒ NO
▪ Pits, Ponds, or Lagoons:	☐ YES	☒ NO
▪ Drains or Sumps	☐ YES	☒ NO
▪ Surface Impoundments:	☐ YES	☒ NO
▪ Waste Water:	☐ YES	☒ NO
▪ USTs/ASTs	☐ YES	☒ NO
▪ Injection/Production Monitoring Wells:	☐ YES	☒ NO
▪ Wastewater Treatment Units:	☐ YES	☒ NO
▪ Septic Tanks:	☐ YES	☒ NO
▪ PCB Containing Equipment:	☐ YES	☒ NO
▪ Asbestos:	☐ YES	☒ NO
▪ Incinerators:	☐ YES	☒ NO
▪ Equipment Containing Radioactive Material:	☐ YES	☒ NO
▪ Medical Waste:	☐ YES	☒ NO
▪ Explosive Material:	☐ YES	☒ NO
▪ Toxic Materials:	☐ YES	☒ NO:
▪ Stained Soil / pavement	☑ YES	☐ NO: sizable stain on pavement crack see pics
▪ Piping protruding from the ground	☐ YES	☑ NO:

15. Were any recognized environmental conditions identified during this site visit? ☒ YES ☐ NO

16. Were photographs taken? ☒ YES ☐ NO

Nicolas Anderson - OA

Name of Person(s) Completing Observations and Affiliation

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PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

1. Address of Property: 2415 N 33rd St

2. Name of Facility: Blums Auto GIS Map ID 35

3. Type of operation (e.g.: industrial, manufacturing, airport, railroad, retail, other commercial, school, residential, agricultural): Auto shop & sales

4. Manufacturing facility: ☐ YES ☒ NO

5. If yes, SIC number (Standard Industrial Classification): ______

6. Currently operating: ☒ YES ☐ NO

7. Describe use and past usage of surrounding properties; any obvious problems? Surrounded by Auto shops with old cars & tanks nearby, Scrap storage

North: commercial

South: commercial

East: Fields

West: Park, BaseBall Fields

PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

8. How many buildings are on this site? 1

9. Describe the heating and cooling systems if visible: —

10. Main roadway access to facility: N 33rd st

11. Any roads without apparent outlets on the property? —

Description of stream/river/pond: Deadmans Run Approx 515' NE
Description of Terrain: Paved / Gravel - Flat
Description of drainage/any indication of stress: —

12. Source of potable water: City of Lincoln

13. Power company (name, if applicable to the property):
    Gas:
    Electric: LES
    Fuel/Oil:
    Other:

14. Are any of the following observed on-site:

▪ Landfills:	☐ YES	☒ NO	
▪ Solid Waste:	☒ YES	☐ NO	
▪ 55 Gallon Drums:	☒ YES	☐ NO	Appears to be trash Drum
▪ Pits, Ponds, or Lagoons:	☐ YES	☒ NO	
▪ Drains or Sumps	☐ YES	☒ NO	
▪ Surface Impoundments:	☐ YES	☒ NO	
▪ Waste Water:	☐ YES	☒ NO	
▪ USTs/ASTs	☐ YES	☒ NO	
▪ Injection/Production Monitoring Wells:	☐ YES	☒ NO	
▪ Wastewater Treatment Units:	☐ YES	☒ NO	
▪ Septic Tanks:	☐ YES	☒ NO	
▪ PCB Containing Equipment:	☒ YES	☐ NO	Electrical Transformers
▪ Asbestos:	☐ YES	☒ NO	
▪ Incinerators:	☐ YES	☒ NO	
▪ Equipment Containing Radioactive Material:	☐ YES	☒ NO	
▪ Medical Waste:	☐ YES	☒ NO	
▪ Explosive Material:	☐ YES	☒ NO	
▪ Toxic Materials:	☐ YES	☒ NO:	
▪ Stained Soil/pavement	☒ YES	☐ NO:	- Small stains on pavement
▪ Piping protruding from the ground	☐ YES	☒ NO:	

15. Were any recognized environmental conditions identified during this site visit? ☐ YES ☒ NO

16. Were photographs taken? ☒ YES ☐ NO

Nicolas Anderson - OA

Name of Person(s) Completing Observations and Affiliation

2/11/15

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PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

1. Address of Property: 3221 Huntington

2. Name of Facility: Crashbusters Body & Paint Inc - GIS ID 28 (Now Major Appliance)

3. Type of operation (e.g.: industrial, manufacturing, airport, railroad, retail, other commercial, school, residential, agricultural): Auto Body Shop

4. Manufacturing facility: ☐ YES ☒ NO

5. If yes, SIC number (Standard Industrial Classification): ____________

6. Currently operating: ☒ YES ☐ NO

7. Describe use and past usage of surrounding properties; any obvious problems? old body shops with waste & old parts/cars Scrap Storage

   North: Commercial

   South: Park, Baseball Fields

   East: Commercial

   West: Park, BaseBall Fields

PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

8. How many buildings are on this site? ___1___

9. Describe the heating and cooling systems if visible: ___—___

10. Main roadway access to facility: ___Huntington Ave___

11. Any roads without apparent outlets on the property? ___–___

Description of stream/river/pond: Deadmans Run Approx 450' NE

Description of Terrain: Paved / Gravel - Flat

Description of drainage/any indication of stress: Soil & Veg Stress

12. Source of potable water: City of Lincoln

13. Power company (name, if applicable to the property):

Gas: ______

Electric: LES

Fuel/Oil: ______

Other: ______

14. Are any of the following observed on-site:

▪ Landfills:	☐ YES	☒ NO	
▪ Solid Waste:	☒ YES	☐ NO	
▪ 55 Gallon Drums:	☐ YES	☒ NO	
▪ Pits, Ponds, or Lagoons:	☐ YES	☒ NO	
▪ Drains or Sumps	☐ YES	☒ NO	
▪ Surface Impoundments:	☐ YES	☒ NO	
▪ Waste Water:	☐ YES	☒ NO	
▪ USTs/ASTs	☒ YES	☐ NO	
▪ Injection/Production Monitoring Wells:	☐ YES	☒ NO	
▪ Wastewater Treatment Units:	☐ YES	☒ NO	
▪ Septic Tanks:	☐ YES	☒ NO	
▪ PCB Containing Equipment:	☒ YES	☐ NO	Electrical Transformer
▪ Asbestos:	☐ YES	☒ NO	
▪ Incinerators:	☐ YES	☒ NO	
▪ Equipment Containing Radioactive Material:	☐ YES	☒ NO	
▪ Medical Waste:	☐ YES	☒ NO	
▪ Explosive Material:	☐ YES	☒ NO	
▪ Toxic Materials:	☒ YES	☐ NO:	In AST? & associated w/ Appliances?
▪ Stained Soil	☒ YES	☐ NO:	was paint shop
▪ Piping protruding from the ground	☐ YES	☒ NO:	

15. Were any recognized environmental conditions identified during this site visit? ☒ YES ☐ NO

16. Were photographs taken? ☒ YES ☐ NO

Nicolas Anderson - OA

Name of Person(s) Completing Observations and Affiliation

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PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

1. Address of Property: 2541 N 48th St & 4740 Huntington Ave

2. Name of Facility: Williams Cleaner - GIS Map ID 21 & 25

3. Type of operation (e.g.: industrial, manufacturing, airport, railroad, retail, other commercial, school, residential, agricultural): Dry Cleaner

4. Manufacturing facility: ☐ YES ☒ NO

5. If yes, SIC number (Standard Industrial Classification): ______

6. Currently operating: ☒ YES ☐ NO

7. Describe use and past usage of surrounding properties; any obvious problems? no obvious Problems

   North: Commercial

   South: Commercial

   East: Commercial

   West: Residential

PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

8. How many buildings are on this site? Two

9. Describe the heating and cooling systems if visible: —

10. Main roadway access to facility: N 48th St.

11. Any roads without apparent outlets on the property? —

Description of stream/river/pond: Deadmans Run Approx. 1500' S

Description of Terrain: Pavement - Flat

Description of drainage/any indication of stress: Grass/Soil on W side of N 48th Property (see Pics)

12. Source of potable water: City of Lincoln

13. Power company (name, if applicable to the property):

Gas:

Electric: LES

Fuel/Oil:

Other:

14. Are any of the following observed on-site:

▪ Landfills:	☐ YES	☒ NO
▪ Solid Waste:	☒ YES	☐ NO
▪ 55 Gallon Drums:	☐ YES	☒ NO
▪ Pits, Ponds, or Lagoons:	☐ YES	☒ NO
▪ Drains or Sumps	☐ YES	☒ NO
▪ Surface Impoundments:	☐ YES	☒ NO
▪ Waste Water:	☐ YES	☒ NO
▪ USTs/ASTs	☐ YES	☒ NO
▪ Injection/Production Monitoring Wells:	☐ YES	☒ NO
▪ Wastewater Treatment Units:	☐ YES	☒ NO
▪ Septic Tanks:	☐ YES	☒ NO
▪ PCB Containing Equipment:	☒ YES	☐ NO Electrical Transformer
▪ Asbestos:	☐ YES	☒ NO
▪ Incinerators:	☐ YES	☒ NO
▪ Equipment Containing Radioactive Material:	☐ YES	☒ NO
▪ Medical Waste:	☐ YES	☒ NO
▪ Explosive Material:	☐ YES	☒ NO
▪ Toxic Materials:	☒ YES	☐ NO: Associated w/ Dry Cleaning operations
▪ Stained Soil/stressed	☒ YES	☐ NO:
▪ Piping protruding from the ground	☐ YES	☒ NO:

15. Were any recognized environmental conditions identified during this site visit? ☐ YES ☒ NO

16. Were photographs taken? ☒ YES ☐ NO

Nicolas Anderson - OA

Name of Person(s) Completing Observations and Affiliation

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PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

1. Address of Property: 2200 N 48th St

2. Name of Facility: Fast Break GFS Map FD 34

3. Type of operation (e.g.: industrial, manufacturing, airport, railroad, retail, other commercial, school, residential, agricultural): Commercial

4. Manufacturing facility: ☐ YES ☒ NO

5. If yes, SIC number (Standard Industrial Classification): ________

6. Currently operating: ☒ YES ☐ NO

7. Describe use and past usage of surrounding properties; any obvious problems? Car washes to N + S

   North: Commercial

   South: Commercial

   East: Residential

   West: open Field

PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

8. How many buildings are on this site? 1

9. Describe the heating and cooling systems if visible: —

10. Main roadway access to facility: N 48th St

11. Any roads without apparent outlets on the property? —

Description of stream/river/pond: Deadmans Run Approx 450' S

Description of Terrain: Flat, paved

Description of drainage/any indication of stress: —

12. Source of potable water: City of Lincoln

13. Power company (name, if applicable to the property):

Gas:

Electric: LES

Fuel/Oil:

Other:

14. Are any of the following observed on-site:

Landfills:	☐ YES	☒ NO
Solid Waste:	☒ YES	☐ NO
55 Gallon Drums:	☐ YES	☒ NO
Pits, Ponds, or Lagoons:	☐ YES	☒ NO
Drains or Sumps	☐ YES	☒ NO
Surface Impoundments:	☐ YES	☒ NO
Waste Water:	☐ YES	☒ NO
USTs/ASTs	☒ YES	☐ NO
Injection/Production Monitoring Wells:	☐ YES	☒ NO
Wastewater Treatment Units:	☐ YES	☒ NO
Septic Tanks:	☐ YES	☒ NO
PCB Containing Equipment:	☐ YES	☒ NO
Asbestos:	☐ YES	☒ NO
Incinerators:	☐ YES	☒ NO
Equipment Containing Radioactive Material:	☐ YES	☒ NO
Medical Waste:	☐ YES	☒ NO
Explosive Material:	☐ YES	☒ NO
Toxic Materials:	☐ YES	☒ NO:
Stained Soil / Pavement	☒ YES	☐ NO: - Small stains on pavement
Piping protruding from the ground	☐ YES	☒ NO:

15. Were any recognized environmental conditions identified during this site visit? ☐ YES ☒ NO

16. Were photographs taken? ☒ YES ☐ NO

Nicolas Anderson - OA

Name of Person(s) Completing Observations and Affiliation

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PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

1. Address of Property: 3301 Holdrege St

2. Name of Facility: Kwik shop GIS Map ID 46

3. Type of operation (e.g.: industrial, manufacturing, airport, railroad, retail, other commercial, school, residential, agricultural): Commercial

4. Manufacturing facility: ☐ YES ☒ NO

5. If yes, SIC number (Standard Industrial Classification): ______

6. Currently operating: ☒ YES ☐ NO

7. Describe use and past usage of surrounding properties; any obvious problems? Fuel station to West

   North: University

   South: Residential

   East: Residential

   West: Commercial

PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

8. How many buildings are on this site? 1

9. Describe the heating and cooling systems if visible: –

10. Main roadway access to facility: Holdrege

11. Any roads without apparent outlets on the property? –

Description of stream/river/pond: Deadmans Run Approx 3000' NE
Description of Terrain: Flat, Paved
Description of drainage/any indication of stress: –

12. Source of potable water: City of Lincoln

13. Power company (name, if applicable to the property):

Gas:
Electric: LES
Fuel/Oil:
Other:

14. Are any of the following observed on-site:

▪ Landfills:	☐ YES	☒ NO
▪ Solid Waste:	☒ YES	☐ NO
▪ 55 Gallon Drums:	☐ YES	☒ NO
▪ Pits, Ponds, or Lagoons:	☐ YES	☒ NO
▪ Drains or Sumps	☐ YES	☒ NO
▪ Surface Impoundments:	☐ YES	☒ NO
▪ Waste Water:	☐ YES	☒ NO
▪ USTs/ASTs	☒ YES	☐ NO
▪ Injection/Production Monitoring Wells:	☐ YES	☒ NO
▪ Wastewater Treatment Units:	☐ YES	☒ NO
▪ Septic Tanks:	☐ YES	☒ NO
▪ PCB Containing Equipment:	☐ YES	☒ NO
▪ Asbestos:	☐ YES	☒ NO
▪ Incinerators:	☐ YES	☒ NO
▪ Equipment Containing Radioactive Material:	☐ YES	☒ NO
▪ Medical Waste:	☐ YES	☒ NO
▪ Explosive Material:	☐ YES	☒ NO
▪ Toxic Materials:	☐ YES	☒ NO:
▪ Stained Soil/pavement	☒ YES	☐ NO: - Small staining on pavement
▪ Piping protruding from the ground	☐ YES	☒ NO:

15. Were any recognized environmental conditions identified during this site visit? ☐ YES ☒ NO

16. Were photographs taken? ☒ YES ☐ NO

Nicolas Andersen - OA

Name of Person(s) Completing Observations and Affiliation

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PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

1. Address of Property: 3248 Cornhusker Hwy

2. Name of Facility: Pittmans - Now Andersen

3. Type of operation (e.g.: industrial, manufacturing, airport, railroad, retail, other commercial, school, residential, agricultural): Commercial

4. Manufacturing facility: ☐ YES ☒ NO

5. If yes, SIC number (Standard Industrial Classification): ____________

6. Currently operating: ☒ YES ☐ NO

7. Describe use and past usage of surrounding properties; any obvious problems? Auto/scrap used yard to Southwest

   North: Commercial

   South: Commercial

   East: Commercial

   West: Commercial

PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

8. How many buildings are on this site? 2

9. Describe the heating and cooling systems if visible: –

10. Main roadway access to facility: Cornhusker Hwy

11. Any roads without apparent outlets on the property? –

Description of stream/river/pond: Deadmans Run Approx 560' W

Description of Terrain: Flat – paved + Grass

Description of drainage/any indication of stress: –

12. Source of potable water: City of Lincoln

13. Power company (name, if applicable to the property):

Gas:

Electric: LES

Fuel/Oil:

Other:

14. Are any of the following observed on-site:

▪ Landfills:	☐ YES	☒ NO
▪ Solid Waste:	☒ YES	☐ NO
▪ 55 Gallon Drums:	☐ YES	☒ NO
▪ Pits, Ponds, or Lagoons:	☐ YES	☒ NO
▪ Drains or Sumps	☐ YES	☒ NO
▪ Surface Impoundments:	☐ YES	☒ NO
▪ Waste Water:	☐ YES	☒ NO
▪ USTs/ASTs	☐ YES	☒ NO
▪ Injection/Production Monitoring Wells:	☐ YES	☒ NO
▪ Wastewater Treatment Units:	☐ YES	☒ NO
▪ Septic Tanks:	☐ YES	☒ NO
▪ PCB Containing Equipment:	☐ YES	☒ NO
▪ Asbestos:	☐ YES	☒ NO
▪ Incinerators:	☐ YES	☒ NO
▪ Equipment Containing Radioactive Material:	☐ YES	☒ NO
▪ Medical Waste:	☐ YES	☒ NO
▪ Explosive Material:	☐ YES	☒ NO
▪ Toxic Materials:	☐ YES	☒ NO:
▪ Stained Soil/pavement	☒ YES	☐ NO: small stains on pavement
▪ Piping protruding from the ground	☒ YES See Photo Log	☐ NO:

15. Were any recognized environmental conditions identified during this site visit? ☐ YES ☒ NO

16. Were photographs taken? ☒ YES ☐ NO

Nicolas Andersen - OA

Name of Person(s) Completing Observations and Affiliation

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PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

1. Address of Property: 2940 Cornhusker Hwy

2. Name of Facility: Yamaha Motorsports - Now Window World
GIS Map ID 46

3. Type of operation (e.g.: industrial, manufacturing, airport, railroad, retail, other commercial, school, residential, agricultural): Commercial

4. Manufacturing facility: ☐ YES ☒ NO

5. If yes, SIC number (Standard Industrial Classification): ______

6. Currently operating: ☒ YES ☐ NO

7. Describe use and past usage of surrounding properties; any obvious problems? Used Auto/Scrap yard to South

North: Commercial

South: Commercial

East: Commercial

West: Commercial

PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

8. How many buildings are on this site? 1

9. Describe the heating and cooling systems if visible: –

10. Main roadway access to facility: Cornhusker Hwy

11. Any roads without apparent outlets on the property? –

    Description of stream/river/pond: Deadmans Run Approx 380' West
    Description of Terrain: Flat - Paved
    Description of drainage/any indication of stress: –

12. Source of potable water: City of Lincoln

13. Power company (name, if applicable to the property):
    Gas:
    Electric: LES
    Fuel/Oil:
    Other:

14. Are any of the following observed on-site:

Landfills:	☐ YES	☒ NO
Solid Waste:	☒ YES	☐ NO
55 Gallon Drums:	☐ YES	☒ NO
Pits, Ponds, or Lagoons:	☐ YES	☒ NO
Drains or Sumps	☐ YES	☒ NO
Surface Impoundments:	☐ YES	☒ NO
Waste Water:	☐ YES	☒ NO
USTs/ASTs	☐ YES	☒ NO
Injection/Production Monitoring Wells:	☐ YES	☒ NO
Wastewater Treatment Units:	☐ YES	☒ NO
Septic Tanks:	☐ YES	☒ NO
PCB Containing Equipment:	☐ YES	☒ NO
Asbestos:	☐ YES	☒ NO
Incinerators:	☐ YES	☒ NO
Equipment Containing Radioactive Material:	☐ YES	☒ NO
Medical Waste:	☐ YES	☒ NO
Explosive Material:	☐ YES	☒ NO
Toxic Materials:	☐ YES	☒ NO:
Stained Soil/Pavement	☒ YES	☐ NO: – Small stains on pavement
Piping protruding from the ground	☐ YES	☒ NO:

15. Were any recognized environmental conditions identified during this site visit? ☐ YES ☒ NO

16. Were photographs taken? ☒ YES ☐ NO

Nicolas Anderson

Name of Person(s) Completing Observations and Affiliation

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PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

1. Address of Property: 2920 Cornhusker Hwy

2. Name of Facility: House of Mufflers, GIS Map ID 47

3. Type of operation (e.g.: industrial, manufacturing, airport, railroad, retail, other commercial, school, residential, agricultural): Commercial

4. Manufacturing facility: ☐ YES ☒ NO

5. If yes, SIC number (Standard Industrial Classification): ______

6. Currently operating: ☒ YES ☐ NO

7. Describe use and past usage of surrounding properties; any obvious problems? Used Auto/ scrap yard to South

   North: Levee & Deadmans Run

   South: Commercial

   East: Commercial

   West: Deadmans Run

PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

8. How many buildings are on this site? 1

9. Describe the heating and cooling systems if visible: —

10. Main roadway access to facility: Cornhusker Hwy

11. Any roads without apparent outlets on the property? —

Description of stream/river/pond: Deadmans Run Adjacent to West

Description of Terrain: Flat - Paved

Description of drainage/any indication of stress: —

12. Source of potable water: City of Lincoln

13. Power company (name, if applicable to the property):

Gas:

Electric: LES

Fuel/Oil:

Other:

14. Are any of the following observed on-site:

	YES	NO
Landfills:	☐ YES	☒ NO
Solid Waste:	☒ YES	☐ NO
55 Gallon Drums:	☒ YES	☐ NO
Pits, Ponds, or Lagoons:	☐ YES	☒ NO
Drains or Sumps	☐ YES	☒ NO
Surface Impoundments:	☐ YES	☒ NO
Waste Water:	☐ YES	☒ NO
USTs/ASTs	☐ YES	☒ NO
Injection/Production Monitoring Wells:	☐ YES	☒ NO
Wastewater Treatment Units:	☐ YES	☒ NO
Septic Tanks:	☐ YES	☒ NO
PCB Containing Equipment:	☐ YES	☒ NO
Asbestos:	☐ YES	☒ NO
Incinerators:	☐ YES	☒ NO
Equipment Containing Radioactive Material:	☐ YES	☒ NO
Medical Waste:	☐ YES	☒ NO
Explosive Material:	☐ YES	☒ NO
Toxic Materials:	☐ YES	☒ NO:
Stained Soil/Pavement	☒ YES	☐ NO: small staining on pavement
Piping protruding from the ground	☐ YES	☒ NO:

PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

15. Were any recognized environmental conditions identified during this site visit? ☒ YES ☐ NO Debris pile

16. Were photographs taken? ☒ YES ☐ NO

Nicolas Anderson - OA

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PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

1. Address of Property: 1445 N 56th St

2. Name of Facility: Andersen Service - Now Russ Stop & Shop

3. Type of operation (e.g.: industrial, manufacturing, airport, railroad, retail, other commercial, school, residential, agricultural): Commercial

4. Manufacturing facility: ☐ YES ☒ NO

5. If yes, SIC number (Standard Industrial Classification): ____________

6. Currently operating: ☒ YES ☐ NO

7. Describe use and past usage of surrounding properties; any obvious problems? Laundry Mat / cleaner to East

   North: Deadmans Run followed by Commercial

   South: Commercial

   East: Commercial

   West: Residential

PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

8. How many buildings are on this site? 1

9. Describe the heating and cooling systems if visible: —

10. Main roadway access to facility: N 56th St

11. Any roads without apparent outlets on the property? —

Description of stream/river/pond: Deadmans Run adjacent to NE

Description of Terrain: Flat - Paved

Description of drainage/any indication of stress: —

12. Source of potable water: City of Lincoln

13. Power company (name, if applicable to the property):

Gas:

Electric: LES

Fuel/Oil:

Other:

14. Are any of the following observed on-site:

▪ Landfills:	☐ YES	☒ NO
▪ Solid Waste:	☒ YES	☐ NO
▪ 55 Gallon Drums:	☐ YES	☒ NO
▪ Pits, Ponds, or Lagoons:	☐ YES	☒ NO
▪ Drains or Sumps	☐ YES	☒ NO
▪ Surface Impoundments:	☐ YES	☒ NO
▪ Waste Water:	☐ YES	☒ NO
▪ USTs/ASTs	☒ YES	☐ NO
▪ Injection/Production Monitoring Wells:	☐ YES	☒ NO
▪ Wastewater Treatment Units:	☐ YES	☒ NO
▪ Septic Tanks:	☐ YES	☒ NO
▪ PCB Containing Equipment:	☐ YES	☒ NO
▪ Asbestos:	☐ YES	☒ NO
▪ Incinerators:	☐ YES	☒ NO
▪ Equipment Containing Radioactive Material:	☐ YES	☒ NO
▪ Medical Waste:	☐ YES	☒ NO
▪ Explosive Material:	☐ YES	☒ NO
▪ Toxic Materials:	☐ YES	☒ NO:
▪ Stained Soil / pavement	☒ YES	☐ NO: small stains on pavement
▪ Piping protruding from the ground	☐ YES	☒ NO:

15. Were any recognized environmental conditions identified during this site visit? ☐ YES ☒ NO

16. Were photographs taken? ☒ YES ☐ NO

Nicolas Anderson - OA

Name of Person(s) Completing Observations and Affiliation

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PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

1. Address of Property: 2939 Cornhusker Hwy

2. Name of Facility: Hinkle Machine shop - Now McGill Restorations
GIS Map ID 42

3. Type of operation (e.g.: industrial, manufacturing, airport, railroad, retail, other commercial, school, residential, agricultural): Commercial, Restoration shop

4. Manufacturing facility: ☐ YES ☒ NO

5. If yes, SIC number (Standard Industrial Classification): ____________

6. Currently operating: ☒ YES ☐ NO

7. Describe use and past usage of surrounding properties; any obvious problems? Coop to South, used Auto/Scrap yard to East, Manufacturing to west

North: Commercial

South: Commercial

East: Deadmans Run followed by commercial

West: Manufacturing

PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

8. How many buildings are on this site? 1

9. Describe the heating and cooling systems if visible: —

10. Main roadway access to facility: Drive off of State Fair Park Rd

11. Any roads without apparent outlets on the property? yes

Description of stream/river/pond: Deadmans Run adjacent to NE
Description of Terrain: Flat - Gravel
Description of drainage/any indication of stress: —

12. Source of potable water: City of Lincoln

13. Power company (name, if applicable to the property):
Gas:
Electric: LES
Fuel/Oil:
Other:

14. Are any of the following observed on-site:

▪ Landfills:	☐ YES	☒ NO
▪ Solid Waste:	☐ YES	☒ NO
▪ 55 Gallon Drums:	☐ YES	☒ NO - But Bulk storage of Liquid in > 55 Gal containers See pics
▪ Pits, Ponds, or Lagoons:	☐ YES	☒ NO
▪ Drains or Sumps	☐ YES	☒ NO
▪ Surface Impoundments:	☐ YES	☒ NO
▪ Waste Water:	☐ YES	☒ NO
▪ USTs/ASTs	☐ YES	☒ NO
▪ Injection/Production Monitoring Wells:	☐ YES	☒ NO
▪ Wastewater Treatment Units:	☐ YES	☒ NO
▪ Septic Tanks:	☐ YES	☒ NO
▪ PCB Containing Equipment:	☐ YES	☒ NO
▪ Asbestos:	☐ YES	☒ NO
▪ Incinerators:	☐ YES	☒ NO
▪ Equipment Containing Radioactive Material:	☐ YES	☒ NO
▪ Medical Waste:	☐ YES	☒ NO
▪ Explosive Material:	☐ YES	☒ NO
▪ Toxic Materials:	☐ YES	☐ NO: unknown
▪ Stained Soil	☐ YES	☒ NO:
▪ Piping protruding from the ground	☐ YES	☒ NO:

15. Were any recognized environmental conditions identified during this site visit? ☐ YES ☒ NO

16. Were photographs taken? ☒ YES ☐ NO

Nicolas Anderson

Name of Person(s) Completing Observations and Affiliation

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PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

1. Address of Property: 43rd & Holdrege

2. Name of Facility: University of NE - Apartments - GIS Map ID 19

3. Type of operation (e.g.: industrial, manufacturing, airport, railroad, retail, other commercial, school, residential, agricultural): School/residential

4. Manufacturing facility: ☐ YES ☒ NO

5. If yes, SIC number (Standard Industrial Classification): ______

6. Currently operating: ☐ YES ☒ NO

7. Describe use and past usage of surrounding properties; any obvious problems? none

North: University

South: Residential

East: open field

West: University

PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

8. How many buildings are on this site? 4

9. Describe the heating and cooling systems if visible: -

10. Main roadway access to facility: Holdrege

11. Any roads without apparent outlets on the property? yes

    Description of stream/river/pond: Deadmans Run Approx 1900' NE

    Description of Terrain: Paved & Grass - Flat

    Description of drainage/any indication of stress: -

12. Source of potable water: City of Lincoln

13. Power company (name, if applicable to the property):

    Gas: ______

    Electric: LES

    Fuel/Oil: ______

    Other: ______

14. Are any of the following observed on-site:

▪ Landfills:	☐ YES	☒ NO
▪ Solid Waste:	☒ YES	☐ NO
▪ 55 Gallon Drums:	☐ YES	☒ NO
▪ Pits, Ponds, or Lagoons:	☐ YES	☒ NO
▪ Drains or Sumps	☐ YES	☒ NO
▪ Surface Impoundments:	☐ YES	☒ NO
▪ Waste Water:	☐ YES	☒ NO
▪ USTs/ASTs	☐ YES	☒ NO
▪ Injection/Production Monitoring Wells:	☐ YES	☒ NO
▪ Wastewater Treatment Units:	☐ YES	☒ NO
▪ Septic Tanks:	☐ YES	☒ NO
▪ PCB Containing Equipment:	☐ YES	☒ NO
▪ Asbestos:	☐ YES	☒ NO
▪ Incinerators:	☐ YES	☒ NO
▪ Equipment Containing Radioactive Material:	☐ YES	☒ NO
▪ Medical Waste:	☐ YES	☒ NO
▪ Explosive Material:	☐ YES	☒ NO
▪ Toxic Materials:	☐ YES	☒ NO:
▪ Stained Soil / pavement	☒ YES	☐ NO: – small stains on pavement
▪ Piping protruding from the ground	☐ YES	☒ NO:

15. Were any recognized environmental conditions identified during this site visit? ☐ YES ☒ NO

16. Were photographs taken? ☑ YES ☐ NO

Nicolas Andersen - OA

Name of Person(s) Completing Observations and Affiliation

2-13-15

Date

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PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

1. Address of Property: 3940 Fair St

2. Name of Facility: Animal Research Fa , GIS Map ID 19

3. Type of operation (e.g.: industrial, manufacturing, airport, railroad, retail, other commercial, school, residential, agricultural): school

4. Manufacturing facility: ☐ YES ☒ NO

5. If yes, SIC number (Standard Industrial Classification): ______

6. Currently operating: ☒ YES ☐ NO

7. Describe use and past usage of surrounding properties; any obvious problems? none

   North: Fields

   South: University

   East: Fields

   West: Open Grass

PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

8. How many buildings are on this site? 2

9. Describe the heating and cooling systems if visible: —

10. Main roadway access to facility: E campus loop

11. Any roads without apparent outlets on the property? —

Description of stream/river/pond: Deadmans Run adjacent to NE

Description of Terrain: Flat - Paved & Grass

Description of drainage/any indication of stress: —

12. Source of potable water: City of Lincoln

13. Power company (name, if applicable to the property):

Gas: ________

Electric: LES

Fuel/Oil: ________

Other: ________

14. Are any of the following observed on-site:

▪ Landfills:	☐ YES	☒ NO
▪ Solid Waste:	☐ YES	☒ NO
▪ 55 Gallon Drums:	☐ YES	☒ NO
▪ Pits, Ponds, or Lagoons:	☐ YES	☒ NO
▪ Drains or Sumps	☐ YES	☒ NO
▪ Surface Impoundments:	☐ YES	☒ NO
▪ Waste Water:	☐ YES	☒ NO
▪ USTs/ASTs	☐ YES	☒ NO
▪ Injection/Production Monitoring Wells:	☐ YES	☒ NO
▪ Wastewater Treatment Units:	☐ YES	☒ NO
▪ Septic Tanks:	☐ YES	☒ NO
▪ PCB Containing Equipment:	☐ YES	☒ NO
▪ Asbestos:	☐ YES	☒ NO
▪ Incinerators:	☐ YES	☒ NO
▪ Equipment Containing Radioactive Material:	☐ YES	☒ NO
▪ Medical Waste:	☐ YES	☒ NO
▪ Explosive Material:	☐ YES	☒ NO
▪ Toxic Materials:	☐ YES	☒ NO:
▪ Stained Soil	☐ YES	☒ NO:
▪ Piping protruding from the ground	☐ YES	☒ NO:

15. Were any recognized environmental conditions identified during this site visit? ☐ YES ☑ NO

16. Were photographs taken? ☒ YES ☐ NO

Nicolas Anderson - OA

Name of Person(s) Completing Observations and Affiliation

2-13-15

Date

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PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

1. Address of Property: 2705 N 33rd st

2. Name of Facility: Star City Auto Salvage, GIS Map ID 49

3. Type of operation (e.g.: industrial, manufacturing, airport, railroad, retail, other commercial, school, residential, agricultural): Commercial

4. Manufacturing facility: ☐ YES ☒ NO

5. If yes, SIC number (Standard Industrial Classification): ____________

6. Currently operating: ☒ YES ☐ NO

7. Describe use and past usage of surrounding properties; any obvious problems? Railyard to Northwest

   North: Rail followed by commercial

   South: commercial

   East: Residential

   West: Deadmans Run followed by City Maint.

PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

8. How many buildings are on this site? 3

9. Describe the heating and cooling systems if visible: –

10. Main roadway access to facility: N 33rd St

11. Any roads without apparent outlets on the property? yes

    Description of stream/river/pond: Deadmans Run adjacent to west

    Description of Terrain: Gravel – flat

    Description of drainage/any indication of stress: –

12. Source of potable water: City of Lincoln

13. Power company (name, if applicable to the property):

    Gas: ______

    Electric: LES

    Fuel/Oil: ______

    Other: ______

14. Are any of the following observed on-site:

▪ Landfills:	☐ YES	☒ NO	Scrap yard
▪ Solid Waste:	☒ YES	☐ NO	
▪ 55 Gallon Drums:	☐ YES	☒ NO	
▪ Pits, Ponds, or Lagoons:	☐ YES	☒ NO	
▪ Drains or Sumps	☐ YES	☒ NO	
▪ Surface Impoundments:	☐ YES	☒ NO	
▪ Waste Water:	☐ YES	☒ NO	
▪ USTs/ASTs	☐ YES	☒ NO	
▪ Injection/Production Monitoring Wells:	☐ YES	☒ NO	
▪ Wastewater Treatment Units:	☐ YES	☒ NO	
▪ Septic Tanks:	☐ YES	☒ NO	
▪ PCB Containing Equipment:	☐ YES	☒ NO	
▪ Asbestos:	☐ YES	☒ NO	
▪ Incinerators:	☐ YES	☒ NO	
▪ Equipment Containing Radioactive Material:	☐ YES	☒ NO	
▪ Medical Waste:	☐ YES	☒ NO	
▪ Explosive Material:	☐ YES	☒ NO	
▪ Toxic Materials:	☐ YES	☒ NO:	
▪ Stained Soil	☐ YES	☒ NO:	
▪ Piping protruding from the ground	☐ YES	☒ NO:	

15. Were any recognized environmental conditions identified during this site visit? ☒ YES ☐ NO storage of vehicles

16. Were photographs taken? ☒ YES ☐ NO

Nicolas Anderson - OA

Name of Person(s) Completing Observations and Affiliation

2-11-15

Date

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PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

1. Address of Property: 3300 N 27th St

2. Name of Facility: Home Depot & Persche Auto
GIS Map ID 24

3. Type of operation (e.g.: industrial, manufacturing, airport, railroad, retail, other commercial, school, residential, agricultural): Commercial

4. Manufacturing facility: ☐ YES ☒ NO

5. If yes, SIC number (Standard Industrial Classification): ______

6. Currently operating: ☒ YES ☐ NO

7. Describe use and past usage of surrounding properties; any obvious problems? Used Auto/Scrap yard to SE

North: Commercial

South: Commercial

East: Deadmans Run followed by commercial

West: Commercial

PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

8. How many buildings are on this site? 2

9. Describe the heating and cooling systems if visible: —

10. Main roadway access to facility: Cornhusker Hwy

11. Any roads without apparent outlets on the property? —

    Description of stream/river/pond: Deadmans Run adjacent to East

    Description of Terrain: Paved - Flat

    Description of drainage/any indication of stress: water in ditch formed by Levee on East Side

12. Source of potable water: City of Lincoln

13. Power company (name, if applicable to the property):

    Gas:

    Electric: LES

    Fuel/Oil:

    Other:

PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

14. Are any of the following observed on-site:

▪ Landfills:	☐ YES	☒ NO	
▪ Solid Waste:	☒ YES	☐ NO	
▪ 55 Gallon Drums:	☐ YES	☒ NO	
▪ Pits, Ponds, or Lagoons:	☐ YES	☒ NO	
▪ Drains or Sumps	☐ YES	☒ NO	
▪ Surface Impoundments:	☒ YES	☐ NO	Water in ditch formed by levee on East side
▪ Waste Water:	☐ YES	☒ NO	
▪ USTs/ASTs	☐ YES	☒ NO	
▪ Injection/Production Monitoring Wells:	☐ YES	☒ NO	
▪ Wastewater Treatment Units:	☐ YES	☒ NO	
▪ Septic Tanks:	☐ YES	☒ NO	
▪ PCB Containing Equipment:	☐ YES	☒ NO	
▪ Asbestos:	☐ YES	☒ NO	
▪ Incinerators:	☐ YES	☒ NO	
▪ Equipment Containing Radioactive Material:	☐ YES	☒ NO	
▪ Medical Waste:	☐ YES	☒ NO	
▪ Explosive Material:	☐ YES	☒ NO	
▪ Toxic Materials:	☐ YES	☒ NO:	
▪ Stained Soil	☐ YES	☒ NO:	
▪ Piping protruding from the ground	☐ YES	☒ NO:	

15. Were any recognized environmental conditions identified during this site visit? ☐ YES ☑ NO

16. Were photographs taken? ☒ YES ☐ NO

Nicolas Anderson - OA

Name of Person(s) Completing Observations and Affiliation

2-11-15

Date

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PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

1. Address of Property: 2949 Cornhusker Hwy

2. Name of Facility: Wertz Plumbing & Heating (Now John Henrys Plumbing)
GIS Map ID 52

3. Type of operation (e.g.: industrial, manufacturing, airport, railroad, retail, other commercial, school, residential, agricultural): Commercial

4. Manufacturing facility: ☐ YES ☒ NO

5. If yes, SIC number (Standard Industrial Classification): ______

6. Currently operating: ☒ YES ☐ NO

7. Describe use and past usage of surrounding properties; any obvious problems? Coop & Rail yard to South, Manufacturing to North

   North: Manufacturing & Commercial

   South: Coop & Rail yard

   East: Commercial

   West: Manufacturing & Commercial

PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

8. How many buildings are on this site? 2

9. Describe the heating and cooling systems if visible: –

10. Main roadway access to facility: Drive way off of State fair park Dr.

11. Any roads without apparent outlets on the property? yes

    Description of stream/river/pond: Deadmans Run Approx 325' NE

    Description of Terrain: Gravel - Flat

    Description of drainage/any indication of stress: –

12. Source of potable water: City of Lincoln

13. Power company (name, if applicable to the property):

    Gas: __________

    Electric: LES

    Fuel/Oil: __________

    Other: __________

14. Are any of the following observed on-site:

▪ Landfills:	☐ YES	☒ NO
▪ Solid Waste:	☒ YES	☐ NO
▪ 55 Gallon Drums:	☐ YES	☒ NO
▪ Pits, Ponds, or Lagoons:	☐ YES	☒ NO
▪ Drains or Sumps	☐ YES	☒ NO
▪ Surface Impoundments:	☐ YES	☒ NO
▪ Waste Water:	☐ YES	☒ NO
▪ USTs/ASTs	☐ YES	☒ NO
▪ Injection/Production Monitoring Wells:	☐ YES	☒ NO
▪ Wastewater Treatment Units:	☐ YES	☒ NO
▪ Septic Tanks:	☐ YES	☒ NO
▪ PCB Containing Equipment:	☐ YES	☒ NO
▪ Asbestos:	☐ YES	☒ NO
▪ Incinerators:	☐ YES	☒ NO
▪ Equipment Containing Radioactive Material:	☐ YES	☒ NO
▪ Medical Waste:	☐ YES	☒ NO
▪ Explosive Material:	☐ YES	☒ NO
▪ Toxic Materials:	☐ YES	☒ NO:
▪ Stained Soil	☐ YES	☒ NO:
▪ Piping protruding from the ground	☐ YES	☒ NO:

15. Were any recognized environmental conditions identified during this site visit? ☐ YES ☒ NO

16. Were photographs taken? ☒ YES ☐ NO

Nicolas Anderson - OA
Name of Person(s) Completing Observations and Affiliation

2/11/15
Date

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PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

1. Address of Property: 2929 cornhusker hwy

2. Name of Facility: Mapes Inds GIS Map ID 51

3. Type of operation (e.g.: industrial, manufacturing, airport, railroad, retail, other commercial, school, residential, agricultural): manufacturing

4. Manufacturing facility: ☒ YES ☐ NO

5. If yes, SIC number (Standard Industrial Classification): Unknown

6. Currently operating: ☒ YES ☐ NO

7. Describe use and past usage of surrounding properties; any obvious problems? Used Auto Sales/Scrap, to East, coop & Railyard to South

   North: Commercial

   South: Commercial

   East: Deadmans Run & Commercial

   West: Commercial

PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

8. How many buildings are on this site? 3

9. Describe the heating and cooling systems if visible: —

10. Main roadway access to facility: Drive off of State Fair Park Dr.

11. Any roads without apparent outlets on the property? yes

Description of stream/river/pond: Deadmans Run adjacent to NE

Description of Terrain: Gravel - Flat

Description of drainage/any indication of stress: —

12. Source of potable water: City of Lincoln

13. Power company (name, if applicable to the property):

Gas:

Electric: LES

Fuel/Oil:

Other:

14. Are any of the following observed on-site:

Landfills:	☐ YES	☒ NO
Solid Waste:	☒ YES	☐ NO
55 Gallon Drums:	☒ YES	☐ NO
Pits, Ponds, or Lagoons:	☐ YES	☒ NO
Drains or Sumps	☐ YES	☒ NO
Surface Impoundments:	☐ YES	☒ NO
Waste Water:	☐ YES	☒ NO
USTs/ASTs	☐ YES	☒ NO
Injection/Production Monitoring Wells:	☐ YES	☒ NO
Wastewater Treatment Units:	☐ YES	☒ NO
Septic Tanks:	☐ YES	☒ NO
PCB Containing Equipment:	☐ YES	☒ NO
Asbestos:	☐ YES	☒ NO
Incinerators:	☐ YES	☒ NO
Equipment Containing Radioactive Material:	☐ YES	☒ NO
Medical Waste:	☐ YES	☒ NO
Explosive Material:	☐ YES	☒ NO
Toxic Materials:	☒ YES	☐ NO: - in 55 Gallon Drums see pics
Stained Soil	☐ YES	☒ NO:
Piping protruding from the ground	☐ YES	☒ NO:

15. Were any recognized environmental conditions identified during this site visit? ☒ YES ☐ NO Drum Storage Outdoors No containment

16. Were photographs taken? ☒ YES ☐ NO

Nicolas Anderson - OA

Name of Person(s) Completing Observations and Affiliation

2-11-15

Date

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PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

1. Address of Property: 31st & Cornhusker Hwy

2. Name of Facility: Lincoln Grain Inc GIS Map ID 15

3. Type of operation (e.g.: industrial, manufacturing, airport, railroad, retail, other commercial, school, residential, agricultural): coop

4. Manufacturing facility: ☐ YES ☒ NO

5. If yes, SIC number (Standard Industrial Classification): ________

6. Currently operating: ☒ YES ☐ NO

7. Describe use and past usage of surrounding properties; any obvious problems? Railyard to South, Scrap yard to East, used car lot & scrap cars to North

   North: Deadmans Run followed by used car / scrap cars

   South: Railyard

   East: Deadmans Run followed by scrap yard

   West: commercial

PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

8. How many buildings are on this site? 1 office & then grain facilities

9. Describe the heating and cooling systems if visible: —

10. Main roadway access to facility: Drive off of State Fair Park Dr.

11. Any roads without apparent outlets on the property? yes

Description of stream/river/pond: Deadmans Run adjacent to NE

Description of Terrain: Gravel - Flat

Description of drainage/any indication of stress: —

12. Source of potable water: City of Lincoln

13. Power company (name, if applicable to the property):

Gas:

Electric: LES

Fuel/Oil:

Other:

14. Are any of the following observed on-site:

▪ Landfills:	☐ YES	☒ NO
▪ Solid Waste:	☒ YES	☐ NO
▪ 55 Gallon Drums:	☐ YES	☒ NO
▪ Pits, Ponds, or Lagoons:	☐ YES	☒ NO
▪ Drains or Sumps	☐ YES	☒ NO
▪ Surface Impoundments:	☐ YES	☒ NO
▪ Waste Water:	☐ YES	☒ NO
▪ USTs/ASTs	☐ YES	☒ NO
▪ Injection/Production Monitoring Wells:	☐ YES	☒ NO
▪ Wastewater Treatment Units:	☐ YES	☒ NO
▪ Septic Tanks:	☐ YES	☒ NO
▪ PCB Containing Equipment:	☐ YES	☒ NO
▪ Asbestos:	☐ YES	☒ NO
▪ Incinerators:	☐ YES	☒ NO
▪ Equipment Containing Radioactive Material:	☐ YES	☒ NO
▪ Medical Waste:	☐ YES	☒ NO
▪ Explosive Material:	☐ YES	☒ NO
▪ Toxic Materials:	☐ YES	☒ NO:
▪ Stained Soil	☐ YES	☒ NO:
▪ Piping protruding from the ground	☐ YES	☒ NO:

15. Were any recognized environmental conditions identified during this site visit? ☐ YES ☒ NO

16. Were photographs taken? ☒ YES ☐ NO

Nicolas Anderson – OA

Name of Person(s) Completing Observations and Affiliation

2/11/15

Date

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PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

1. Address of Property: Cornhusker Int. Truck

2. Name of Facility: 3131 Cornhusker Hwy GIS Map ID 14

3. Type of operation (e.g.: industrial, manufacturing, airport, railroad, retail, other commercial, school, residential, agricultural): Repair Shop

4. Manufacturing facility: ☐ YES ☒ NO

5. If yes, SIC number (Standard Industrial Classification): ____________

6. Currently operating: ☒ YES ☐ NO

7. Describe use and past usage of surrounding properties; any obvious problems? Used car lot & scrap yard adjacent to West with UST on Deadmans Run Bank

   North: Commercial

   South: Deadmans Run

   East: Commercial

   West: Commercial

8. How many buildings are on this site? 2

9. Describe the heating and cooling systems if visible: —

10. Main roadway access to facility: Cornhusker Highway

11. Any roads without apparent outlets on the property? yes

Description of stream/river/pond: Deadmans Run Adjacent to South
Description of Terrain: Flat - Paved / Gravel
Description of drainage/any indication of stress: —

12. Source of potable water: City of Lincoln

13. Power company (name, if applicable to the property):
Gas:
Electric: LES
Fuel/Oil:
Other:

14. Are any of the following observed on-site:

	YES	NO
▪ Landfills:	☐ YES	☒ NO
▪ Solid Waste:	☒ YES	☐ NO
▪ 55 Gallon Drums:	☒ YES	☐ NO
▪ Pits, Ponds, or Lagoons:	☐ YES	☒ NO
▪ Drains or Sumps	☐ YES	☒ NO
▪ Surface Impoundments:	☐ YES	☒ NO
▪ Waste Water:	☐ YES	☒ NO
▪ USTs/ASTs	☐ YES	☒ NO
▪ Injection/Production Monitoring Wells:	☐ YES	☒ NO
▪ Wastewater Treatment Units:	☐ YES	☒ NO
▪ Septic Tanks:	☐ YES	☒ NO
▪ PCB Containing Equipment:	☐ YES	☒ NO
▪ Asbestos:	☐ YES	☒ NO
▪ Incinerators:	☐ YES	☒ NO
▪ Equipment Containing Radioactive Material:	☐ YES	☒ NO
▪ Medical Waste:	☐ YES	☒ NO
▪ Explosive Material:	☐ YES	☒ NO
▪ Toxic Materials:	☒ YES	☐ NO:
▪ Stained Soil/ pavement	☒ YES	☐ NO: small stains on pavement
▪ Piping protruding from the ground	☐ YES	☒ NO:

15. Were any recognized environmental conditions identified during this site visit? ☒ YES ☐ NO

Associated w/ Star city auto salvage to west. old AST/UST on Bank of Deadmans Run

16. Were photographs taken? ☒ YES ☐ NO

Nicolas Anderson - OA

Name of Person(s) Completing Observations and Affiliation

2-11-15

Date

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PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

1. Address of Property: 5600 Holdrege, Lincoln, NE

2. Name of Facility: Kwik Shop #650 - GIS Map ID 13

3. Type of operation (e.g.: industrial, manufacturing, airport, railroad, retail, other commercial, school, residential, agricultural): Fuel station + convenience shop

4. Manufacturing facility: ☐ YES ☒ NO

5. If yes, SIC number (Standard Industrial Classification): ______

6. Currently operating: ☒ YES ☐ NO

7. Describe use and past usage of surrounding properties; any obvious problems? Fuel station to SW

North: Retail strip + Hotel

South: Deadmans Run

East: Residential

West: Deadmans Run + Restaurant

PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

8. How many buildings are on this site? 1

9. Describe the heating and cooling systems if visible: –

10. Main roadway access to facility: Holdrege St

11. Any roads without apparent outlets on the property? –

Description of stream/river/pond: Deadmans Run Adjacent to SW

Description of Terrain: Paved - Flat

Description of drainage/any indication of stress: –

12. Source of potable water: City of Lincoln

13. Power company (name, if applicable to the property):

Gas:

Electric: LES

Fuel/Oil:

Other:

14. Are any of the following observed on-site:

▪ Landfills:	☐ YES	☒ NO	
▪ Solid Waste:	☒ YES	☐ NO	
▪ 55 Gallon Drums:	☐ YES	☒ NO	
▪ Pits, Ponds, or Lagoons:	☐ YES	☒ NO	
▪ Drains or Sumps	☐ YES	☐ NO	
▪ Surface Impoundments:	☐ YES	☒ NO	
▪ Waste Water:	☐ YES	☒ NO	
▪ USTs/ASTs	☒ YES	☐ NO	
▪ Injection/Production Monitoring Wells:	☐ YES	☒ NO	
▪ Wastewater Treatment Units:	☐ YES	☒ NO	
▪ Septic Tanks:	☐ YES	☒ NO	
▪ PCB Containing Equipment:	☒ YES	☐ NO	Electrical Transformer
▪ Asbestos:	☐ YES	☒ NO	
▪ Incinerators:	☐ YES	☒ NO	
▪ Equipment Containing Radioactive Material:	☐ YES	☒ NO	
▪ Medical Waste:	☐ YES	☒ NO	
▪ Explosive Material:	☐ YES	☒ NO	
▪ Toxic Materials:	☐ YES	☒ NO:	
▪ Stained Soil / Pavement	☒ YES	☐ NO:	Stains on pavement & possible stressed Soil
▪ Piping protruding from the ground	☐ YES	☒ NO:	

15. Were any recognized environmental conditions identified during this site visit? ☒ YES ☐ NO Stained Soil near solid waste dumpster

16. Were photographs taken? ☒ YES ☐ NO

Nicolas Anderson - OA

Name of Person(s) Completing Observations and Affiliation

2/10/15

Date

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PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

1. Address of Property: 1440 N 56th St

2. Name of Facility: Laundry Land - GIS Map ID 20

3. Type of operation (e.g.: industrial, manufacturing, airport, railroad, retail, other commercial, school, residential, agricultural): Dry Cleaner

4. Manufacturing facility: ☐ YES ☒ NO

5. If yes, SIC number (Standard Industrial Classification): ______

6. Currently operating: ☒ YES ☐ NO

7. Describe use and past usage of surrounding properties; any obvious problems? Fuel Stations west & North of facility

   North: Fuel station - Kwik shop #650 on EDR & Dead mans Run

   South: Restaurant followed by Residential

   East: Deadmans Run

   West: Fuel Station & Business strip

PHASE I ENVIRONMENTAL SITE ASSESSMENT
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

8. How many buildings are on this site? 1

9. Describe the heating and cooling systems if visible: —

10. Main roadway access to facility: N 56th St

11. Any roads without apparent outlets on the property? —

    Description of stream/river/pond: Deadmans Run Approx 50' NE
    Description of Terrain: Paved, Flat
    Description of drainage/any indication of stress: —

12. Source of potable water: City of Lincoln

13. Power company (name, if applicable to the property):
    Gas:
    Electric: LES
    Fuel/Oil:
    Other:

14. Are any of the following observed on-site:

▪ Landfills:	☐ YES	☒ NO
▪ Solid Waste:	☐ YES	☒ NO
▪ 55 Gallon Drums:	☐ YES	☒ NO
▪ Pits, Ponds, or Lagoons:	☐ YES	☒ NO
▪ Drains or Sumps	☐ YES	☒ NO
▪ Surface Impoundments:	☐ YES	☒ NO
▪ Waste Water:	☐ YES	☒ NO
▪ USTs/ASTs	☐ YES	☒ NO
▪ Injection/Production Monitoring Wells:	☐ YES	☒ NO
▪ Wastewater Treatment Units:	☐ YES	☒ NO
▪ Septic Tanks:	☐ YES	☒ NO
▪ PCB Containing Equipment:	☐ YES	☒ NO
▪ Asbestos:	☐ YES	☒ NO
▪ Incinerators:	☐ YES	☒ NO
▪ Equipment Containing Radioactive Material:	☐ YES	☒ NO
▪ Medical Waste:	☐ YES	☒ NO
▪ Explosive Material:	☐ YES	☒ NO
▪ Toxic Materials:	☐ YES	☒ NO:
▪ Stained Soil / Pavement	☒ YES	☐ NO: Small stains on pavement
▪ Piping protruding from the ground	☐ YES	☒ NO:

15. Were any recognized environmental conditions identified during this site visit? ☐ YES ☒ NO

16. Were photographs taken? ☒ YES ☐ NO

Nicolas Anderson - OA

Name of Person(s) Completing Observations and Affiliation

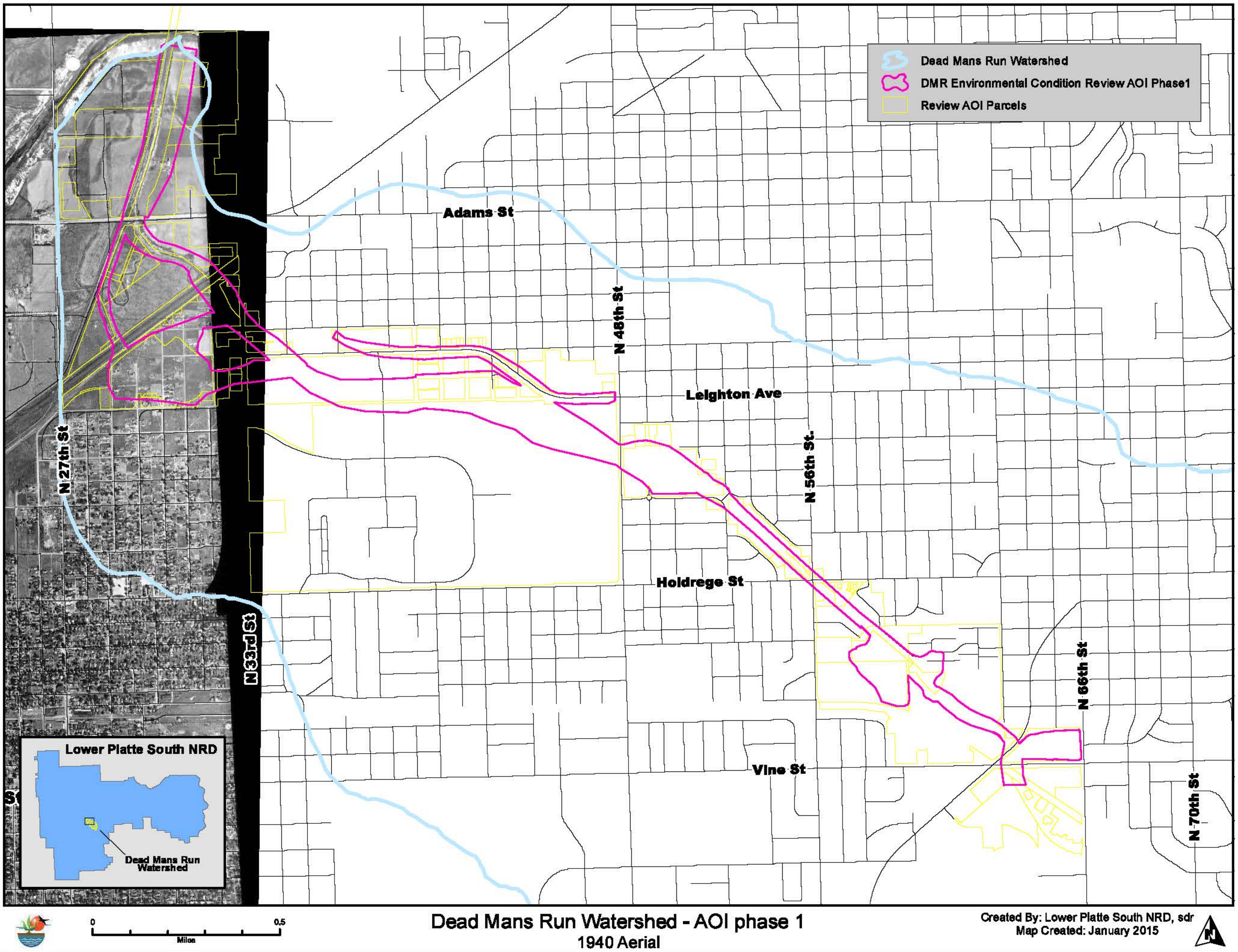
2/10/15

Date

F:\Projects\015-0189\Documents\Reports\Environmental\Due Diligence\Phase I ESA\site visits\Phase I Checklist_Deadmans Run.doc

Appendix D

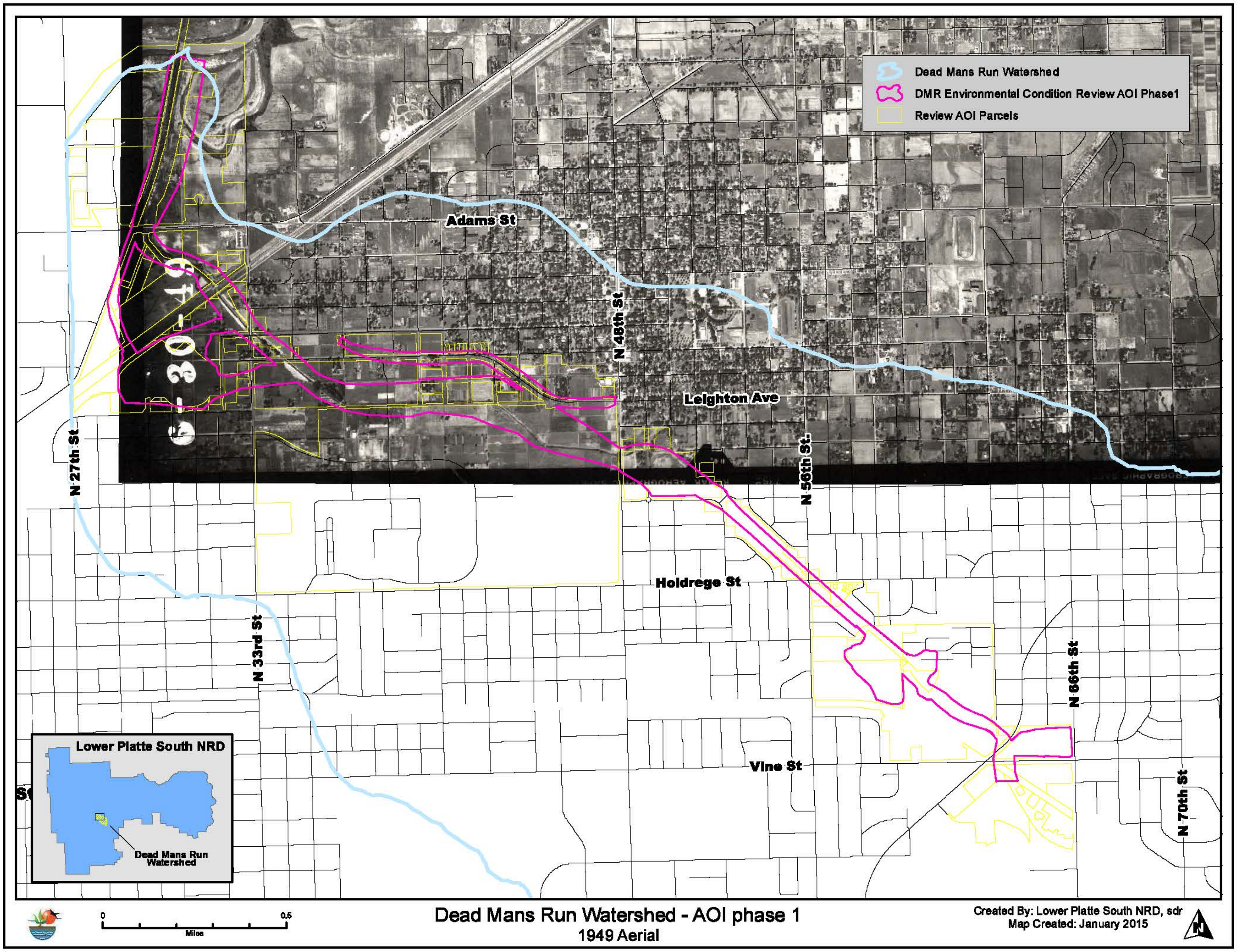
Historical Photographs of Deadmans Run



Dead Mans Run Watershed - AOI phase 1

1940 Aerial

Created By: Lower Platte South NRD, sdr
Map Created: January 2015

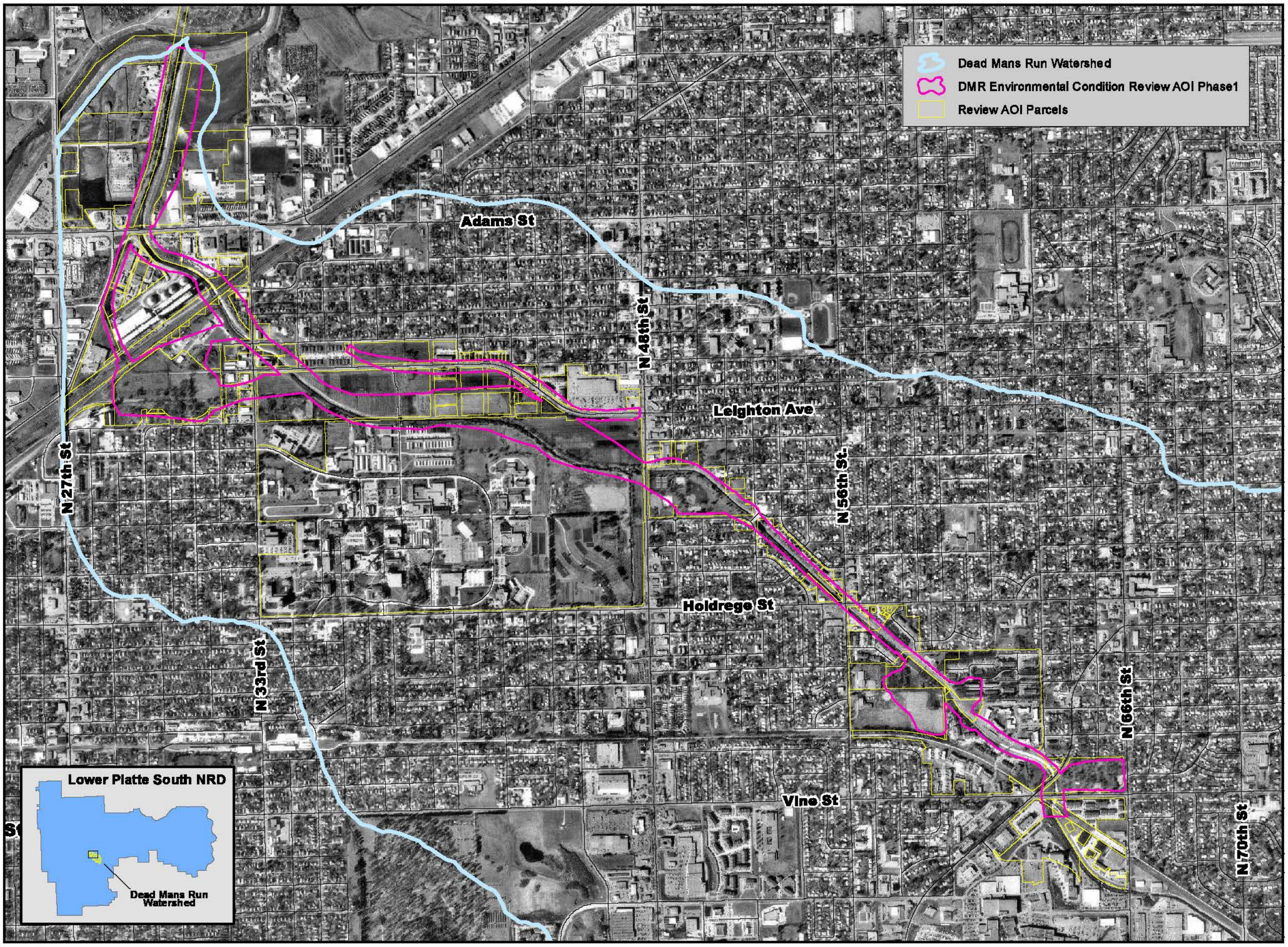


Dead Mans Run Watershed - AOI phase 1

1949 Aerial

Created By: Lower Platte South NRD, sdr
Map Created: January 2015

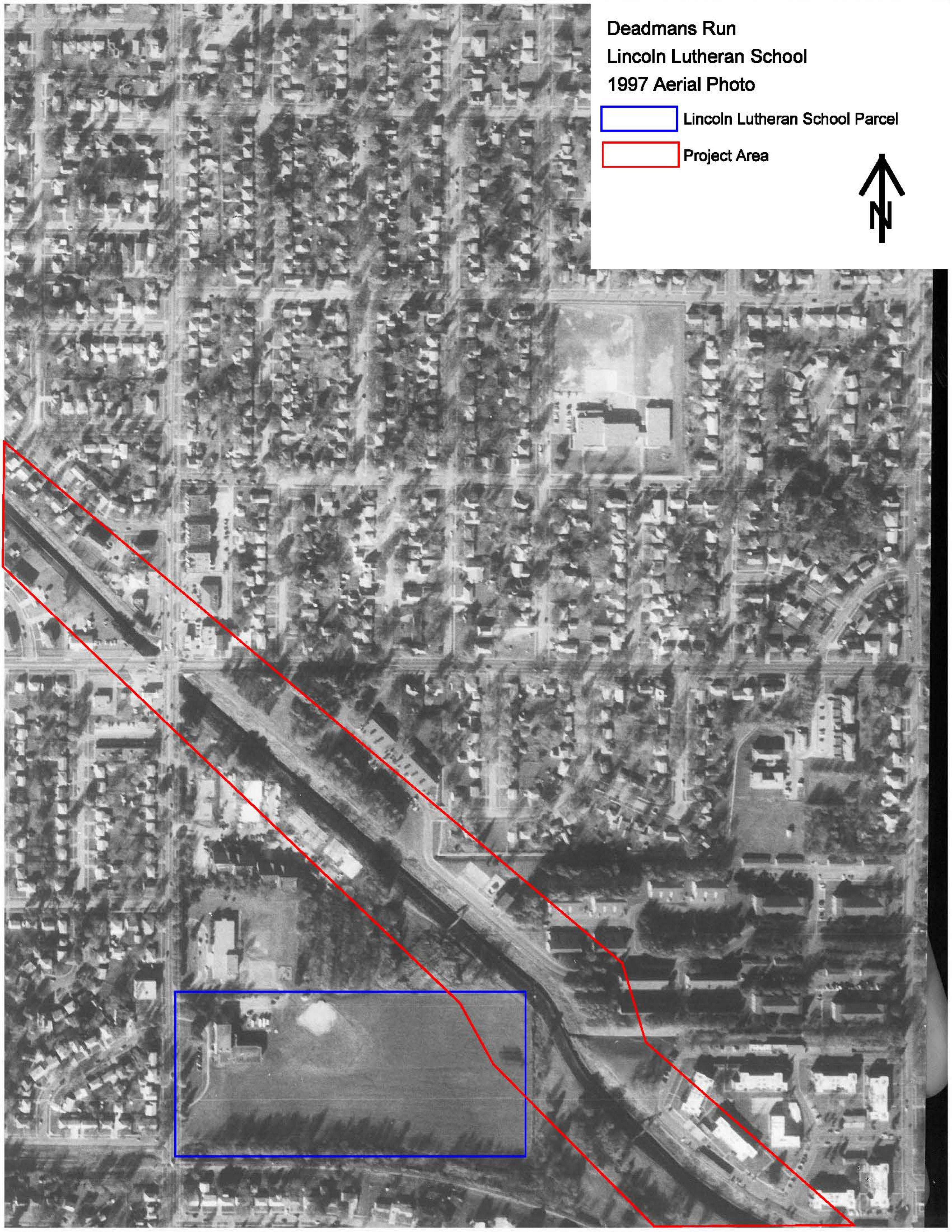

Deadmans Run
1955 Aerial Photo
Project Area
N



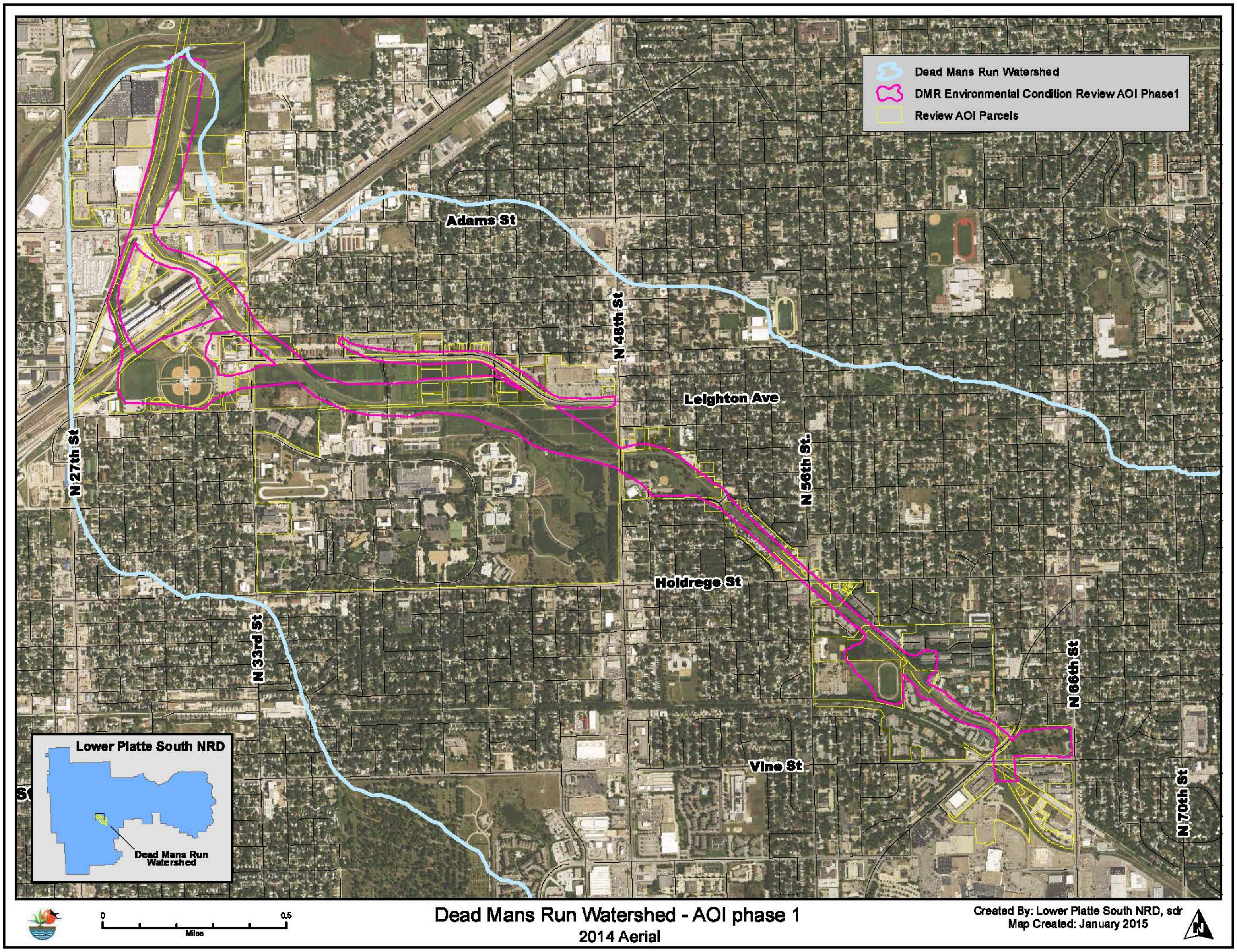
Dead Mans Run Watershed - AOI phase 1

1993 Aerial

Created By: Lower Platte South NRD, sdr
Map Created: January 2015



Deadmans Run
Lincoln Lutheran School
1997 Aerial Photo
Lincoln Lutheran School Parcel
Project Area
N



Dead Mans Run Watershed - AOI phase 1

2014 Aerial

Created By: Lower Platte South NRD, sdr
Map Created: January 2015

Dead Mans Run channel view looking northwest from 37th Street bridge
iversity property. March 1967.

Appendix E

Lancaster County Assessor's Office Documents

(Residential Property construction dates)

Residential Building Year Built

PID	OWNER	SITUS	PROP_CLASS	PRIMARY USE	YearBlt	Pre-1978
1721115009000	CHATEAU PROPERTIES NORTH LLC	1025 N 63 ST, LINCOLN, NE	C1	Multi-Family	1969	1
1717439017000	BARNASON, JOSEPH & CHRISTINA P	1512 DAVID DR, LINCOLN, NE	C1	Multi-Family	1972	1
1717439016000	UNITED EQUITY LLC	1530 DAVID DR, LINCOLN, NE	R1		1964	1
1717439015000	ZILLIG, PHILLIP L & JUDITH A	1536 DAVID DR, LINCOLN, NE	R1		1964	1
1717439014000	BENTZINGER, DAN & PAMELA	1542 DAVID DR, LINCOLN, NE	R1		1964	1
1717439013000	MERTES, BRADLEY D & ANGELA R	1600 DAVID DR, LINCOLN, NE	R1		1964	1
1717439012000	TRUAX, GARY A & ALBERTA L	1606 DAVID DR, LINCOLN, NE	R1	Multi-Family	1964	1
1717439011000	BIERBOWER, JAMES R	1612 DAVID DR, LINCOLN, NE	R1		1964	1
1717439010000	SEHNERT, GENE R & MARILYN C	1618 DAVID DR, LINCOLN, NE	R1		1964	1
1717439009000	COLLINS, CHRIS & SUE	1624 DAVID DR, LINCOLN, NE	R1		1964	1
1717432019000	1ST STREET PROPERTIES LLC	1625 DEWEESE DR, LINCOLN, NE	C1	Multi-Family	1972	1
1717439008000	WALKER, J GRACE	1630 DAVID DR, LINCOLN, NE	R1		1964	1
1717439007000	MOSS, DEBORAH L	1636 DAVID DR, LINCOLN, NE	R1		1964	1
1717439006000	FITL, SANDRA J	1640 DAVID DR, LINCOLN, NE	R1		1964	1
1717432018000	BALLARD, STERLING JAMES & DARLENE ELIZABETH & STEVEN JAMES	1701 DEWEESE DR, LINCOLN, NE	R1		1962	1
1717432017000	CARLSON, ADRIAN R	1715 DEWEESE DR, LINCOLN, NE	R1		1963	1
1717439003000	GREGG, JAMES L & DEANNA R	1720 N 52 ST, LINCOLN, NE	R1		1964	1
1717432016000	SCHIEBER INVESTMENTS LLC	1721 DEWEESE DR, LINCOLN, NE	R1		1963	1
1717432015000	BUDKE, MICHAEL & TOSHA	1727 DEWEESE DR, LINCOLN, NE	R1		1963	1
1717432014000	BEAN, ALLEN R & JEANNETTE H	1731 DEWEESE DR, LINCOLN, NE	R1		1963	1
1717432013000	CLARK, SCOTT A & DEBBIE L	1737 DEWEESE DR, LINCOLN, NE	R1	Multi-Family	1963	1
1717432012000	KLAPPERICH, ROBERT L & ARLENE	1745 DEWEESE DR, LINCOLN, NE	R1		1963	1
1717432011000	WILKE, NICKOLAS S & JENNIFER	1751 DEWEESE DR, LINCOLN, NE	R1		1963	1
1717439002000	MCCOY, WILLIAM E & TAMMIE J	1800 N 52 ST, LINCOLN, NE	R1		1964	1
1717432010000	HOLLERS, CLAUDE A & MAUREEN	1801 DEWEESE DR, LINCOLN, NE	R1		1963	1
1717439001000	EVERTSON, JUSTIN & TAMMY	1810 N 52 ST, LINCOLN, NE	R1		1920	1
1717432009000	WESKAMP, ROBERT A	1811 DEWEESE DR, LINCOLN, NE	R1		1963	1
1717432008000	COON, CINDY S	1817 DEWEESE DR, LINCOLN, NE	R1		1963	1
1717432007000	CARLSEN, RICKY G & DONNA J	1825 DEWEESE DR, LINCOLN, NE	R1		1963	1
1717432006000	KEHM, MARJORIE LOU REVOCABLE TRUST	1831 DEWEESE DR, LINCOLN, NE	R1		1963	1
1717432005000	SIGLER, JANETTE C	1837 DEWEESE DR, LINCOLN, NE	R1		1963	1
1717432004000	BOLDT, GARY D & ROBERTA A	1845 DEWEESE DR, LINCOLN, NE	R1		1962	1
1717141003000	EDMISTON, MABEL M LIFE ESTATE	2320 N 43 ST, LINCOLN, NE	R1	YearBlt	1900	1
1717142003000	BROWNIES BOYS	2360 N 44 ST, LINCOLN, NE	C1	Multi-Family	1989	0
1717137001000	CHEE-VEE LIMITED PARTNERSHIP	2441 N 44 ST, LINCOLN, NE	C1	Multi-Family	1978	0
1718230003000	HYWOOD, DAVID E REVOCABLE TRUST	3300 HUNTINGTON AVE, LINCOLN, NE	C1	Multi-Family	1975	1
1718231004000	SOLLENBERGER, ARLEN R & NYLA M	3500 HUNTINGTON AVE, LINCOLN, NE	C1	Multi-Family	1976	1
1718232012000	FLEGE, STACY S & SHAWN D	3632 HUNTINGTON AVE, LINCOLN, NE	C1	Multi-Family	1977	1
1718232004000	KARDELL, MADONNA G	3640 HUNTINGTON AVE, LINCOLN, NE	C1	Multi-Family	1977	1
1718232009000	LASSEN, ROBERT L & VELMA J & TIMOTHY J & KIMBERLY A	3641 BALDWIN AVE, LINCOLN, NE	C1	Multi-Family	1977	1

Residential Building Year Built

PID	OWNER	SITUS	PROP_CLASS	PRIMARY USE	YearBlt	Pre-1978
1718234005000	HUNTINGTON GROUP LLC	3825 BALDWIN AVE, LINCOLN, NE	C1	Multi-Family	1998	0
1718236001000	WPLA LLC	4000 HUNTINGTON AVE, LINCOLN, NE	C1	Multi-Family	1984	0
1717128006000	OSWALD, KEVIN A	4100 HUNTINGTON AVE, LINCOLN, NE	C1	Multi-Family	1976	1
1717128008000	SILVER CREEK INVESTMENT LLC	4112 HUNTINGTON AVE, LINCOLN, NE	C1	Multi-Family	1976	1
1717128013000	HSIEH, YU NIAN & AI LING	4132 HUNTINGTON AVE, LINCOLN, NE	C1	Multi-Family	1977	1
1717128011000	KAR INVESTMENTS LLC	4140 HUNTINGTON AVE, LINCOLN, NE	C1	Multi-Family	1977	1
1717137003000	CHEE-VEE LIMITED PARTNERSHIP	4315 HUNTINGTON AVE, LINCOLN, NE	C1	Multi-Family	1978	0
1717431004000	BOHLKEN, JAMES E & DIANNE J	5125 FRANCIS ST, LINCOLN, NE	R1		1972	1
1717431015000	FERRARO, DENNIS M	5135 FRANCIS ST, LINCOLN, NE	R1		1972	1
1717431001000	EKLUND, BLAIR T & MUHR, AUDRA A	5145 FRANCIS ST, LINCOLN, NE	R1		1972	1
1717432003000	SIMANEK, GARY L & PENNY L	5201 FRANCIS ST, LINCOLN, NE	R1		1960	1
1717432002000	APPLE, CHRISTOPHER T & WENDY A	5221 FRANCIS ST, LINCOLN, NE	R1	Multi-Family	1963	1
1721115006000	CHATEAU PROPERTIES NORTH LLC	5600 ABBEY CT, LINCOLN, NE	C1	Multi-Family	1986	0
1721100037009	SHIPP, DARYL R	5715 HOLDREGE ST, LINCOLN, NE	R1		1991	0
1721100037010	MURRAY, DAN L & PATRICIA A	5721 HOLDREGE ST, LINCOLN, NE	R1		1991	0
1721100037011	FERGUSON, ALIDA M TRUST	5727 HOLDREGE ST, LINCOLN, NE	R1		1991	0
1721100037012	COLLINS, TOMMY & JOANN	5733 HOLDREGE ST, LINCOLN, NE	R1		1991	0
1721115004000	CHATEAU PROPERTIES NORTH LLC	6100 VINE ST	C1	Multi-Family	1970	1
1721115005000	CHATEAU PROPERTIES NORTH LLC	825 N COTNER BLVD	C1	Multi-Family	1996	0
1721100037000	CILD HAVEN COURT CONDO BASE ACCOUNT	CILD HAVEN COURT Holdrege Street	R2		1991	0
			Total Residences built prior to 1978			48
Source	http://lincoln.ne.gov/gis/gisviewer/?PID=1717148001000					

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Property Detail Sheet (R92821)

Treasurer Info | GIS Map | Datasheet | Comp Sales
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Owner Information

Owner Name:	CHATEAU PROPERTIES NORTH LLC
Owner Address:	3100 S 72 ST LINCOLN,NE 68506
Property Address:	825 N COTNER BLVD LINCOLN, NE

Parcel Information

Legal Description:	CHATEAU FIRST ADDITION, Lot 5
Property ID:	17-21-115-005-000
Exemption Codes:	
Primary Class:	C1(Commercial Improved)
Primary Use:	07(Multi-Family)
Zoning:	R5(R5-Residential District)
Neighborhood:	MECCOM(MF East Central Lincoln)
Year Built:	1996
Imp Type:	N/A
No of Buildings:	0.0
Total Living Area:	

Sales History

Instrument #	Sale Date	Sale Price
2008053092	11/18/2008	0
1996015212	04/06/1996	0
1996014238	04/06/1996	0

Values Breakdown 2015 Preliminary Value

Total Non-Ag Assessed:	$5,339,000
Total Ag Sp Assessed:	$0

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County Assessor/Register of Deeds

Property Detail Sheet (R350667)

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Owner Information

Owner Name:	CHATEAU PROPERTIES NORTH LLC
Owner Address:	3100 S 72 ST LINCOLN,NE 68506
Property Address:	1025 N 63 ST LINCOLN, NE

Parcel Information

Legal Description:	CHATEAU FIRST ADDITION, 12.59 AC TRACT COMPRISED OF PORT OF LOT 3 (DESC 08-053096)
Property ID:	17-21-115-009-000
Exemption Codes:	
Primary Class:	C1(Commercial Improved)
Primary Use:	07(Multi-Family)
Zoning:	R4(R4-Residential District)
Neighborhood:	MECCOM(MF East Central Lincoln)
Year Built:	1969
Imp Type:	N/A
No of Buildings:	0.0
Total Living Area:	

Sales History

Instrument #	Sale Date	Sale Price
2008053096	11/18/2008	0

Values Breakdown

	2015 Preliminary Value
Total Non-Ag Assessed:	$9,214,000
Total Ag Sp Assessed:	$0

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Property Detail Sheet (R88298)

Treasurer Info GIS Map Datasheet Comp Sales
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Owner Information

Owner Name: BARNASON, JOSEPH & CHRISTINA P
Owner Address: 3911 VILLAGE CT
LINCOLN,NE 68516
Property Address: 1512 DAVID DR
LINCOLN, NE

Parcel Information

Legal Description: ELIZABETH PLAZA, BLOCK 4, Lot 17 - 19
Property ID: 17-17-439-017-000
Exemption Codes:
Primary Class: C1(Commercial Improved)
Primary Use: 07(Multi-Family)
Zoning: R2(R2-Residential District)
Neighborhood: MECCOM(MF East Central Lincoln)
Year Built: 1972
Imp Type: N/A
No of Buildings: 0.0
Total Living Area:

Sales History

Instrument #	Sale Date	Sale Price
2012054761	10/29/2012	635,000
1994002167	12/31/1993	710,000

Values Breakdown	2015 Preliminary Value
Total Non-Ag Assessed:	$296,900
Total Ag Sp Assessed:	

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Property Detail Sheet (R88297)

Owner Information

Owner Name:	UNITED EQUITY LLC
Owner Address:	PO BOX 5946 LINCOLN,NE 68505
Property Address:	1530 DAVID DR LINCOLN, NE

Parcel Information

Legal Description:	ELIZABETH PLAZA, BLOCK 4, Lot 15, S1' & LOT 16
Property ID:	17-17-439-016-000
Exemption Codes:	
Primary Class:	R1(Residential Improved)
Primary Use:	01(Single Family)
Zoning:	R2(R2-Residential District)
Neighborhood:	7MNE043(Uni Place South)
Year Built:	1964
Imp Type:	R1(1 Story)
No of Buildings:	1.0
Total Living Area:	960

Sales History

Instrument #	Sale Date	Sale Price
2015000389	12/31/2014	30,000
2014029289	08/01/2014	0
1994037285	08/18/1994	63,900

Values Breakdown	2015 Preliminary Value
Total Non-Ag Assessed:	$90,900
Total Ag Sp Assessed:	

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Property Detail Sheet (R88296)

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Owner Information

Owner Name: ZILLIG, PHILLIP L & JUDITH A
Owner Address: 1536 DAVID DR
LINCOLN,NE 68504
Property Address: 1536 DAVID DR
LINCOLN, NE

Parcel Information

Legal Description: ELIZABETH PLAZA, BLOCK 4, Lot 15, N54'
Property ID: 17-17-439-015-000
Exemption Codes:
Primary Class: R1(Residential Improved)
Primary Use: 01(Single Family)
Zoning: R2(R2-Residential District)
Neighborhood: 7MNE043(Uni Place South)
Year Built: 1964
Imp Type: R1(1 Story)
No of Buildings: 1.0
Total Living Area: 960

Sales History

Instrument #	Sale Date	Sale Price

Values Breakdown

2015 Preliminary Value

Total Non-Ag Assessed: $98,700
Total Ag Sp Assessed:

LANCASTER COUNTY ASSESSOR

County Assessor/Register of Deeds

Property Detail Sheet (R88295)

Owner Information

Owner Name:	BENTZINGER, DAN & PAMELA
Owner Address:	1130 RAINY RIVER BAY LINCOLN,NE 68505
Property Address:	1542 DAVID DR LINCOLN, NE

Parcel Information

Legal Description:	ELIZABETH PLAZA, BLOCK 4, Lot 14
Property ID:	17-17-439-014-000
Exemption Codes:	
Primary Class:	R1(Residential Improved)
Primary Use:	01(Single Family)
Zoning:	R2(R2-Residential District)
Neighborhood:	7MNE043(Uni Place South)
Year Built:	1964
Imp Type:	R1(1 Story)
No of Buildings:	1.0
Total Living Area:	960

Sales History

Instrument #	Sale Date	Sale Price
2013043874	08/16/2013	88,000
2013012341	01/15/2013	0
2003082252	06/19/2003	96,000

Values Breakdown

	2015 Preliminary Value
Total Non-Ag Assessed:	$92,200
Total Ag Sp Assessed:	

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Property Detail Sheet (R88294)

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Owner Information

Owner Name:	MERTES, BRADLEY D & ANGELA R
Owner Address:	1600 DAVID DR LINCOLN,NE 68504
Property Address:	1600 DAVID DR LINCOLN, NE

Parcel Information

Legal Description:	ELIZABETH PLAZA, BLOCK 4, Lot 13
Property ID:	17-17-439-013-000
Exemption Codes:	
Primary Class:	R1(Residential Improved)
Primary Use:	01(Single Family)
Zoning:	R2(R2-Residential District)
Neighborhood:	7MNE043(Uni Place South)
Year Built:	1964
Imp Type:	R1(1 Story)
No of Buildings:	1.0
Total Living Area:	1,208

Sales History

Instrument #	Sale Date	Sale Price
1998038639	07/28/1998	90,000
1994016203	03/31/1994	70,000

Values Breakdown

	2015 Preliminary Value
Total Non-Ag Assessed:	$112,600
Total Ag Sp Assessed:	

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Property Detail Sheet (R88293)

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Owner Information

Owner Name:	TRUAX, GARY A & ALBERTA L
Owner Address:	1606 DAVID DR LINCOLN,NE 68504
Property Address:	1606 DAVID DR LINCOLN, NE

Parcel Information

Legal Description:	ELIZABETH PLAZA, BLOCK 4, Lot 12
Property ID:	17-17-439-012-000
Exemption Codes:	
Primary Class:	R1(Residential Improved)
Primary Use:	01(Single Family)
Zoning:	R2(R2-Residential District)
Neighborhood:	7MNE043(Uni Place South)
Year Built:	1964
Imp Type:	R1(1 Story)
No of Buildings:	1.0
Total Living Area:	960

Sales History

Instrument #	Sale Date	Sale Price

Values Breakdown	2015 Preliminary Value
Total Non-Ag Assessed:	$96,000
Total Ag Sp Assessed:	

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Property Detail Sheet (R88292)

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Owner Information

Owner Name:	BIERBOWER, JAMES R
Owner Address:	1612 DAVID DR LINCOLN,NE 68504-3124
Property Address:	1612 DAVID DR LINCOLN, NE

Parcel Information

Legal Description:	ELIZABETH PLAZA, BLOCK 4, Lot 11
Property ID:	17-17-439-011-000
Exemption Codes:	
Primary Class:	R1(Residential Improved)
Primary Use:	01(Single Family)
Zoning:	R2(R2-Residential District)
Neighborhood:	7MNE043(Uni Place South)
Year Built:	1964
Imp Type:	R1(1 Story)
No of Buildings:	1.0
Total Living Area:	994

Sales History

Instrument #	Sale Date	Sale Price
2014001360	01/09/2014	33,000
2013064238	12/20/2013	33,000
2008039016	08/09/2008	120,000

Values Breakdown

	2015 Preliminary Value
Total Non-Ag Assessed:	$125,000
Total Ag Sp Assessed:	$0

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Property Detail Sheet (R88291)

Owner Information

Owner Name:	SEHNERT, GENE R & MARILYN C
Owner Address:	1618 DAVID DR LINCOLN,NE 68504
Property Address:	1618 DAVID DR LINCOLN, NE

Parcel Information

Legal Description:	ELIZABETH PLAZA, BLOCK 4, Lot 10
Property ID:	17-17-439-010-000
Exemption Codes:	
Primary Class:	R1(Residential Improved)
Primary Use:	01(Single Family)
Zoning:	R2(R2-Residential District)
Neighborhood:	7MNE043(Uni Place South)
Year Built:	1964
Imp Type:	R1(1 Story)
No of Buildings:	1.0
Total Living Area:	1,252

Sales History

Instrument #	Sale Date	Sale Price

Values Breakdown

	2015 Preliminary Value
Total Non-Ag Assessed:	$117,000
Total Ag Sp Assessed:	$0

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Property Detail Sheet (R88290)

Treasurer Info | GIS Map | Datasheet | Comp Sales
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Owner Information

Owner Name: COLLINS, CHRIS & SUE
Owner Address: 7725 MESA RD
LINCOLN,NE 68505
Property Address: 1624 DAVID DR
LINCOLN, NE

Parcel Information

Legal Description: ELIZABETH PLAZA, BLOCK 4, Lot 9
Property ID: 17-17-439-009-000
Exemption Codes:
Primary Class: R1(Residential Improved)
Primary Use: 01(Single Family)
Zoning: R2(R2-Residential District)
Neighborhood: 7MNE043(Uni Place South)
Year Built: 1964
Imp Type: R1(1 Story)
No of Buildings: 1.0
Total Living Area: 964

Sales History

Instrument #	Sale Date	Sale Price
2013026259	05/15/2013	90,500
2013024888	10/25/2012	0
2009001091	01/09/2009	0

Values Breakdown — 2015 Preliminary Value

Total Non-Ag Assessed: $92,600
Total Ag Sp Assessed:

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Property Detail Sheet (R88219)

Treasurer Info | GIS Map | Datasheet | Comp Sales
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Owner Information

Owner Name:	1ST STREET PROPERTIES LLC
Owner Address:	740 S 48 ST LINCOLN,NE 68510
Property Address:	1625 DEWEESE DR LINCOLN, NE

Parcel Information

Legal Description:	ELIZABETH PLAZA, BLOCK 3, Lot 19 - 21
Property ID:	17-17-432-019-000
Exemption Codes:	
Primary Class:	C1(Commercial Improved)
Primary Use:	07(Multi-Family)
Zoning:	R2(R2-Residential District)
Neighborhood:	MECCOM(MF East Central Lincoln)
Year Built:	1972
Imp Type:	N/A
No of Buildings:	0.0
Total Living Area:	

Sales History

Instrument #	Sale Date	Sale Price
2004080599	12/15/2004	526,000
1998020130	04/24/1998	255,000
1994047199	10/28/1994	230,000

Values Breakdown	2015 Preliminary Value
Total Non-Ag Assessed:	$281,400
Total Ag Sp Assessed:	$0

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Property Detail Sheet (R88289)

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Owner Information

Owner Name:	WALKER, J GRACE
Owner Address:	1630 DAVID DR LINCOLN,NE 68504
Property Address:	1630 DAVID DR LINCOLN, NE

Parcel Information

Legal Description:	ELIZABETH PLAZA, BLOCK 4, Lot 8
Property ID:	17-17-439-008-000
Exemption Codes:	
Primary Class:	R1(Residential Improved)
Primary Use:	01(Single Family)
Zoning:	R2(R2-Residential District)
Neighborhood:	7MNE043(Uni Place South)
Year Built:	1964
Imp Type:	R1(1 Story)
No of Buildings:	1.0
Total Living Area:	936

Sales History

Instrument #	Sale Date	Sale Price
2009029583	05/29/2009	0
2006021989	05/08/2006	0
2005056542	09/16/2005	0

Values Breakdown

	2015 Preliminary Value
Total Non-Ag Assessed:	$101,700
Total Ag Sp Assessed:	$0

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Property Detail Sheet (R88288)

Owner Information

Owner Name:	MOSS, DEBORAH L
Owner Address:	1636 DAVID DR LINCOLN,NE 68505
Property Address:	1636 DAVID DR LINCOLN, NE

Parcel Information

Legal Description:	ELIZABETH PLAZA, BLOCK 4, Lot 7
Property ID:	17-17-439-007-000
Exemption Codes:	
Primary Class:	R1(Residential Improved)
Primary Use:	01(Single Family)
Zoning:	R2(R2-Residential District)
Neighborhood:	7MNE043(Uni Place South)
Year Built:	1964
Imp Type:	R1(1 Story)
No of Buildings:	1.0
Total Living Area:	936

Sales History

Instrument #	Sale Date	Sale Price
2008041611	08/27/2008	110,000
2002060830	09/10/2002	90,000
2000055582	11/15/2000	93,000

Values Breakdown **2015 Preliminary Value**

Total Non-Ag Assessed:	$99,700
Total Ag Sp Assessed:	$0

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Property Detail Sheet (R88287)

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Owner Information

Owner Name:	FITL, SANDRA J
Owner Address:	1640 DAVID DR LINCOLN,NE 68504
Property Address:	1640 DAVID DR LINCOLN, NE

Parcel Information

Legal Description:	ELIZABETH PLAZA, BLOCK 4, Lot 6
Property ID:	17-17-439-006-000
Exemption Codes:	
Primary Class:	R1(Residential Improved)
Primary Use:	01(Single Family)
Zoning:	R2(R2-Residential District)
Neighborhood:	7MNE043(Uni Place South)
Year Built:	1964
Imp Type:	R1(1 Story)
No of Buildings:	1.0
Total Living Area:	792

Sales History

Instrument #	Sale Date	Sale Price
1995014870	05/19/1995	59,000

Values Breakdown	2015 Preliminary Value
Total Non-Ag Assessed:	$78,000
Total Ag Sp Assessed:	

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Property Detail Sheet (R88218)

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Owner Information

Owner Name:	BALLARD, STERLING JAMES & DARLENE ELIZABETH & STEVEN JAMES
Owner Address:	1701 DEWEESE DR LINCOLN,NE 68504
Property Address:	1701 DEWEESE DR LINCOLN, NE

Parcel Information

Legal Description:	ELIZABETH PLAZA, BLOCK 3, Lot 18
Property ID:	17-17-432-018-000
Exemption Codes:	
Primary Class:	R1(Residential Improved)
Primary Use:	01(Single Family)
Zoning:	R2(R2-Residential District)
Neighborhood:	7MNE043(Uni Place South)
Year Built:	1962
Imp Type:	R1(1 Story)
No of Buildings:	1.0
Total Living Area:	977

Sales History

Instrument #	Sale Date	Sale Price
2002021567	04/02/2002	0

Values Breakdown

	2015 Preliminary Value
Total Non-Ag Assessed:	$110,000
Total Ag Sp Assessed:	$0

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Property Detail Sheet (R88217)

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Owner Information

Owner Name:	CARLSON, ADRIAN R
Owner Address:	1715 DEWEESE DR LINCOLN,NE 68505
Property Address:	1715 DEWEESE DR LINCOLN, NE

Parcel Information

Legal Description:	ELIZABETH PLAZA, BLOCK 3, Lot 17
Property ID:	17-17-432-017-000
Exemption Codes:	
Primary Class:	R1(Residential Improved)
Primary Use:	01(Single Family)
Zoning:	R2(R2-Residential District)
Neighborhood:	7MNE043(Uni Place South)
Year Built:	1963
Imp Type:	R1(1 Story)
No of Buildings:	1.0
Total Living Area:	994

Sales History

Instrument #	Sale Date	Sale Price
2013020921	04/18/2013	108,000
2007027396	05/31/2007	105,000
1998060403	10/29/1998	82,000

Values Breakdown 2015 Preliminary Value

Total Non-Ag Assessed:	$105,800
Total Ag Sp Assessed:	$0

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Property Detail Sheet (R88284)

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Owner Information

Owner Name:	GREGG, JAMES L & DEANNA R
Owner Address:	1720 N 52 ST LINCOLN,NE 68504
Property Address:	1720 N 52 ST LINCOLN, NE

Parcel Information

Legal Description:	ELIZABETH PLAZA, BLOCK 4, Lot 3
Property ID:	17-17-439-003-000
Exemption Codes:	
Primary Class:	R1(Residential Improved)
Primary Use:	01(Single Family)
Zoning:	R2(R2-Residential District)
Neighborhood:	7MNE043(Uni Place South)
Year Built:	1964
Imp Type:	R1(1 Story)
No of Buildings:	1.0
Total Living Area:	1,219

Sales History

Instrument #	Sale Date	Sale Price
2001015583	03/22/2001	111,000

Values Breakdown

	2015 Preliminary Value
Total Non-Ag Assessed:	$136,500
Total Ag Sp Assessed:	

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Property Detail Sheet (R88216)

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Owner Information

Owner Name:	SCHIEBER INVESTMENTS LLC
Owner Address:	12100 W CENTER RD STE #518 OMAHA,NE 68144-3960
Property Address:	1721 DEWEESE DR LINCOLN, NE

Parcel Information

Legal Description:	ELIZABETH PLAZA, BLOCK 3, Lot 16
Property ID:	17-17-432-016-000
Exemption Codes:	
Primary Class:	R1(Residential Improved)
Primary Use:	01(Single Family)
Zoning:	R2(R2-Residential District)
Neighborhood:	7MNE043(Uni Place South)
Year Built:	1963
Imp Type:	R1(1 Story)
No of Buildings:	1.0
Total Living Area:	1,028

Sales History

Instrument #	Sale Date	Sale Price
2013023282	05/04/2013	0
2013000174	01/02/2013	0
2005061054	10/06/2005	0

Values Breakdown

	2015 Preliminary Value
Total Non-Ag Assessed:	$110,600
Total Ag Sp Assessed:	$0

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Property Detail Sheet (R88215)

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Owner Information

Owner Name:	BUDKE, MICHAEL & TOSHA
Owner Address:	1727 DEWEESE DR LINCOLN,NE 68504
Property Address:	1727 DEWEESE DR LINCOLN, NE

Parcel Information

Legal Description:	ELIZABETH PLAZA, BLOCK 3, Lot 15
Property ID:	17-17-432-015-000
Exemption Codes:	
Primary Class:	R1(Residential Improved)
Primary Use:	01(Single Family)
Zoning:	R2(R2-Residential District)
Neighborhood:	7MNE043(Uni Place South)
Year Built:	1963
Imp Type:	R1(1 Story)
No of Buildings:	1.0
Total Living Area:	884

Sales History

Instrument #	Sale Date	Sale Price
2012012898	03/15/2012	105,900
2006051540	10/11/2006	105,000
1998025958	05/29/1998	0

Values Breakdown

	2015 Preliminary Value
Total Non-Ag Assessed:	$100,100
Total Ag Sp Assessed:	

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Property Detail Sheet (R88214)

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Owner Information

Owner Name:	BEAN, ALLEN R & JEANNETTE H
Owner Address:	1731 DEWEESE DR LINCOLN,NE 68504
Property Address:	1731 DEWEESE DR LINCOLN, NE

Parcel Information

Legal Description:	ELIZABETH PLAZA, BLOCK 3, Lot 14
Property ID:	17-17-432-014-000
Exemption Codes:	
Primary Class:	R1(Residential Improved)
Primary Use:	01(Single Family)
Zoning:	R2(R2-Residential District)
Neighborhood:	7MNE043(Uni Place South)
Year Built:	1963
Imp Type:	R1(1 Story)
No of Buildings:	1.0
Total Living Area:	1,019

Sales History

Instrument #	Sale Date	Sale Price
1995026016	08/14/1995	75,000

Values Breakdown

	2015 Preliminary Value
Total Non-Ag Assessed:	$112,600
Total Ag Sp Assessed:	$0

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Property Detail Sheet (R88213)

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Owner Information

Owner Name:	CLARK, SCOTT A & DEBBIE L
Owner Address:	1737 DEWEESE DR LINCOLN,NE 68504
Property Address:	1737 DEWEESE DR LINCOLN, NE

Parcel Information

Legal Description:	ELIZABETH PLAZA, BLOCK 3, Lot 13
Property ID:	17-17-432-013-000
Exemption Codes:	
Primary Class:	R1(Residential Improved)
Primary Use:	01(Single Family)
Zoning:	R2(R2-Residential District)
Neighborhood:	7MNE043(Uni Place South)
Year Built:	1963
Imp Type:	R1(1 Story)
No of Buildings:	1.0
Total Living Area:	1,004

Sales History

Instrument #	Sale Date	Sale Price
1995008118	03/23/1995	75,000

Values Breakdown

	2015 Preliminary Value
Total Non-Ag Assessed:	$112,600
Total Ag Sp Assessed:	$0

Property Detail Sheet (R88212)

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Owner Information

Owner Name:	KLAPPERICH, ROBERT L & ARLENE
Owner Address:	1745 DEWEESE DR LINCOLN,NE 68504
Property Address:	1745 DEWEESE DR LINCOLN, NE

Parcel Information

Legal Description:	ELIZABETH PLAZA, BLOCK 3, Lot 12
Property ID:	17-17-432-012-000
Exemption Codes:	
Primary Class:	R1(Residential Improved)
Primary Use:	01(Single Family)
Zoning:	R2(R2-Residential District)
Neighborhood:	7MNE043(Uni Place South)
Year Built:	1963
Imp Type:	R1(1 Story)
No of Buildings:	1.0
Total Living Area:	1,028

Sales History

Instrument #	Sale Date	Sale Price

Values Breakdown

	2015 Preliminary Value
Total Non-Ag Assessed:	$100,900
Total Ag Sp Assessed:	$0

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Property Detail Sheet (R88211)

Owner Information

Owner Name:	WILKE, NICKOLAS S & JENNIFER
Owner Address:	14121 GUILDFORD ST WAVERLY,NE 68462
Property Address:	1751 DEWEESE DR LINCOLN, NE

Parcel Information

Legal Description:	ELIZABETH PLAZA, BLOCK 3, Lot 11
Property ID:	17-17-432-011-000
Exemption Codes:	
Primary Class:	R1(Residential Improved)
Primary Use:	01(Single Family)
Zoning:	R2(R2-Residential District)
Neighborhood:	7MNE043(Uni Place South)
Year Built:	1963
Imp Type:	R1(1 Story)
No of Buildings:	1.0
Total Living Area:	902

Sales History

Instrument #	Sale Date	Sale Price
2013049728	09/18/2013	0
2006020345	04/21/2006	112,500
2003030069	03/27/2003	99,000

Values Breakdown

	2015 Preliminary Value
Total Non-Ag Assessed:	$105,200
Total Ag Sp Assessed:	$0

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Property Detail Sheet (R88283)

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Owner Information

Owner Name:	MCCOY, WILLLIAM E & TAMMIE J
Owner Address:	1800 N 52 ST LINCOLN,NE 68504
Property Address:	1800 N 52 ST LINCOLN, NE

Parcel Information

Legal Description:	ELIZABETH PLAZA, BLOCK 4, Lot 2
Property ID:	17-17-439-002-000
Exemption Codes:	
Primary Class:	R1(Residential Improved)
Primary Use:	01(Single Family)
Zoning:	R2(R2-Residential District)
Neighborhood:	7MNE043(Uni Place South)
Year Built:	1964
Imp Type:	R1(1 Story)
No of Buildings:	1.0
Total Living Area:	960

Sales History

Instrument #	Sale Date	Sale Price

Values Breakdown	2015 Preliminary Value
Total Non-Ag Assessed:	$107,600
Total Ag Sp Assessed:	

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Property Detail Sheet (R88210)

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Owner Information

Owner Name:	HOLLERS, CLAUDE A & MAUREEN
Owner Address:	1801 DEWEESE DR LINCOLN,NE 68504
Property Address:	1801 DEWEESE DR LINCOLN, NE

Parcel Information

Legal Description:	ELIZABETH PLAZA, BLOCK 3, Lot 10
Property ID:	17-17-432-010-000
Exemption Codes:	
Primary Class:	R1(Residential Improved)
Primary Use:	01(Single Family)
Zoning:	R2(R2-Residential District)
Neighborhood:	7MNE043(Uni Place South)
Year Built:	1963
Imp Type:	R1(1 Story)
No of Buildings:	1.0
Total Living Area:	984

Sales History

Instrument #	Sale Date	Sale Price

Values Breakdown — 2015 Preliminary Value

Total Non-Ag Assessed:	$108,000
Total Ag Sp Assessed:	$0

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Property Detail Sheet (R88282)

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Owner Information

Owner Name: EVERTSON, JUSTIN & TAMMY
Owner Address: 10621 N 138 ST
WAVERLY,NE 68462
Property Address: 1810 N 52 ST
LINCOLN, NE

Parcel Information

Legal Description: ELIZABETH PLAZA, BLOCK 4, Lot 1
Property ID: 17-17-439-001-000
Exemption Codes:
Primary Class: R1(Residential Improved)
Primary Use: 01(Single Family)
Zoning: R2(R2-Residential District)
Neighborhood: 7LNE222(University Place - Low)
Year Built: 1920
Imp Type: BN(Bungalow)
No of Buildings: 1.0
Total Living Area: 832

Sales History

Instrument #	Sale Date	Sale Price
2014011169	03/28/2014	112,000
2011030097	06/28/2011	115,000
2006034413	07/11/2006	105,000

Values Breakdown

	2015 Preliminary Value
Total Non-Ag Assessed:	$110,800
Total Ag Sp Assessed:	

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Property Detail Sheet (R88209)

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Owner Information

Owner Name:	WESKAMP, ROBERT A
Owner Address:	1811 DEWEESE DR LINCOLN,NE 68504
Property Address:	1811 DEWEESE DR LINCOLN, NE

Parcel Information

Legal Description:	ELIZABETH PLAZA, BLOCK 3, Lot 9
Property ID:	17-17-432-009-000
Exemption Codes:	
Primary Class:	R1(Residential Improved)
Primary Use:	01(Single Family)
Zoning:	R2(R2-Residential District)
Neighborhood:	7MNE043(Uni Place South)
Year Built:	1963
Imp Type:	R1(1 Story)
No of Buildings:	1.0
Total Living Area:	1,004

Sales History

Instrument #	Sale Date	Sale Price
1994032800	07/11/1994	51,000

Values Breakdown	**2015 Preliminary Value**
Total Non-Ag Assessed:	$93,600
Total Ag Sp Assessed:	$0

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Property Detail Sheet (R88208)

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Owner Information

Owner Name:	COON, CINDY S
Owner Address:	1817 DEWEESE DR LINCOLN,NE 68504
Property Address:	1817 DEWEESE DR LINCOLN, NE

Parcel Information

Legal Description:	ELIZABETH PLAZA, BLOCK 3, Lot 8
Property ID:	17-17-432-008-000
Exemption Codes:	
Primary Class:	R1(Residential Improved)
Primary Use:	01(Single Family)
Zoning:	R2(R2-Residential District)
Neighborhood:	7MNE043(Uni Place South)
Year Built:	1963
Imp Type:	R1(1 Story)
No of Buildings:	1.0
Total Living Area:	908

Sales History

Instrument #	Sale Date	Sale Price
2004047305	07/01/2004	0
1996001692	01/10/1996	70,000

Values Breakdown	2015 Preliminary Value
Total Non-Ag Assessed:	$92,100
Total Ag Sp Assessed:	$0

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Property Detail Sheet (R88207)

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Owner Information

Owner Name:	CARLSEN, RICKY G & DONNA J
Owner Address:	1825 DEWEESE DR LINCOLN,NE 68504
Property Address:	1825 DEWEESE DR LINCOLN, NE

Parcel Information

Legal Description:	ELIZABETH PLAZA, BLOCK 3, Lot 7
Property ID:	17-17-432-007-000
Exemption Codes:	
Primary Class:	R1(Residential Improved)
Primary Use:	01(Single Family)
Zoning:	R2(R2-Residential District)
Neighborhood:	7MNE043(Uni Place South)
Year Built:	1963
Imp Type:	R1(1 Story)
No of Buildings:	1.0
Total Living Area:	994

Sales History

Instrument #	Sale Date	Sale Price
1998030327	06/19/1998	83,000
1995014848	05/27/1995	73,000

Values Breakdown	2015 Preliminary Value
Total Non-Ag Assessed:	$106,100
Total Ag Sp Assessed:	$0

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Property Detail Sheet (R88206)

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Owner Information

Owner Name: KEHM, MARJORIE LOU REVOCABLE TRUST
Owner Address: 1831 DEWEESE DR
LINCOLN,NE 68504
Property Address: 1831 DEWEESE DR
LINCOLN, NE

Parcel Information

Legal Description: ELIZABETH PLAZA, BLOCK 3, Lot 6
Property ID: 17-17-432-006-000
Exemption Codes:
Primary Class: R1(Residential Improved)
Primary Use: 01(Single Family)
Zoning: R2(R2-Residential District)
Neighborhood: 7MNE043(Uni Place South)
Year Built: 1963
Imp Type: R1(1 Story)
No of Buildings: 1.0
Total Living Area: 994

Sales History

Instrument #	Sale Date	Sale Price
2011027199	06/23/2011	0
2011024901	05/20/2011	

Values Breakdown	2015 Preliminary Value
Total Non-Ag Assessed:	$95,600
Total Ag Sp Assessed:	$0

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Property Detail Sheet (R88205)

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Owner Information

Owner Name:	SIGLER, JANETTE C
Owner Address:	1837 DEWEESE DR LINCOLN,NE 68504
Property Address:	1837 DEWEESE DR LINCOLN, NE

Parcel Information

Legal Description:	ELIZABETH PLAZA, BLOCK 3, Lot 5
Property ID:	17-17-432-005-000
Exemption Codes:	
Primary Class:	R1(Residential Improved)
Primary Use:	01(Single Family)
Zoning:	R2(R2-Residential District)
Neighborhood:	7MNE043(Uni Place South)
Year Built:	1963
Imp Type:	R1(1 Story)
No of Buildings:	1.0
Total Living Area:	1,293

Sales History

Instrument #	Sale Date	Sale Price
2009043791	12/10/2005	0
2005067010	11/10/2005	
1994027025	06/07/1994	0

Values Breakdown — 2015 Preliminary Value

Total Non-Ag Assessed:	$132,400
Total Ag Sp Assessed:	$0

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Property Detail Sheet (R88204)

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Owner Information

Owner Name:	BOLDT, GARY D & ROBERTA A
Owner Address:	1845 DEWEESE DR LINCOLN,NE 68504
Property Address:	1845 DEWEESE DR LINCOLN, NE

Parcel Information

Legal Description:	ELIZABETH PLAZA, BLOCK 3, Lot 4
Property ID:	17-17-432-004-000
Exemption Codes:	
Primary Class:	R1(Residential Improved)
Primary Use:	01(Single Family)
Zoning:	R2(R2-Residential District)
Neighborhood:	7MNE043(Uni Place South)
Year Built:	1962
Imp Type:	R1(1 Story)
No of Buildings:	1.0
Total Living Area:	900

Sales History

Instrument #	Sale Date	Sale Price

Values Breakdown

	2015 Preliminary Value
Total Non-Ag Assessed:	$99,200
Total Ag Sp Assessed:	$0

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Property Detail Sheet (R87558)

Owner Information

Owner Name:	EDMISTON, MABEL M LIFE ESTATE
Owner Address:	2320 N 43 ST LINCOLN,NE 68504
Property Address:	2320 N 43 ST LINCOLN, NE

Parcel Information

Legal Description:	PITCHER AND BALDWINS SECOND ADDITION TO UNIVERSITY PLACE, BLOCK 43, Lot 6
Property ID:	17-17-141-003-000
Exemption Codes:	
Primary Class:	R1(Residential Improved)
Primary Use:	01(Single Family)
Zoning:	R6(R6-Residential District)
Neighborhood:	7LNE225(Huntington - Low)
Year Built:	1900
Imp Type:	RXF(1 Story With FA)
No of Buildings:	1.0
Total Living Area:	852

Sales History

Instrument #	Sale Date	Sale Price
2010014493	04/11/2010	59,587
1999013953	03/11/1999	0
1994027567	06/09/1994	0

Values Breakdown

	2015 Preliminary Value
Total Non-Ag Assessed:	$77,600
Total Ag Sp Assessed:	$0

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Property Detail Sheet (R87561)

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Owner Information

Owner Name:	BROWNIES BOYS
Owner Address:	ATTN: CLIFFORD CHEEVER PO BOX 67100 LINCOLN,NE 68506
Property Address:	2360 N 44 ST LINCOLN, NE

Parcel Information

Legal Description:	UNIVERSITY PLACE, BLOCK 91, Lot 7 - 12, & S1/2 VAC ALLEY ADJ & VAC 45TH ST & VAC WALKER AVE ADJ & BLOCK 116 LOTS 1 - 5 & 12 N & E OF LEIGHTON AVE BYPASS
Property ID:	17-17-142-003-000
Exemption Codes:	
Primary Class:	C1(Commercial Improved)
Primary Use:	07(Multi-Family)
Zoning:	R6(R6-Residential District)
Neighborhood:	MNECOM(MF Northeast Lincoln)
Year Built:	1989
Imp Type:	N/A
No of Buildings:	0.0
Total Living Area:	

Sales History

Instrument #	Sale Date	Sale Price

Values Breakdown	2015 Preliminary Value
Total Non-Ag Assessed:	$3,729,000
Total Ag Sp Assessed:	$0

Property Detail Sheet (R87546)

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Owner Information

Owner Name: CHEE-VEE LIMITED PARTNERSHIP
Owner Address: Attn: CLIFFORD C CHEEVER
6635 S PASS DR
LINCOLN,NE 68512
Property Address: 2441 N 44 ST
LINCOLN, NE

Parcel Information

Legal Description: PITCHER AND BALDWINS SECOND ADDITION TO UNIVERSITY PLACE, BLOCK 42, Lot 1 - 2, & LOT 3 EX .30 SQ FT & VAC ALLEY ADJ
Property ID: 17-17-137-001-000
Exemption Codes:
Primary Class: C1(Commercial Improved)
Primary Use: 07(Multi-Family)
Zoning: R6(R6-Residential District)
Neighborhood: MNECOM(MF Northeast Lincoln)
Year Built: 1978
Imp Type: N/A
No of Buildings: 0.0
Total Living Area:

Sales History

Instrument #	Sale Date	Sale Price
1996049525	10/15/1996	0

Values Breakdown

	2015 Preliminary Value
Total Non-Ag Assessed:	$863,400
Total Ag Sp Assessed:	$0

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Property Detail Sheet (R88754)

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Owner Information

Owner Name:	HYWOOD, DAVID E REVOCABLE TRUST
Owner Address:	4340 NORMAL BLVD LINCOLN,NE 68506
Property Address:	3300 HUNTINGTON AVE LINCOLN, NE

Parcel Information

Legal Description:	PITCHER AND BALDWINS SECOND ADDITION TO UNIVERSITY PLACE, BLOCK 36, Lot 12 - 17, EX ST & E-W ALLEY ADJ LOTS 7 & 16 (SEE ALSO ALT KEY 1554641 FOR 1987 - 1991)
Property ID:	17-18-230-003-000
Exemption Codes:	
Primary Class:	C1(Commercial Improved)
Primary Use:	07(Multi-Family)
Zoning:	R6(R6-Residential District)
Neighborhood:	MNCCOM(MF North Central Lincoln)
Year Built:	1975
Imp Type:	N/A
No of Buildings:	0.0
Total Living Area:	

Sales History

Instrument #	Sale Date	Sale Price
2008018646	03/04/2008	0
1996036326	08/29/1996	0
1995024929	08/11/1995	750,000

Values Breakdown

	2015 Preliminary Value
Total Non-Ag Assessed:	$1,105,300
Total Ag Sp Assessed:	$0

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Property Detail Sheet (R88760)

Owner Information

Owner Name:	SOLLENBERGER, ARLEN R & NYLA M
Owner Address:	2438 CR 4500 COFFEYVILLE,KS 67337
Property Address:	3500 HUNTINGTON AVE LINCOLN, NE

Parcel Information

Legal Description:	PITCHER AND BALDWINS SECOND ADDITION TO UNIVERSITY PLACE, BLOCK 35, Lot 7, EX S10' (SEE ALSO 1254787 FOR 1983 THRU 1986)
Property ID:	17-18-231-004-000
Exemption Codes:	
Primary Class:	C1(Commercial Improved)
Primary Use:	07(Multi-Family)
Zoning:	R5(R5-Residential District)
Neighborhood:	MNCCOM(MF North Central Lincoln)
Year Built:	1976
Imp Type:	N/A
No of Buildings:	0.0
Total Living Area:	

Sales History

Instrument #	Sale Date	Sale Price

Values Breakdown	2015 Preliminary Value
Total Non-Ag Assessed:	$162,200
Total Ag Sp Assessed:	

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Property Detail Sheet (R88780)

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Owner Information

Owner Name: FLEGE, STACY S & SHAWN D
Owner Address: ATTN: E & S REAL ESTATE PO BOX 6691
LINCOLN,NE 68506
Property Address: 3632 HUNTINGTON AVE
LINCOLN, NE

Parcel Information

Legal Description: BARNES (G M) SUBDIVISION (BLOCKS 35-39,45-48,55-58 PIBAUNPL), BLOCK 39, Lot 21 - 22, EX ST
Property ID: 17-18-232-012-000
Exemption Codes:
Primary Class: C1(Commercial Improved)
Primary Use: 07(Multi-Family)
Zoning: R5(R5-Residential District)
Neighborhood: MNCCOM(MF North Central Lincoln)
Year Built: 1977
Imp Type: N/A
No of Buildings: 0.0
Total Living Area:

Sales History

Instrument #	Sale Date	Sale Price
2011023952	05/27/2011	137,000
2011018200	04/21/2011	125,000
2010040630	09/13/2010	223,000

Values Breakdown

2015 Preliminary Value

Total Non-Ag Assessed: $162,200
Total Ag Sp Assessed:

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Property Detail Sheet (R88772)

Owner Information

Owner Name:	KARDELL, MADONNA G
Owner Address:	Attn: CENTURY SALES & MGMT 2855 S 70 ST STE 200 LINCOLN,NE 68506
Property Address:	3640 HUNTINGTON AVE LINCOLN, NE

Parcel Information

Legal Description:	BARNES (G M) SUBDIVISION (BLOCKS 35-39,45-48,55-58 PIBAUNPL), BLOCK 39, Lot 23 - 24, EX ST
Property ID:	17-18-232-004-000
Exemption Codes:	
Primary Class:	C1(Commercial Improved)
Primary Use:	07(Multi-Family)
Zoning:	R5(R5-Residential District)
Neighborhood:	MNCCOM(MF North Central Lincoln)
Year Built:	1977
Imp Type:	N/A
No of Buildings:	0.0
Total Living Area:	

Sales History

Instrument #	Sale Date	Sale Price
1999014316	02/03/1999	0

Values Breakdown

	2015 Preliminary Value
Total Non-Ag Assessed:	$162,200
Total Ag Sp Assessed:	

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Property Detail Sheet (R88777)

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Owner Information

Owner Name:	LASSEN, ROBERT L & VELMA J & TIMOTHY J & KIMBERLY A
Owner Address:	5131 QUAIL RIDGE DR LINCOLN,NE 68516
Property Address:	3641 BALDWIN AVE LINCOLN, NE

Parcel Information

Legal Description:	BARNES (G M) SUBDIVISION (BLOCKS 35-39,45-48,55-58 PIBAUNPL), BLOCK 39, Lot 1 - 2
Property ID:	17-18-232-009-000
Exemption Codes:	
Primary Class:	C1(Commercial Improved)
Primary Use:	07(Multi-Family)
Zoning:	R5(R5-Residential District)
Neighborhood:	MNCCOM(MF North Central Lincoln)
Year Built:	1977
Imp Type:	N/A
No of Buildings:	0.0
Total Living Area:	

Sales History

Instrument #	Sale Date	Sale Price
2010016563	04/23/2010	140,750
2003076285	07/01/2003	0
1992006982	02/01/1992	117,000

Values Breakdown	2015 Preliminary Value
Total Non-Ag Assessed:	$162,200
Total Ag Sp Assessed:	

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Property Detail Sheet (R88781)

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Owner Information

Owner Name:	HUNTINGTON GROUP LLC
Owner Address:	Attn: CLIFFORD CHEEVER 6635 S PASS DR LINCOLN,NE 68512-3662
Property Address:	3825 BALDWIN AVE LINCOLN, NE

Parcel Information

Legal Description:	BARNES (G M) SUBDIVISION (BLOCKS 35-39,45-48,55-58 PIBAUNPL), BLOCK 36, Lot 1 - 24, & BLOCK 37 LOTS 1 - 24 & BLOCK 38 LOTS 1 - 24 EX S10' FOR ST & VAC STS & E-W ALLEY ADJ
Property ID:	17-18-234-005-000
Exemption Codes:	
Primary Class:	C1(Commercial Improved)
Primary Use:	07(Multi-Family)
Zoning:	R5(R5-Residential District)
Neighborhood:	MNCCOM(MF North Central Lincoln)
Year Built:	1998
Imp Type:	N/A
No of Buildings:	0.0
Total Living Area:	

Sales History

Instrument #	Sale Date	Sale Price

Values Breakdown

	2015 Preliminary Value
Total Non-Ag Assessed:	$7,563,300
Total Ag Sp Assessed:	$0

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Property Detail Sheet (R88782)

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Owner Information

Owner Name:	WPLA LLC
Owner Address:	Attn: THE ARTER GROUP 927 M ST LINCOLN,NE 68508
Property Address:	4000 HUNTINGTON AVE LINCOLN, NE

Parcel Information

Legal Description:	BARNES (G M) SUBDIVISION (BLOCKS 35-39,45-48,55-58 PIBAUNPL), BLOCK 35, Lot 1 - 24, EX ST & VAC ALLEY ADJ
Property ID:	17-18-236-001-000
Exemption Codes:	
Primary Class:	C1(Commercial Improved)
Primary Use:	07(Multi-Family)
Zoning:	R5(R5-Residential District)
Neighborhood:	MNCCOM(MF North Central Lincoln)
Year Built:	1984
Imp Type:	N/A
No of Buildings:	0.0
Total Living Area:	

Sales History

Instrument #	Sale Date	Sale Price
2005034090	06/20/2005	1,695,000

Values Breakdown

	2015 Preliminary Value
Total Non-Ag Assessed:	$1,614,100
Total Ag Sp Assessed:	$0.0

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Owner Information

Owner Name: OSWALD, KEVIN A
Owner Address: 3841 N 42 ST
LINCOLN,NE 68504
Property Address: 4100 HUNTINGTON AVE
LINCOLN, NE

Parcel Information

Legal Description: PITCHER AND BALDWINS SECOND ADDITION TO UNIVERSITY PLACE, BLOCK 34, Lot 7, EX S10'
Property ID: 17-17-128-006-000
Exemption Codes:
Primary Class: C1(Commercial Improved)
Primary Use: 07(Multi-Family)
Zoning: R5(R5-Residential District)
Neighborhood: MNCCOM(MF North Central Lincoln)
Year Built: 1976
Imp Type: N/A
No of Buildings: 0.0
Total Living Area:

Sales History

Instrument #	Sale Date	Sale Price
1999019064	03/03/1999	155,000
1996049600	12/12/1996	0
1996049599	12/12/1996	0

Values Breakdown

2015 Preliminary Value

Total Non-Ag Assessed: $162,200
Total Ag Sp Assessed:

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Property Detail Sheet (R87478)

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Owner Information

Owner Name:	SILVER CREEK INVESTMENT LLC
Owner Address:	6159 OLD FARM CT LINCOLN,NE 68512
Property Address:	4112 HUNTINGTON AVE LINCOLN, NE

Parcel Information

Legal Description:	PITCHER AND BALDWINS SECOND ADDITION TO UNIVERSITY PLACE, BLOCK 34, Lot 8, EX S10' & LOT 9 W1/2 EX S10'
Property ID:	17-17-128-008-000
Exemption Codes:	
Primary Class:	C1(Commercial Improved)
Primary Use:	07(Multi-Family)
Zoning:	R5(R5-Residential District)
Neighborhood:	MNCCOM(MF North Central Lincoln)
Year Built:	1976
Imp Type:	N/A
No of Buildings:	0.0
Total Living Area:	

Sales History

Instrument #	Sale Date	Sale Price
2001010807	03/05/2001	35,000
1998016569	04/09/1998	197,000
1993008455	02/22/1993	0

Values Breakdown

	2015 Preliminary Value
Total Non-Ag Assessed:	$229,800
Total Ag Sp Assessed:	

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Property Detail Sheet (R87483)

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Owner Information

Owner Name:	HSIEH, YU NIAN & AI LING
Owner Address:	1083 FOXHURST WAY SAN JOSE,CA 95120
Property Address:	4132 HUNTINGTON AVE LINCOLN, NE

Parcel Information

Legal Description:	PITCHER AND BALDWINS SECOND ADDITION TO UNIVERSITY PLACE, BLOCK 34, Lot 11, EX S10'
Property ID:	17-17-128-013-000
Exemption Codes:	
Primary Class:	C1(Commercial Improved)
Primary Use:	07(Multi-Family)
Zoning:	R5(R5-Residential District)
Neighborhood:	MNCCOM(MF North Central Lincoln)
Year Built:	1977
Imp Type:	N/A
No of Buildings:	0.0
Total Living Area:	

Sales History

Instrument #	Sale Date	Sale Price

Values Breakdown

	2015 Preliminary Value
Total Non-Ag Assessed:	$162,200
Total Ag Sp Assessed:	

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Property Detail Sheet (R87481)

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Owner Information

Owner Name:	KAR INVESTMENTS LLC
Owner Address:	PO BOX 445 BEATRICE,NE 68310
Property Address:	4140 HUNTINGTON AVE LINCOLN, NE

Parcel Information

Legal Description:	PITCHER AND BALDWINS SECOND ADDITION TO UNIVERSITY PLACE, BLOCK 34, Lot 12, EX S10'
Property ID:	17-17-128-011-000
Exemption Codes:	
Primary Class:	C1(Commercial Improved)
Primary Use:	07(Multi-Family)
Zoning:	R5(R5-Residential District)
Neighborhood:	MNCCOM(MF North Central Lincoln)
Year Built:	1977
Imp Type:	N/A
No of Buildings:	0.0
Total Living Area:	

Sales History

Instrument #	Sale Date	Sale Price
2008052359	10/28/2008	135,000
2008036584	07/30/2008	129,625
2006039996	08/08/2006	168,000

Values Breakdown 2015 Preliminary Value

Total Non-Ag Assessed:	$162,200
Total Ag Sp Assessed:	

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Property Detail Sheet (R87547)

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Owner Information

Owner Name:	CHEE-VEE LIMITED PARTNERSHIP
Owner Address:	Attn: CLIFFORD C CHEEVER 6635 S PASS DR LINCOLN,NE 68512
Property Address:	4315 HUNTINGTON AVE LINCOLN, NE

Parcel Information

Legal Description:	PITCHER AND BALDWINS SECOND ADDITION TO UNIVERSITY PLACE, BLOCK 42, Lot 4 - 6, REM PT
Property ID:	17-17-137-003-000
Exemption Codes:	
Primary Class:	C1(Commercial Improved)
Primary Use:	07(Multi-Family)
Zoning:	R6(R6-Residential District)
Neighborhood:	MNECOM(MF Northeast Lincoln)
Year Built:	1978
Imp Type:	N/A
No of Buildings:	0.0
Total Living Area:	

Sales History

Instrument #	Sale Date	Sale Price
1996049525	10/15/1996	0

Values Breakdown

	2015 Preliminary Value
Total Non-Ag Assessed:	$360,300
Total Ag Sp Assessed:	

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Property Detail Sheet (R88189)

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Owner Information

Owner Name:	BOHLKEN, JAMES E & DIANNE J
Owner Address:	5125 FRANCIS ST LINCOLN,NE 68504
Property Address:	5125 FRANCIS ST LINCOLN, NE

Parcel Information

Legal Description:	MILLS 2ND ADDITION TO UNIVERSITY PLACE, BLOCK 18, Lot 4, EX N PT FOR ST
Property ID:	17-17-431-004-000
Exemption Codes:	
Primary Class:	R1(Residential Improved)
Primary Use:	01(Single Family)
Zoning:	R2(R2-Residential District)
Neighborhood:	7MNE043(Uni Place South)
Year Built:	1972
Imp Type:	R1(1 Story)
No of Buildings:	1.0
Total Living Area:	840

Sales History

Instrument #	Sale Date	Sale Price

Values Breakdown

	2015 Preliminary Value
Total Non-Ag Assessed:	$96,100
Total Ag Sp Assessed:	

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Property Detail Sheet (R88199)

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Owner Information

Owner Name:	FERRARO, DENNIS M
Owner Address:	5135 FRANCIS ST LINCOLN,NE 68504
Property Address:	5135 FRANCIS ST LINCOLN, NE

Parcel Information

Legal Description:	MILLS 2ND ADDITION TO UNIVERSITY PLACE, BLOCK 18, Lot 3, EX N PT FOR ST
Property ID:	17-17-431-015-000
Exemption Codes:	
Primary Class:	R1(Residential Improved)
Primary Use:	01(Single Family)
Zoning:	R2(R2-Residential District)
Neighborhood:	7MNE043(Uni Place South)
Year Built:	1972
Imp Type:	BL(Split Foyer)
No of Buildings:	1.0
Total Living Area:	840

Sales History

Instrument #	Sale Date	Sale Price
2013052103	09/30/2013	112,000
2012051406	10/02/2012	77,000
2012011262	03/06/2012	94,500

Values Breakdown

	2015 Preliminary Value
Total Non-Ag Assessed:	$106,400
Total Ag Sp Assessed:	

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Property Detail Sheet (R88188)

Owner Information

Owner Name:	EKLUND, BLAIR T & MUHR, AUDRA A
Owner Address:	5145 FRANCIS ST LINCOLN,NE 68504
Property Address:	5145 FRANCIS ST LINCOLN, NE

Parcel Information

Legal Description:	MILLS 2ND ADDITION TO UNIVERSITY PLACE, BLOCK 18, Lot 1 - 2, EX N PT FOR ST
Property ID:	17-17-431-001-000
Exemption Codes:	
Primary Class:	R1(Residential Improved)
Primary Use:	01(Single Family)
Zoning:	R2(R2-Residential District)
Neighborhood:	7MNE043(Uni Place South)
Year Built:	1972
Imp Type:	BL(Split Foyer)
No of Buildings:	1.0
Total Living Area:	840

Sales History

Instrument #	Sale Date	Sale Price
2005052006	08/31/2005	99,500
2002008699	01/24/2002	85,000
1992034572	07/17/1992	59,000

Values Breakdown 2015 Preliminary Value

Total Non-Ag Assessed:	$103,900
Total Ag Sp Assessed:	

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Property Detail Sheet (R88203)

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Owner Information

Owner Name:	SIMANEK, GARY L & PENNY L
Owner Address:	5201 FRANCIS ST LINCOLN,NE 68504
Property Address:	5201 FRANCIS ST LINCOLN, NE

Parcel Information

Legal Description:	ELIZABETH PLAZA, BLOCK 3, Lot 3
Property ID:	17-17-432-003-000
Exemption Codes:	
Primary Class:	R1(Residential Improved)
Primary Use:	01(Single Family)
Zoning:	R2(R2-Residential District)
Neighborhood:	7MNE043(Uni Place South)
Year Built:	1960
Imp Type:	R1(1 Story)
No of Buildings:	1.0
Total Living Area:	1,020

Sales History

Instrument #	Sale Date	Sale Price
1993060638	12/17/1993	65,750

Values Breakdown	2015 Preliminary Value
Total Non-Ag Assessed:	$107,400
Total Ag Sp Assessed:	$0

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Property Detail Sheet (R88202)

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Owner Information

Owner Name: APPLE, CHRISTOPHER T & WENDY A
Owner Address: 5221 FRANCIS ST
LINCOLN,NE 68504
Property Address: 5221 FRANCIS ST
LINCOLN, NE

Parcel Information

Legal Description: ELIZABETH PLAZA, BLOCK 3, Lot 2
Property ID: 17-17-432-002-000
Exemption Codes:
Primary Class: R1(Residential Improved)
Primary Use: 01(Single Family)
Zoning: R2(R2-Residential District)
Neighborhood: 7MNE043(Uni Place South)
Year Built: 1963
Imp Type: R1(1 Story)
No of Buildings: 1.0
Total Living Area: 824

Sales History

Instrument #	Sale Date	Sale Price
2002066297	09/27/2002	96,000
1996033706	07/25/1996	71,000

Values Breakdown	2015 Preliminary Value
Total Non-Ag Assessed:	$108,200
Total Ag Sp Assessed:	$0

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Property Detail Sheet (R350664)

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Owner Information

Owner Name:	CHATEAU PROPERTIES NORTH LLC
Owner Address:	3100 S 72 ST LINCOLN,NE 68506
Property Address:	5600 ABBEY CT LINCOLN, NE

Parcel Information

Legal Description:	CHATEAU FIRST ADDITION, 11.83 AC TRACT COMPRISED OF PORT OF LOTS 1 & 2 (DESC 08-053093)
Property ID:	17-21-115-006-000
Exemption Codes:	
Primary Class:	C1(Commercial Improved)
Primary Use:	07(Multi-Family)
Zoning:	R4(R4-Residential District)
Neighborhood:	MECCOM(MF East Central Lincoln)
Year Built:	1986
Imp Type:	N/A
No of Buildings:	0.0
Total Living Area:	

Sales History

Instrument #	Sale Date	Sale Price
2008053093	11/18/2008	0

Values Breakdown

	2015 Preliminary Value
Total Non-Ag Assessed:	$8,991,300
Total Ag Sp Assessed:	$0

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Property Detail Sheet (R92661)

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Owner Information

Owner Name:	SHIPP, DARYL R
Owner Address:	5715 HOLDREGE ST LINCOLN,NE 68505
Property Address:	5715 HOLDREGE ST LINCOLN, NE

Parcel Information

Legal Description:	CILD HAVEN COURT, UNIT #3 (1/12 INTEREST)
Property ID:	17-21-100-037-009
Exemption Codes:	
Primary Class:	R1(Residential Improved)
Primary Use:	02(Townhouse)
Zoning:	R3(R3-Residential District)
Neighborhood:	1721B(CO- CILD HAVEN)
Year Built:	1991
Imp Type:	T1(1 Story TH End Unit)
No of Buildings:	1.0
Total Living Area:	1,176

Sales History

Instrument #	Sale Date	Sale Price
2014028589	07/18/2014	0
2003122075	12/17/2003	0
1992009136	03/01/1992	79,000

Values Breakdown

	2015 Preliminary Value
Total Non-Ag Assessed:	$108,700
Total Ag Sp Assessed:	$0

LANCASTER COUNTY ASSESSOR

County Assessor/Register of Deeds

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Property Detail Sheet (R92662)

Treasurer Info | GIS Map | Datasheet | Comp Sales
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Owner Information

Owner Name:	MURRAY, DAN L & PATRICIA A
Owner Address:	5721 HOLDREGE ST LINCOLN,NE 68505
Property Address:	5721 HOLDREGE ST LINCOLN, NE

Parcel Information

Legal Description:	CILD HAVEN COURT, UNIT #4
Property ID:	17-21-100-037-010
Exemption Codes:	
Primary Class:	R1(Residential Improved)
Primary Use:	02(Townhouse)
Zoning:	R3(R3-Residential District)
Neighborhood:	1721B(CO- CILD HAVEN)
Year Built:	1991
Imp Type:	T1(1 Story TH End Unit)
No of Buildings:	1.0
Total Living Area:	1,176

Sales History

Instrument #	Sale Date	Sale Price
2012015576	03/25/2012	86,000
2012015575	11/30/2011	
1992041523	09/14/1992	79,000

Values Breakdown

	2015 Preliminary Value
Total Non-Ag Assessed:	$94,700
Total Ag Sp Assessed:	$0

LANCASTER COUNTY ASSESSOR
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Property Detail Sheet (R92663)

Treasurer Info | GIS Map | Datasheet | Comp Sales
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Owner Information

Owner Name:	BLOW, WARREN E & LINDA W
Owner Address:	5727 HOLDREGE ST LINCOLN,NE 68505
Property Address:	5727 HOLDREGE ST LINCOLN, NE

Parcel Information

Legal Description:	CILD HAVEN COURT, UNIT #5 (1/6 INTEREST)
Property ID:	17-21-100-037-011
Exemption Codes:	
Primary Class:	R1(Residential Improved)
Primary Use:	02(Townhouse)
Zoning:	R3(R3-Residential District)
Neighborhood:	1721B(CO- CILD HAVEN)
Year Built:	1991
Imp Type:	T1(1 Story TH End Unit)
No of Buildings:	1.0
Total Living Area:	1,176

Sales History

Instrument #	Sale Date	Sale Price
2015003219	01/19/2015	112,000
2005057742	09/19/2005	0
2001023972	04/18/2001	110,000

Values Breakdown

	2015 Preliminary Value
Total Non-Ag Assessed:	$106,400
Total Ag Sp Assessed:	

LANCASTER COUNTY ASSESSOR
County Assessor/Register of Deeds

Property Detail Sheet (R92664)

Owner Information

Owner Name:	COLLINS, TOMMY & JOANN
Owner Address:	5733 HOLDREGE ST LINCOLN,NE 68505
Property Address:	5733 HOLDREGE ST LINCOLN, NE

Parcel Information

Legal Description:	CILD HAVEN COURT, UNIT #6
Property ID:	17-21-100-037-012
Exemption Codes:	
Primary Class:	R1(Residential Improved)
Primary Use:	02(Townhouse)
Zoning:	R3(R3-Residential District)
Neighborhood:	1721B(CO- CILD HAVEN)
Year Built:	1991
Imp Type:	T1(1 Story TH End Unit)
No of Buildings:	1.0
Total Living Area:	1,176

Sales History

Instrument #	Sale Date	Sale Price
2004060581	09/09/2004	120,000
1991035885	10/01/1991	77,000

Values Breakdown

	2015 Preliminary Value
Total Non-Ag Assessed:	$110,800
Total Ag Sp Assessed:	$0

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Property Detail Sheet (R92820)

Treasurer Info | GIS Map | Datasheet | Comp Sales
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Owner Information

Owner Name: CHATEAU PROPERTIES NORTH LLC
Owner Address: 3100 S 72 ST
LINCOLN,NE 68506
Property Address: 6100 VINE ST
LINCOLN, NE

Parcel Information

Legal Description: CHATEAU FIRST ADDITION, Lot 4
Property ID: 17-21-115-004-000
Exemption Codes:
Primary Class: C1(Commercial Improved)
Primary Use: 07(Multi-Family)
Zoning: R4(R4-Residential District)
Neighborhood: MECCOM(MF East Central Lincoln)
Year Built: 1970
Imp Type: N/A
No of Buildings: 0.0
Total Living Area:

Sales History

Instrument #	Sale Date	Sale Price
2008053092	11/18/2008	0
1996015212	04/06/1996	0
1996014238	04/06/1996	0

Values Breakdown — 2015 Preliminary Value

Total Non-Ag Assessed: $15,825,900
Total Ag Sp Assessed:

Condos listed as built between 1991 and 1998

LANCASTER COUNTY ASSESSOR

County Assessor/Register of Deeds

Property Detail Sheet (R92658)

Owner Information

Owner Name:	CILD HAVEN COURT CONDO BASE ACCOUNT
Owner Address:	99999 **NO ADDRESS** ST LINCOLN,NE 68508
Property Address:	

Parcel Information

Legal Description:	CILD HAVEN COURT, BASE ACCOUNT LOCATED ON: E PART IT LOT 236 NW 21-10-7
Property ID:	17-21-100-037-000
Exemption Codes:	
Primary Class:	R2(Residential Unimproved)
Primary Use:	16(Condo Base Account)
Zoning:	R3(R3-Residential District)
Neighborhood:	1721B(CO- CILD HAVEN)
Year Built:	N/A
Imp Type:	N/A
No of Buildings:	N/A
Total Living Area:	N/A

Sales History

Instrument #	Sale Date	Sale Price

Values Breakdown

2015 Preliminary Value

Total Non-Ag Assessed:	
Total Ag Sp Assessed:	

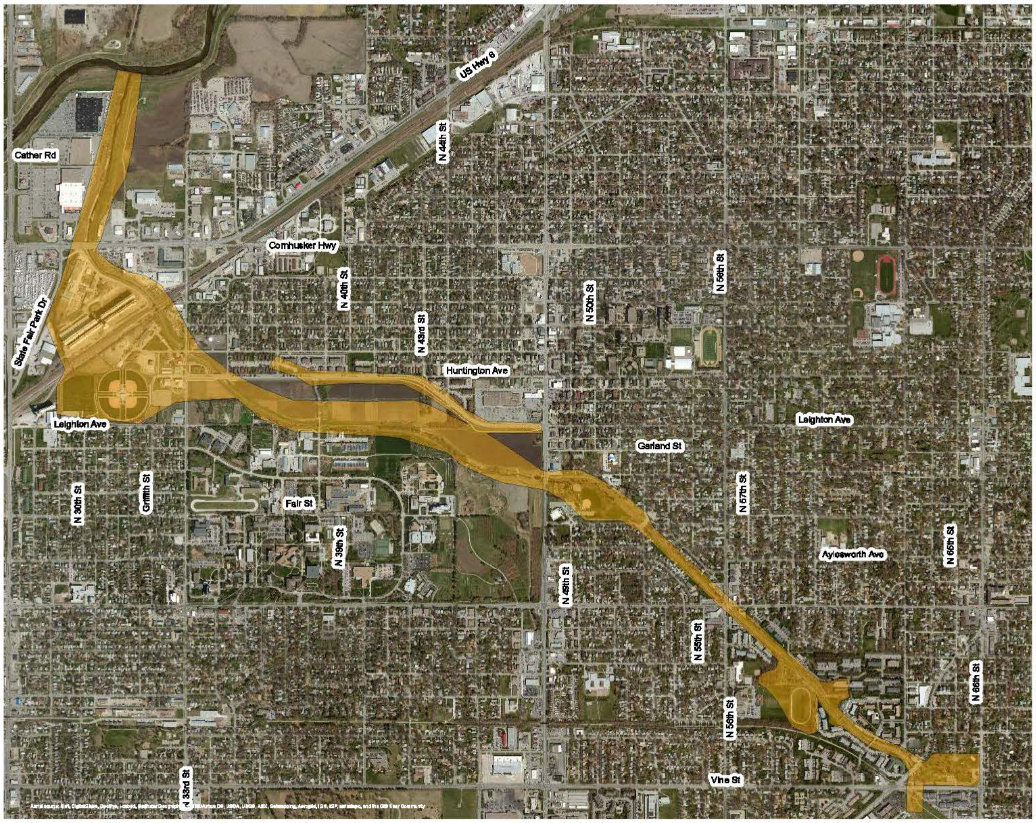
Appendix F

Public Meeting Information

DEADMANS RUN FLOOD CONTROL PROJECT

Environmental Study Phase

Do you know of any current or potential environmental issues that would affect this project?



Environmental Study Components:

- ✓ Environmental Records Search
- ✓ Review Historic Aerial Photos and Maps
- ✓ Windshield Survey of Properties
- ➔ **Collect Public Input**
- Collect Follow-up Information for Certain Properties

CDM Smith

LOWER PLATTE SOUTH
NATURAL RESOURCES DISTRICT

3125 PORTIA STREET
P.O. BOX 83581 · LINCOLN, NE 68501-3581
(402) 476-2729 · FAX (402) 476-6454
www.lpsnrd.org

Mailed 2/11/15

February 11, 2015

1ST STREET PROPERTIES LLC
740 S 48 ST
LINCOLN, NE 68510

Dear Landowner:

RE: Deadmans Run Watershed – Environmental Assessment of Flood Plain Property

The Lower Platte South NRD is working with the City of Lincoln and U.S. Army Corps of Engineers to assess the flood risk in the Deadman's Run Watershed in northeast Lincoln. The NRD and City are interested finding ways we can reduce flood risk and flood insurance costs.

One component of the multi-year study is to complete a basic assessment of thc environmental condition of properties near the Deadman's Run channel. The NRD has contracted with CDMSmith/Olsson Associates to compile information of record on these properties and complete a windshield survey of the properties from the public right of way. Property ownership records show that you own property along Deadman's Run and we wanted to notify you of the study and give you an opportunity to provide input.

We will be scheduling several public meetings to further explain the study and answer any questions. An Open House to receive input on the environmental condition of properties in the study area will be held from 4:00 – 6:00 pm on Thursday, February 19, 2015 at the Fourth Presbyterian Church, 52nd & Francis Street. At that time we can explain the study and the public will be encouraged to provide any comments or environmental information on properties in the area.

We look forward to seeing you on the 19th!

Sincerely,

Paul D. Zillig
Assistant Manager

1ST STREET PROPERTIES LLC
740 S 48 ST
LINCOLN, NE 68510

3001 CORNHUSKER HIGHWAY LLC
Attn: INTERSTATE COMMODITIES INC
7 MADISON ST
TROY, NY 12181

66TH & R CENTER CONDOMINIUM BASE ACCOUNT
NO ADDRESS ST
LINCOLN, NE 68508

APPLE, CHRISTOPHER T & WENDY A
5221 FRANCIS ST
LINCOLN, NE 68504

B & J PARTNERSHIP LTD
Attn: MICHAEL TAVLIN
340 VICTORY LN
LINCOLN, NE 68528

B & J PARTNERSHIP LTD
PO BOX 81906
LINCOLN, NE 68501

BALLARD, STERLING JAMES & DARLENE ELIZABETH & STEVEN JAMES
1701 DEWEESE DR
LINCOLN, NE 68504

BARNASON, JOSEPH & CHRISTINA P
3911 VILLAGE CT
LINCOLN, NE 68516

BEAN, ALLEN R & JEANNETTE H
1731 DEWEESE DR
LINCOLN, NE 68504

BENTZINGER, DAN & PAMELA
1130 RAINY RIVER BAY
LINCOLN, NE 68505

BIERBOWER, JAMES R
1612 DAVID DR
LINCOLN, NE 68504-3124

BLACK HILLS/NEBRASKA GAS UTILITY CO LLC
ATTN: TAX DEPT, 7TH FLR
PO BOX 1400
RAPID CITY, SD 57709-1400

BOARD OF REGENTS UNIV OF NEBR
Attn: PROPERTY MANAGEMENT
1901 Y ST
LINCOLN, NE 68588-0605

BOHLKEN, JAMES E & DIANNE J
5125 FRANCIS ST
LINCOLN, NE 68504

BOLDT, GARY D & ROBERTA A
1845 DEWEESE DR
LINCOLN, NE 68504

BROWNIES BOYS
ATTN: CLIFFORD CHEEVER
PO BOX 67100
LINCOLN, NE 68506

BT-OH LLC
ATTN: REAL ESTATE DEPT
PO BOX 28606
ATLANTA, GA 30358-0606

BUDKE, MICHAEL & TOSHA
1727 DEWEESE DR
LINCOLN, NE 68504

C F P
2929 CORNHUSKER HWY
LINCOLN, NE 68504

CARLSEN, RICKY G & DONNA J
1825 DEWEESE DR
LINCOLN, NE 68504

CARLSON, ADRIAN R
1715 DEWEESE DR
LINCOLN, NE 68505

CHATEAU DEVELOPMENT LLC
3100 S 72 ST
LINCOLN, NE 68506

CHATEAU PROPERTIES NORTH LLC
3100 S 72 ST
LINCOLN, NE 68506

CHEE-VEE LIMITED PARTNERSHIP
Attn: CLIFFORD C CHEEVER
6635 S PASS DR
LINCOLN, NE 68512

CHICAGO BURLINGTON & QUINCY RR
Attn: PROPERTY TAX DEPT
1206 CONTINENTAL PLZ
FORT WORTH, TX 76102

CHURCH IN LINCOLN
PO BOX 5521
LINCOLN, NE 68505

CILD HAVEN COURT CONDO BASE ACCOUNT
NO ADDRESS ST
LINCOLN, NE 68508

CITY OF LINCOLN
Attn: REAL ESTATE DIVISION
555 S 10 ST RM 205
LINCOLN, NE 68508

CLARK, SCOTT A & DEBBIE L
1737 DEWEESE DR
LINCOLN, NE 68504

COLEMAN INVESTMENTS
2415 N 33 ST
LINCOLN, NE 68504

COLLINS, CHRIS & SUE
7725 MESA RD
LINCOLN, NE 68505

COLLINS, TOMMY & JOANN
5733 HOLDREGE ST
LINCOLN, NE 68505

COON, CINDY S
1817 DEWEESE DR
LINCOLN, NE 68504

EDMISTON, MABEL M LIFE ESTATE
2320 N 43 ST
LINCOLN, NE 68504

EKLUND, BLAIR T & MUHR, AUDRA A
5145 FRANCIS ST
LINCOLN, NE 68504

EUSTIS ASSOCIATES LIMITED PRTN
PO BOX 105842
ATLANTA, GA 30348-5842

EVERTSON, JUSTIN & TAMMY
10621 N 138 ST
WAVERLY, NE 68462

FERGUSON, ALIDA M TRUST
3324 W ROSE ST
LINCOLN, NE 68522

FERRARO, DENNIS M
5135 FRANCIS ST
LINCOLN, NE 68504

FITL, SANDRA J
1640 DAVID DR
LINCOLN, NE 68504

GALANTER FAMILY GST 2
3908 LOG TRAIL WAY
REISTERSTOWN, MD 21136

GARMEL PROPERTIES LLC
1604 S 1 ST STE 6
LINCOLN, NE 68502

GATEWAY EXECUTIVE CTR PRTNSHP
770 N COTNER BLVD STE 406
LINCOLN, NE 68505

GREDER, GRANT & GREGORY A
518 PIER 1
LINCOLN, NE 68528

GREGG, JAMES L & DEANNA R
1720 N 52 ST
LINCOLN, NE 68504

HOLLERS, CLAUDE A & MAUREEN
1801 DEWEESE DR
LINCOLN, NE 68504

HSIEH, YU NIAN & AI LING
1083 FOXHURST WAY
SAN JOSE, CA 95120

HUNTINGTON GROUP LLC
Attn: CLIFFORD CHEEVER
6635 S PASS DR
LINCOLN, NE 68512-3662

HUSKER REAL ESTATE LLC
Attn: JOHN W PLAGMAN
4502 S 110 ST
OMAHA, NE 68137-1219

HYWOOD, DAVID E REVOCABLE TRUST
4340 NORMAL BLVD
LINCOLN, NE 68506

J & J INVESTMENTS
2949 CORNHUSKER HWY
LINCOLN, NE 68504

JACKSON, SETH
7326 YORK LN
LINCOLN, NE 68505-2148

JAYCON ENTERPRISES INC
1110 SHERMAN MT LOOP
CHEYENNE, WY 82009

JOINT ANTELOPE VALLEY AUTHOR
Attn: REAL ESTATE DIVISION
555 S 10 ST RM 205
LINCOLN, NE 68508

KAR INVESTMENTS LLC
PO BOX 445
BEATRICE, NE 68310

KEHM, MARJORIE LOU REVOCABLE TRUST
1831 DEWEESE DR
LINCOLN, NE 68504

KLAPPERICH, ROBERT L & ARLENE
1745 DEWEESE DR
LINCOLN, NE 68504

KOCH, TIMOTHY JOHN
1530 DAVID DR
LINCOLN, NE 68504

LASSEN, ROBERT L & VELMA J & TIMOTHY J &
KIMBERLY A
5131 QUAIL RIDGE DR
LINCOLN, NE 68516

LEISING, STEVE
4535 NORMAL BLVD UNIT 205
LINCOLN, NE 68506

LINCOLN ELEVATOR & FEED
PO BOX 2047
OMAHA, NE 68103-2047

LINCOLN LEASE PARTNERS
PO BOX 22845
OKLAHOMA CITY, OK 73123

LINCOLN LUTHERAN SCHOOL ASSN
1100 N 56 ST
LINCOLN, NE 68504

LOWER PLATTE SOUTH N R D
3125 PORTIA ST
LINCOLN, NE 68521

MALOUSEK, ROBERT & ROXANE
2435 N 33 ST
LINCOLN, NE 68504

MAPES INDUSTRIES INC
2929 CORNHUSKER HWY
LINCOLN, NE 68501

MCCOY, WILLLIAM E & TAMMIE J
1800 N 52 ST
LINCOLN, NE 68504

MCGILL DEVELOPMENT LLC
2821 GREBE ST
OMAHA, NE 68112

MENARD INC
Attn: CORPORATE ACCOUNTING
4777 MENARD DR
EAU CLAIRE, WI 54703

MERTES, BRADLEY D & ANGELA R
1600 DAVID DR
LINCOLN, NE 68504

MITCHELL LIVING TRUST
14875 NE TANGEN RD
NEWBURG, OR 97132

MOSS, DEBORAH L
1636 DAVID DR
LINCOLN, NE 68505

MURRAY, DAN L & PATRICIA A
5721 HOLDREGE ST
LINCOLN, NE 68505

NEBRASKA CROP IMPROVEMENT
ASSOCIATION
PO BOX 830911 268 PLANT SCIENCE HALL
LINCOLN, NE 68583

NORTHGATE PARK INC
2920 CORNHUSKER HWY STE 2
LINCOLN, NE 68504

NORTHGATE PARK INC
2875 MT VERNON RD SE
CEDAR RAPIDS, IA 52403

NORWEST BANK NEBRASKA
C/O THOMSON PROPERTY TAX SVS
PO BOX 2609
CARLSBAD, CA 92018

O'KEEFE ELEVATOR COMPANY INC
1402 JONES ST
OMAHA, NE 68102-3218

OMAHA LINCOLN & BEATRICE RR
PO BOX 80268
LINCOLN, NE 68501

OMAHA LINCOLN & BEATRICE RR CO
1815 Y ST
LINCOLN, NE 68508

OSWALD, KEVIN A
3841 N 42 ST
LINCOLN, NE 68504

PROSKOVEC, GARY E & LINDA
1831 SAINT ANDREWS PL
LINCOLN, NE 68512

RAIN DANCE LLC
301 FRANKFORD NE UNIT 114
ORANGE CITY, IA 51041

REAL GROWTH LLC
PO BOX 84891
LINCOLN, NE 68501

RODRIGUEZ, YOLANDA & VERA, FAVIOLA
521 E TRENTON AVE
ORANGE, CA 92867

ROTTINGHAUS, SUSAN & DONALD
15249 NW 27 ST
RAYMOND, NE 68428

RPB INC
PO BOX 80721
LINCOLN, NE 68501

SALT WAHOO WATERSHED DISTRICT
3125 PORTIA ST
LINCOLN, NE 68521

SCHIEBER INVESTMENTS LLC
12100 W CENTER RD STE 518
OMAHA, NE 68144-3960

SEHNERT, GENE R & MARILYN C
1618 DAVID DR
LINCOLN, NE 68504

SHIPP, DARYL R
5715 HOLDREGE ST
LINCOLN, NE 68505

SIGLER, JANETTE C
1837 DEWEESE DR
LINCOLN, NE 68504

SILVER CREEK INVESTMENT LLC
6159 OLD FARM CT
LINCOLN, NE 68512

SIMANEK, GARY L & PENNY L
5201 FRANCIS ST
LINCOLN, NE 68504

~~SKOROHOD CONDO BASE ACCOUNT~~
~~**NO ADDRESS** ST~~
~~LINCOLN, NE 68508~~

SKOROHOD, GEORGE & CAROLENE V
501 S 120 ST
LINCOLN, NE 68520

SOLLENBERGER, ARLEN R & NYLA M
2438 CR 4500
COFFEYVILLE, KS 67337

SPILKER FAMILY LTD PARTNERSHIP
Attn: DONALD W SPILKER
2920 CORNHUSKER HWY STE 2
LINCOLN, NE 68504

STEVE MIERS LLC
6000 S 56 ST
LINCOLN, NE 68516-3323

TG UNLIMITED LLC
Attn: MARY M COX
2110 BRADFIELD DR
LINCOLN, NE 68502

THE EATING ESTABLISHMENT
56TH & HOLDREGE LLC
5931 S 58 ST
LINCOLN, NE 68516

TRINITY LUTHERAN CHURCH
724 S 12 ST
LINCOLN, NE 68508

TRUAX, GARY A & ALBERTA L
1606 DAVID DR
LINCOLN, NE 68504

UNIVERSITY PLACE LLC
RESERVOIR OFFICE PARK
822 BOYLSTON ST
CHESTNUT HILL, MA 02467

VINE STREET APARTMENTS LLC
Attn: THOMAS C SMITH
1225 L ST STE 501
LINCOLN, NE 68508

WALKER, J GRACE
1630 DAVID DR
LINCOLN, NE 68504

WEA GATEWAY LLC
Attn: WESTFIELD PROP TAX DEPT
2030 HAMILTON PLACE BLVD
CHATTANOOGA, TN 37421

WESKAMP, ROBERT A
1811 DEWEESE DR
LINCOLN, NE 68504

WILKE, NICKOLAS S & JENNIFER
14121 GUILDFORD ST
WAVERLY, NE 68462

WPLA LLC
Attn: THE ARTER GROUP
927 M ST
LINCOLN, NE 68508

ZILLIG, PHILLIP L & JUDITH A
1536 DAVID DR
LINCOLN, NE 68504

DEADMANS RUN FLOOD CONTROL PROJECT

ENVIRONMENTAL STUDY – PUBLIC AVAILABILITY SESSION

February 19, 2015

Name	Address	Phone Number
Ron & Pat Murray	5721 Holdrege St	402-466-1249
Bill Ballenger	240 Locust Lodge Co. Bluffs 51503	(712) 328-0992
LIZA GARRETT	UNL-EHS	402-472-2212
FRED J. MATUCKA	2949 CORNHUSKER	402-435-5555
Pam Brunke	~~2547~~ PO Box 80721	402 466-2957
Bill McCoy	1800 N 52nd 68504	402-464-5801
Ben Higgins	City of Lincoln	402-441-7589
Phil & Judy Zillig	1536 David Dr	402-466-1227
T. T. Chan	1200 N. 56th	402-466-1800
Scott Ernstmeyer	1100 N 56th St	402 467-5404
BARRY SHULL	UNL- IANR	402-472-2046
John Jensen	UNL - Real Estate Management 1901 Y St.	
DAVID HEYWOOD	3300 Huntington	402-440-2090
Jennifer Dam	332 AdminN UNL	402 472-2823
ALLAN WORRES	5144 HOLDREGE ST	402 466-5264
ED UBBEN	LPS NRD	476-2729
Donna Garden	Lincoln PWU	402-441-8605
Kyle Hauschild	LPS NRD	402-525-0321
Pat O'Neill	CDM Smith	816.444.8270

Photographs from the Public Meeting

February 19, 2015


SECTION
205
STUDY

ENVIRONMENTAL STUDY QUESTIONNAIRE
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

I have information regarding the following property

(Address or description of property location): ______________________________

____

____

I am the property owner: ☐ YES ☐ NO

The following hazardous substances (pesticides, solvents, etc.) or petroleum products have been released to the environment: ____________________________

____

____

____

____

Please state if soil or groundwater are known to be affected and the extent, if known: ____

____

____

____

Any there any groundwater monitoring wells installed at the property?

☐ YES ☐ NO ☐ UNKNOWN

The following chemicals, compounds, or other hazardous substances or petroleum products are used on the property and have the potential to be released to the environment: ______________________________________

____

____

____

____

ENVIRONMENTAL STUDY QUESTIONNAIRE
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

Please provide information on current or previous operations or activities at the property related to hazardous substance or petroleum product use:____________

____

____

____

____

Type of operation (e.g.: industrial, manufacturing, railroad, retail, other commercial, school, residential, agricultural): ________________________

____

____

Are any of the following known to exist at the property?

- Landfills: ☐ YES ☐ NO
- Solid Waste: ☐ YES ☐ NO
- 55 Gallon Drums: ☐ YES ☐ NO
- Pits, Ponds, or Lagoons: ☐ YES ☐ NO
- Drains or Sumps ☐ YES ☐ NO
- Surface Impoundments: ☐ YES ☐ NO
- Waste Water: ☐ YES ☐ NO
- USTs/ASTs ☐ YES ☐ NO
- Injection/Production or Monitoring Wells: ☐ YES ☐ NO
- Wastewater Treatment Units: ☐ YES ☐ NO
- Septic Tanks: ☐ YES ☐ NO

ENVIRONMENTAL STUDY QUESTIONNAIRE
DEADMANS RUN PROJECT, LINCOLN, NEBRASKA

- PCB Containing Equipment: ☐ YES ☐ NO
- Asbestos: ☐ YES ☐ NO
- Lead Paint: ☐ YES ☐ NO
- Incinerators: ☐ YES ☐ NO
- Equipment Containing Radioactive Material: ☐ YES ☐ NO
- Medical Waste: ☐ YES ☐ NO
- Explosive Material: ☐ YES ☐ NO
- Toxic Materials: ☐ YES ☐ NO

Please describe any buildings with asbestos-containing materials; the location of asbestos within the buildings, and any asbestos inspection/survey reports for the property: ____

____

____

Name: ______________________ Phone number: ______________

Thank you for your input. Please indicate if we may contact you to follow-up on information provided in this questionnaire: ☐ YES ☐ NO

Mail to: Lower Platte South Natural Resources District
Attn: Paul Zillig, Assistant Manager
3125 Portia Street
Lincoln, NE 68501

Appendix G

Completed User Questionnaire

ASTM E1527-13 USER QUESTIONNAIRE

When the "user" (the party for whom the assessment is being prepared) of the Phase I is required to help the environmental professional identify recognized environmental conditions at the property, a "User Questionnaire" is completed by the user to help gather information that may identify recognized environmental conditions at the property.

We ask that you answer the six questions below to the best of your knowledge, to the extent that they are applicable. We understand that, in some circumstances, you may have little or no information. Still, we encourage you to complete and return the questionnaire as soon as possible. This will allow us to reflect the fact that the Questionnaire was completed when we issue our report as is required.

1. Are you aware of any environmental cleanup liens against the properties that are filed or recorded under federal, tribal, state or local law?

   NO

2. Are you aware of any Activity and Use Limitations (AULs), such as engineering controls, land use restrictions or institutional controls that are in place at the site and/or have been filed or recorded in a registry under federal, tribal, state or local law?

   NO

3. As the user of this ESA do you have any specialized knowledge or experience related to the property or nearby properties? For example, are you involved in the same line of business as the current or former occupants of the property or an adjoining property so that you would have specialized knowledge of the chemicals and processes used by this type of business?

   NO

4. Does the purchase price/loan amount for this property reasonably reflect the fair market value of the property? If you conclude that there is a difference, have you considered whether the lower purchase price is because contamination is known or believed to be present at the property?

   N/A

5. Are you aware of commonly known or reasonably ascertainable information about the property that would help the environmental professional to identify conditions indicative of releases or threatened releases? For example, as user, (a.) Do you know the past uses of the property? (b.) Do you know of specific chemicals that are present or once were present at the property? (c.) Do you know of spills or other chemical releases that have taken place at the property? (d.) Do you know of any environmental cleanups that have taken place at the property?

   YES, FAMILIAR WITH MANY OF THE PREVIOUS USES AND REQUIRED MONITORING IN SOME AREAS.

6. As the user of this ESA, based on your knowledge and experience related to the property are there any obvious indicators that point to the presence or likely presence of contamination at the property?

   YES.

PAUL ZILLIG
LPSNRD

Pugh, Terry

From: Splichal, Laura
Sent: Friday, February 27, 2015 12:49 PM
To: Pugh, Terry
Subject: FW: Deadmans Run 205 Study - ASTM E1527-13 User Questionnaire
Attachments: SKMBT_C552D15020907430.pdf; SKMBT_C552D15020907431.pdf

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From: Paul Zillig [mailto:pzillig@lpsnrd.org]
Sent: Tuesday, February 10, 2015 11:50 AM
To: Splichal, Laura
Subject: Deadmans Run 205 Study - ASTM E1527-13 User Questionnaire

Laura:

The property referred to on questions 5 & 6 is in reference to the Lincoln Grain/Continental Grain property near 29th & Cornhusker Highway. Please find attached some additional information on the sites monitored on NRD property and the results of the monitoring in 2014.

Paul Zillig

Paul Zillig

From: Dick Ehrman
Sent: Monday, June 16, 2014 1:16 PM
To: Paul Zillig
Cc: Glenn Johnson
Subject: RE: Water Sampling 30th & Cornhusker

Hi, Paul—I've reviewed the monitoring results as submitted by Huff & Huff. As all of these contaminants are from point sources as the result of the operation of the Lincoln Grain Company, I don't believe LPSNRD has any responsibility regarding their occurrence or cleanup as this is historical contamination. I'm assuming that's the purview of NDEQ/USEPA. But, just a few observations:

1. For your reference, here are the applicable USEPA (or other) drinking water limits for the listed contaminants:
    a. Carbon tetrachloride: 0.005 mg/l (MCL)
    b. Chloroform: 0.05 mg/l (not an MCL—interim guideline)
    c. Carbon disulfide: 0.07 mg/l (not an MCL—0.07 is the number used by the State of New Hampshire)
    d. Ethylene dibromide (EDB): 0.00005 mg/l (MCL)
    e. Methylene chloride (aka dichloromethane): 0.005 mg/l (MCL)
2. So, as you can see, some of the noted parameters exceed these limits at some locations—mostly in TMW-504. Carbon disulfide and methylene chloride don't exceed any limits; carbon disulfide is mostly a concern for inhalation rather than drinking water ingestion.
3. Carbon tet, chloroform, and ethylene dibromide all exceed the applicable limit at TMW-504. As you note, carbon tet is higher at the 37-41' interval, but this is true for chloroform and EDB as well. This isn't a surprise as all three of these compounds are "sinkers—" that is, they're denser than water so over time are likely to move downward through the soil profile and, once released into ground water, downward in the aquifer. These compounds in some cases exceed their limits by over an order of magnitude.
4. Even though these compounds are found in fairly high quantities, the likely threat to human health appears to be low. Individual domestic water supply wells aren't allowed in Lincoln, and this is a fairly highly industrialized area so human exposure is not very likely. This is illustrated by a quick search of NDNR's well registration database—there are 45 registered wells in the section that this site is located in, but ALL of them are monitoring or recovery wells associated with various environmental investigations/cleanups!

So, that's all the comments I have. Generally, these levels are above what would be optimal but not unexpected for a former grain storage/fumigation site. Given the nature of ground water occurrence and use in this area, I would guess the likelihood for serious human health hazards to be fairly low. And as mentioned above, I believe LPSNRD really has no authority/responsibility in this regard. If you'd like more info, I can contact NDEQ and see if they have any other ideas (or if they'd refer me to USEPA). Let me know. Thanks!

Dick Ehrman
Water Resources Specialist
Lower Platte South Natural Resources District
Office: (402) 476-2729
Cell: (402) 429-1327
Email: dehrman@lpsnrd.org
www.lpsnrd.org

From: Paul Zillig
Sent: Thursday, June 12, 2014 11:53 AM
To: Dick Ehrman

Cc: Glenn Johnson
Subject: Water Sampling 30th & Cornhusker

Dick:

Please look over the monitoring results for the contamination from the old Lincoln Grain property. Looks like the monitoring well just north of Cornhusker and east of DMR has carbon tet from 27-31 feet and a much higher reading from 37-41 feet. Any other observations or nuggets of wisdom?

Paul

extra

Huff & Huff incorporated
environmental engineers
and consultants

915 Harger Road, Suite 330
Oak Brook, IL 60523
Phone (630) 684-9100
Fax (630) 684-9120
Website: http://huffnhuff.com

June 10, 2014

Mr. Paul Zillig
Lower Platte South Natural Resources District
PO Box 83581
Lincoln, Nebraska 68501-3581

Re: Site Investigation Results
Lincoln Grain Elevator
3001 Cornhusker Highway

Dear Mr. Zillig:

Submittal of laboratory data from *Irregular Tracts Lot 177 located in the SW1/4 of Section 7, Township 10 North, Range 7 East of the 6th P.M., Lancaster County, Nebraska* was requested in the November 2013 third amendment to the March 22, 2006 access agreement between Continental Grain Company and LPSNRD. The current set of analytical data from the most recent sampling round is being submitted for your information.

If you have any questions regarding these results, please do not hesitate to call.

Sincerely yours,

Linda L Huff

Linda L. Huff, P.E.
President

cc: Mr. James Taylor, Continental Grain Company (w/enclosure)

R:\CONTGRAN\CCl4Cargill\Lincoln\Correspondence 2013\GW HP Sampling\CG Lincoln LPSNRD Data Transmittal (2013-12-02 Sampling).doc

TABLE 1

HYDROPUNCH / TEMPORARY MONITOR WELL SAMPLE RESULTS, mg/L
December 2, 2013

CONTINENTAL GRAIN COMPANY
LINCOLN, NEBRASKA

Hydropunch / Temporary Monitoring Well Location	Installation Date	Collection Method	Sample Date	Carbon Tetrachloride, mg/L	Chloroform, mg/L	Carbon Disulfide, mg/L	Ethylene Dibromide, mg/L	Methylene Chloride, mg/L
Hydropunch TMW-504 27-31	12/03/13	Inertial Pump	12/03/13	0.09280	0.0939	0.00072 J/	0.00039	0.00048 J/
Hydropunch TMW-504 37-41	12/03/13	Inertial Pump	12/03/13	0.41100	0.31	0.0011 J/	0.0021	0.0026
Hydropunch TMW-504 48-52	12/03/13	Inertial Pump	12/03/13	< 0.00018	0.00053	0.00031 J/	< 0.000018	< 0.00015
Hydropunch HP-511 30-34	12/03/13	Inertial Pump	12/03/13	< 0.00018	0.006	0.00035 J/	< 0.000019	0.00031 J/
Hydropunch HP-511 37-41	12/03/13	Inertial Pump	12/03/13	< 0.00018	0.0084	0.00093 J/	< 0.000018	< 0.00015
Hydropunch HP-511 47-51	12/03/13	Inertial Pump	12/03/13	< 0.00018	0.0322	0.00027 J/	< 0.000018	< 0.00015
Hydropunch TMW-512 29-33	12/03/13	Inertial Pump	12/03/13	< 0.00018	0.0044	0.00037 J/	< 0.000018	< 0.00015
Hydropunch TMW-512 37-41	12/03/13	Inertial Pump	12/03/13	< 0.00018	0.0011	0.00053 J/	< 0.000018	< 0.00015
Hydropunch TMW-512 48-52	12/03/13	Inertial Pump	12/03/13	< 0.00090	0.0116	0.00098 J/	< 0.000017	0.0024 J/

J/ flag by laboratory denotes estimated concentration above the adjusted method detection limit and below the adjusted reporting limit

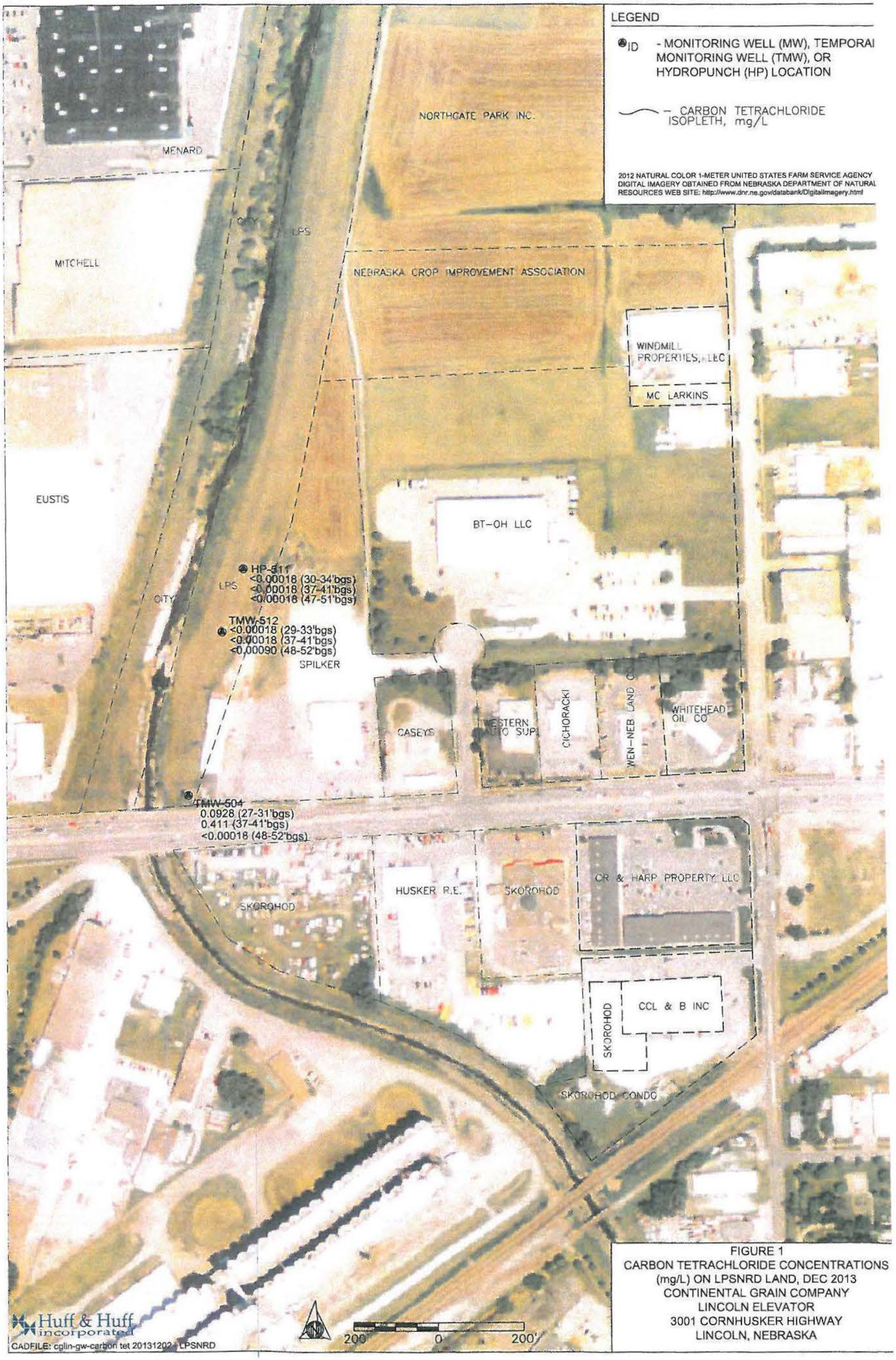

FIGURE 1
CARBON TETRACHLORIDE CONCENTRATIONS (mg/L) ON LPSNRD LAND, DEC 2013
CONTINENTAL GRAIN COMPANY
LINCOLN ELEVATOR
3001 CORNHUSKER HIGHWAY
LINCOLN, NEBRASKA