Construction Response Action Plan/Construction Contingency Plan

Twin Ports Interchange - Work Package 1

Duluth, Minnesota

State Projects 6982-322 (I-35), 6980-60 (I-535), and 6915-136 (TH 53)
MPCA BF0000952

MNTCO 151179 | January 23, 2020

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January 23, 2020

RE: Twin Ports Interchange - Work Package 1
Construction Response Action
Plan/Construction Contingency Plan
Duluth, Minnesota
SP 6982-322 (I-35), 6980-60 (I-535), and
6915-136 (TH 53)
MPCA BF0000952
SEH No. MNTCO 151179 4.00

Ms. Carolyn Boben
MnDOT Office of Environmental Stewardship
395 John Ireland Blvd, Mail Stop 620
Saint Paul, Minnesota 55155

Dear Ms. Boben:

Please find enclosed the Construction Response Action Plan/Construction Contingency Plan (RAP/CCP) for the Twins Ports Interchange – Work Package 1 project located in Duluth, Minnesota. Please feel free to contact me directly at 651.490.2070 if you have any questions or comments.

Sincerely,

Christine Carlson, PG (MN)
Project Manager
(Lic. MN)

cc
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Construction Response Action Plan/Construction Contingency Plan

Twin Ports Interchange - Work Package 1
Duluth, Minnesota

SP 6982-322 (I-35), 6980-60 (I-535), and 6915-136 (TH 53)
MPCA BF0000952
SEH No. MNTCO 151179

January 23, 2020

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List of Abbreviations

Abbreviation	Meaning
ACM	Asbestos Containing Material
ACWM	Asbestos Containing Waste Material
AST	Aboveground Storage Tank
BaP	Benzo(a)pyrene
bgs	Below Ground Surface
BMP	Best Management Practice
BNSF	Burlington Northern Santa Fe
CCP	Construction Contingency Plan
CMGC	Construction Manager/General Contractor
CN	Canadian National
DRO	Diesel Range Organics
EPA	Environmental Protection Agency
ESA	Environmental Site Assessment
GPL	General Permit Limit
GRO	Gasoline Range Organics
HAZWOPER	Hazardous Waste Operations and Emergency Response
HBG	Health Based Guidance
HBV	Health Based Value
HRL	Health Risk Limit
I	Interstate
LOD	Limits of Disturbance
MDA	Minnesota Department of Agriculture
MDH	Minnesota Department of Health
mg/kg	Milligrams per kilogram
MGS	Minnesota Geological Survey
MnDOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency
NAD	No Association Determination
NB	Northbound
NPDES	National Pollutant Discharge Elimination System
OES	Office of Environmental Stewardship
OSHA	Occupational Safety and Health Administration
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyl
PID	Photoionization Detector
ppm	Parts Per Million
RAA	Risk Assessment Advice
RAP	Response Action Plan
RCRA	Resource Conservation and Recovery Act
SB	Southbound
SDS	State Disposal System
SEH	Short Elliott Hendrickson Inc.
SHSP	Site Health and Safety Plan
SLV	Soil Leaching Value
SP	State Project
SRV	Soil Reference Value
SVOC	Semi-Volatile Organic Compound
SWPPP	Storm Water Pollution Prevention Plan
TCLP	Toxicity Characteristic Leaching Procedure
TH	Trunk Highway
TPI	Twin Ports Interchange

List of Abbreviations (continued)

Abbreviation	Meaning
UFC	Unregulated Fill Criteria
ug/L	Micrograms per liter
USGS	United States Geological Survey
UST	Underground Storage Tank
VIC	Voluntary Investigation & Cleanup
VOC	Volatile Organic Compounds
WLSSD	Western Lake Superior Sanitary District

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Construction Response Action Plan/Construction Contingency Plan

Twin Ports Interchange - Work Package 1

Prepared for MnDOT Office of Environmental Stewardship

1 Introduction and Background

The Minnesota Department of Transportation (MnDOT) retained Short Elliott Hendrickson Inc. (SEH®) to develop a Construction Response Action Plan/Construction Contingency Plan (RAP/CCP) for the Twin Ports Interchange (TPI) – Work Package 1 project in Duluth, Minnesota ("Project"). The Project will include reconstruction of the Interstate (I)-35/I-535/Trunk Highway (TH) 53 interchange, bridge replacements and realignment of Miller and Coffee Creeks. In general, the Project will enhance safety by eliminating blind merge and left exits, replacing aging infrastructure, and improving freight mobility between the Port of Duluth-Superior and local, regional, and international destinations. The Project will be completed under State Projects (SP) 6982-322 (I-35), 6980-60 (I-535), and 6915-136 (TH 53). MnDOT is completing the project under the Construction Manager/General Contractor (CMGC) approach where MnDOT, designers and contractors work collaboratively to develop the project scope, optimize the design, improve quality and manage cost.

The Project area is depicted on **Figure 1**. The Twin Ports are located at the far western corner of Lake Superior and include Duluth, Minnesota and Superior, Wisconsin. The region's central artery, I-35, is one of the nation's principal trade corridors. The Project is located in the City of Duluth downtown section between St. Louis Bay of Lake Superior, Rice's Point, Burlington Northern Santa Fe (BNSF) rail yard, and the Lincoln Park neighborhood. The Project will be completed in multiple stages, Work Packages 1 through 4. The work packages are currently in development. Much of the work to be completed for the work packages will take place in the same geographic area; therefore, Phase I and II Environmental Site Assessments (ESA) and Addenda completed for the Project overlap with the various work packages. This RAP/CCP addresses work to be completed as part of Work Package 1. Project construction for Work Package 1 will begin in early 2020 and conclude in mid-2023. Additional RAP/CCPs will be submitted for subsequent Work Packages at a future date.

A summary of the results of the applicable Phase I ESA, Phase II ESA, and Addenda completed for the Project is included in this report.

This Construction RAP provides a description of the methods that will be used to manage contaminated materials during Project construction. These methods include environmental monitoring, segregation, handling, reuse and disposal procedures that will apply to materials excavated and to groundwater dewatered for the Project. This RAP also addresses permits required for management of contaminated groundwater during planned construction dewatering.

Additionally, a CCP is included in this RAP for addressing unexpected environmental conditions encountered during construction.

MnDOT has enrolled the Project in the Minnesota Pollution Control Agency (MPCA) Brownfield Program and has been assigned MPCA site identification number BF0000952. This RAP is being completed to satisfy Brownfield Program guidelines.

1.1 Response Action Plan Scope and Objectives

The RAP will address contamination issues identified in the Project area during previous investigation activities, and will provide a plan for proper management of contaminated materials that are likely to be encountered during earthwork for the planned construction of the Project. A CCP outlining procedures to address unexpected contamination is also provided.

The objective of the RAP is to ensure that the Project is completed in a manner that protects human health, welfare and the environment from releases or threatened releases of hazardous substances, pollutants, or contaminants. The RAP will provide a description of the actions that will be taken to ensure proper handling and disposal of contaminated materials so that contamination is not exacerbated by the Project construction activities.

The scope of the RAP is limited to Project construction-related actions. Project response actions are not intended to remediate the Project corridor (although, as with any construction project, beneficial remediation may occur through the excavation and disposal of contaminated materials as part of the construction process). The Project's response actions will be "construction-related" only—that is, only those response actions that are necessitated by construction excavation will occur, in contrast with other types of projects/sites with targeted risk remediation actions. Contaminated materials will be managed using methods appropriate for the current and anticipated future use of the Project area as a transportation corridor.

Any unanticipated/unidentified contaminated materials encountered during construction will be evaluated using the MPCA risk-based approach, and will be managed in accordance with the CCP and MnDOT standards and specifications. As with the actions detailed in the RAP, any contaminated materials removed from the Project construction limits in accordance with the CCP will be removed solely for construction or geotechnical purposes. Contaminated materials that are not disturbed by the Project because they are outside Project excavation areas, and/or underneath Project fill areas, will remain in-place.

1.2 Project Contacts

The following parties and their representatives are those currently involved in development of the Project:

<u>Minnesota Department of Transportation</u>
Office of Environmental Stewardship (OES)
395 John Ireland Blvd, Mail Stop 620
Saint Paul, Minnesota 55155-1899
Contact: Carolyn Boben, Project Manager/Hydrogeologist (651-366-3621)

<u>Environmental Consultant to MnDOT</u>
Short Elliott Hendrickson Inc.
3535 Vadnais Center Drive

Saint Paul, Minnesota 55110
Contact: Christine Carlson, Project Manager (651-490-2070)

Minnesota Pollution Control Agency
Voluntary Investigation & Cleanup (VIC) Program
520 Lafayette Road
Saint Paul, Minnesota 55155
Contact: Andrew Nichols, Project Manager (651-757-2612)

Petroleum Brownfield Program
520 Lafayette Road
Saint Paul, Minnesota 55155
Contact: Stacey VanPatten, Project Manager (651-757-2425)

Construction Manager/General Contractor
Ames-Kramer Joint Venture
Contractor Environmental Consultant: Jill Mickelson, Braun Intertec (507-273-7170)

Disposal Facility
To be determined

1.3 Summary of Proposed Project Development

The Project will include reconstruction of the I-35/I-535/TH 53 interchange and realignment of Miller and Coffee Creeks. Approximately 1.2 miles of I-35 from south of 27th Avenue to north of Garfield Avenue, and approximately 0.5 miles of I-535 south of I-35 will be reconstructed. Portions of TH 53 and I-535/Garfield will be reconstructed. Project construction will begin in early 2020 and conclude in mid-2023. The following is a brief summary of Work Package 1 Project construction staging (based on the plan set at the 90% stage of completion):

Please note, work being completed for the Project is currently being evaluated for staging. Some of the items listed below may actually be completed under Work Packages 2-4 instead of in Work Package 1. The information below is based on the 90% plans.

Stage 0 Phase 1 TPI Interchange

- Construct Crossover 1 and Crossover 2 and construct I-35 northbound (NB) and I-southbound (SB) inside temporary widening
- Demolish 27th Ave. Bridge and construct substructure and pier for 27th Ave. Bridge
- Demolish TH 53 SB to I-35 SB Bridge

Stage 0 Phase 2 TPI Interchange

- Construct Bypass 1 for temporary 27th Ave. NW Ramp and construct I-35 NB outside temporary widening
- Construct temporary W Superior St. connection
- Remove existing median barrier and construct temporary pavement for Crossover 3
- Construct and activate temporary signals at 24th Ave. W. and Piedmont Ave. intersection and at Garfield Ave. and Railroad St. intersection.

Stage 1 TPI Interchange

- Construct 27th Ave. Bridge.
- Construct Miller/Coffee Creek Box Culvert western and eastern portion
- Excavate I-35 SB and place temporary pavement between 27th Ave. and TH 53
- Construct Bypass 2 between temporary pavement and Lower Michigan St.
- Reconstruct Lower Michigan St. storm sewer and place temporary pavement
- Construct Bypass 3 between Lower Michigan St. and I-35 SB
- Construct substructure then construct TH 535 NB to TH 35 NB Bridge
- Construct N 22nd Ave. W Miller/Coffee Creek storm sewer
- Construct Piedmont Ave.
- Construct N 21st Ave. W water main
- Demolish I-35 NB to TH 53 NB and TH 535 NB to I-35 SB Bridges

Stage 2 Phase 1 TPI Interchange

- Construct temporary I-35 pavement between 27th Ave. W. and TH 53
- Construct substructure for I-35 NB to I-535 SB Bridge
- Construct TH 535 NB to I-35 NB Bridge

Stage 2 Phases 2 and 3 TPI Interchange

- Construct Miller/Coffee Creek box culvert middle portion
- Construct substructure for I-35 NB to I-535 SB Bridge
- Construct I-535 NB to I-35 NB Bridge
- Construct Bypass 5 for temporary 27th Ave. NE ramp
- Demolish I-35 SB to TH 535 SB Bridge, I-35 NB Low-Level Bridge and I-35 NB to I-535 SB Bridge

Stage 3 Phases 1 and 2 TPI Interchange

- Construct Miller/Coffee Creek box culvert middle portion
- Demolish I35 SB to TH 53 NB Bridge, TH 53 SB to I-35 NB Bridge, TH 53 SB to I-535 SB Bridge, TH 535 SB to I-35 NB Bridge, I-535 NB to TH 53 NB Bridge and TH 53 Bridge from W. Michigan St. To north of N. 21st Ave. W.

Stage 2 Phases 1, 2 and 3 Garfield Interchange

- Construct temporary widening along the I-535 NB exit ramp to Garfield Ave.
- Remove median barrier and construct temporary pavement for Crossover 4

Stage 3 Phases 1 and 2 Garfield Interchange

- Remove entire Garfield interchange roadway and structures for construction of I-535 NB exit ramp to Garfield Ave. and Garfield Ave. north of I-535
- Demolish I-535 Bridge over railroad

Because the Project is currently at the 90% stage of design, excavation locations and depths are preliminary, and design changes may be incorporated before the Project plan is 100% complete. Select construction plans are included in **Appendix A**. Soil balance determinations (calculations of volumes of material to be excavated vs. imported) are in progress.

2 Summary of Previous Assessments

In preparation for the Project, MnDOT completed the following Modified Phase I and II ESAs, and Addenda for the Project area:

- *Modified Phase I ESA, I-35, I-535, TH 53 Twin Ports Interchange, Duluth Minnesota, SP 6982-322, SP 6980-60 (January 2018)*
- *Modified Phase I ESA Addendum, Twin Ports Interchange – Michigan/Superior Streets Intersection, Duluth, Minnesota, SP 6982-322 (May 2019)*
- *Modified Phase I ESA Addendum, Twin Ports Interchange – TH 53, Duluth, Minnesota, SP 6915-136 (May 2019)*
- *Modified Phase I ESA Addendum, Twin Ports Interchange – Piedmont Avenue, Duluth, Minnesota, SP 6982-322 (August 2019)*
- *Phase II ESA, Twin Ports Interchange – Work Package 1, Duluth Minnesota, SP 6982-322, 6980-60, 6915-136 (October 4, 2019)*
- *Phase II ESA Addendum, Twin Ports Interchange -- Work Package 1, Duluth, Minnesota, SP 6982-322, 6980-60, 6915-136 (December, 2019)*

2.1 Phase I ESA Findings

MnDOT completed a Phase I ESA (SEH, 2018) and Phase I ESA Addenda (SEH, 2019) that identified potential contaminated materials concerns within and adjacent to the Project. The Phase I ESA findings indicated that the Port of Duluth-Superior Harbor was a busy transportation hub by the mid-1870s. The harbor area had rapid industrial development driven by the city's port connection with the St. Louis River and Lake Superior. Numerous harbor developments in the St. Louis Bay and Superior Harbor Basin were made during this time, and an extensive railroad system was developed on Rice's Point. Garfield Avenue (formerly 3rd Street) and Michigan Street were present with railroad tracks paralleling Michigan Street. The railroads accessed industry on Rice's Point and other industrial properties that lined the shore of the St. Louis Bay south of Michigan Street.

Rice's Point was expanded with substantial fill material several times between the late 1890s and the late 1960s. The area was largely occupied with rail yards, lumber mills, grain elevators and bulk gravel/limestone building materials. Developments on Rice's Point included (but were not limited to) roundhouses, a bulk petroleum tank farm, oil/pump houses, rail car repair shops, coal storage, blacksmiths, and outdoor storage of lumber, taconite and railroad ties. The original two roundhouses and rail yard were built north and east of Garfield Avenue by the 1890s. After Rice's Point was widened in the late 1890s/early 1900s to accommodate future development of rail yards, lumber mills, and grain elevators, a much larger brick roundhouse and yards (referred to as the BNSF Glacier Park Roundhouse and Rail Yard – today designated as Superfund Site SR1356) were constructed along the southwest side of Garfield Avenue. The type and origin of fill used to widen Rice's Point is unknown. By 1975, the larger roundhouse was razed. Presently, roughly one third of the original rail yard operation remains on Rice's Point. The tracks are now mainly used for staging and storage of grain cars.

Industrial properties along the St. Louis Bay were predominantly lumber mills/yards and shingle mills that were accessed by the railroads and bay ports. Former log booms (areas of the bay with barriers to collect floating logs), inlets, and the general shoreline southwest of Garfield Avenue were filled with material of unknown type and origin to accommodate development. Miller Creek and Coffee Creek have been realigned over time, but continue to discharge into the St. Louis Bay in the Project area. Discharge, runoff and port operations have contributed to contaminated sediment in the vicinity of Rice's Point. On a larger scale, state and federal remediation projects have been underway for concerns related to sediment, water quality, wildlife, etc. for the St. Louis River and Great Lakes (several Superfund sites are listed for the area including Superfund IDs SR1010-SR1015).

Construction of the I-35 corridor began in the late 1960s and required razing of several city blocks with commercial and residential development. Properties adjacent to the highway corridor were redeveloped with primarily commercial structures. During the I-35 expansion project in the 1980s, several areas of buried shantytowns and debris were encountered in fill material excavated from the corridor. The potential to encounter debris-laden materials exists across the Project corridor.

The large Western Lake Superior Sanitary District (WLSSD) site, occupying the southeastern portion of the Project area, was originally a small sewage treatment plant built around 1930. The facility was eventually expanded to include numerous other city wastewater and solid waste services including a yard waste composting facility (leaves, grass clippings, brush, plant materials).

South of the WLSSD facility is the Canadian National (CN) Duluth Dock and the Lakehead Storage Facility. The facility trainloads iron ore, taconite, and limestone from railcar to vessel and vice versa. Railroad tracks formerly accessed the staging/storage area in the northeastern portion of the site was well as the dock. The docks and staging/storage areas are southwest of the Project area.

The remainder of the Project area (including Michigan Street and Superior Street) is primarily occupied by residences and commercial properties. Industrial sites south of Michigan Street included junk yards, auto salvage, and scrap metal facilities.

2.2 Phase II ESA Findings

2.2.1 Background

MnDOT completed a Phase II ESA (SEH, 2019) and Phase II ESA Addendum (SEH, 2019) including placement of borings to investigate soil and groundwater for the presence of contamination based on field screening (using visual and olfactory observations and photoionization detector (PID) readings), and laboratory analysis of soil, groundwater and regulated material samples. The Phase II ESA concentrated on the area within the proposed Project limits of disturbance (LOD).

A total of 352 Geoprobe® soil borings have been completed to date in the Project primarily on the Work Package 1 Project Area during the Phase II ESA and Phase II Addendum. A total of 818 soil samples and 382 water samples were collected and submitted for laboratory analysis. Boring locations are depicted on **Figure 2** and **Figure 3**. Tables with soil and groundwater analytical results are shown in **Appendix B** and **Appendix C**, respectively.

2.2.2 Phase II ESA Geology and Hydrogeology

The regional topography in the Project area was originally shaped by glaciation during which several ice sheets advanced and retreated over the area. The surficial geology of the majority of the project areas consists of Superior Lobe till (Minnesota Geological Survey (MGS), 2009 and MGS, 2016). Where not removed by development, unconsolidated native sediments in the Project area are expected to range from 5 feet to 20 feet thick, with thicknesses increasing toward the shoreline. Rice's Point native sediments consist of beach sand and disturbed sediment consisting of clean, fine to medium grained sand, including some coarser grained fragments, deposited as bay-mouth bars by waves and longshore currents. Rice's Point has been extensively covered by dredge spoil (MGS, 2009). Substantial quantities of fill are also present where the shoreline has been expanded, and log booms (areas of the bay with barriers to collect floating logs) and inlets have been filled.

The uppermost bedrock in the Project area consists of the Duluth Complex, which varies widely in depth from as shallow as 5 feet below ground surface (bgs) to as deep as 150 feet bgs (MGS, 2010). The Duluth Complex is composed of multiple discrete, layered mafic igneous intrusions consisting of anorthosite grading to diorites in the Upper Contact Zone (MGS, 2001).

According to the Water Resources of the St. Louis River Watershed, Northeastern Minnesota, the regional groundwater flow is generally to the southeast towards St. Louis Bay, which abuts the Project area (United States Geological Survey (USGS), 1977). Groundwater depths were observed and measured during the Phase II ESA. Groundwater was observed from 0.4 feet to 22.5 feet bgs.

2.2.3 Phase II ESA Summary

Borings completed in the Project area usually encountered fill material. Borings that were completed in roadway embankment areas (generally elevated above the former (historical) industrial surfaces due to previous highway construction) encountered little to no contaminated soil. Most borings that were completed in areas outside embankment areas and/or in roadway cut areas (at or below elevations consistent with the general historical land surface) encountered urban/industrial fill often containing debris. The debris found in fill material ranged from trace amounts to as much as 75% of fill volume in some locations. The debris consisted of wood, coal/slag, concrete, glass and brick, as well as various other less common debris materials. One material sample (tar paper) collected during the investigation tested positive for asbestos containing material (ACM). Additional investigation that identified buried ACM in the project area was completed by the MnDOT OES Regulated Material Management Team under a separate contract and is reported under separate cover. ACM located within the Project will be removed and disposed in accordance with all applicable state and federal requirements under the management of the MnDOT OES Regulated Material Management Team.

In addition to the presence of debris, historical industrial fill material in the Project area also had consistent occurrences of generally low-level petroleum-related compounds, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and metals as well as sporadic occurrences of polychlorinated biphenyls (PCBs) and pesticides. Concentrations of commonly-detected parameters often exceeded MPCA Unregulated Fill Criteria (UFC) (see **Section 2.3**). The parameters regularly detected in the historical industrial fill material appeared to be area-wide at or below the level of the old industrial land surface, and are associated with industrial activity typical in the area. The concentrations do not appear to be isolated occurrences related to

specific releases, but are wide-spread. The majority of concentrations are not associated with any other typical field indication of contamination including elevated PID readings, visual or olfactory evidence of contamination other than the presence of debris. Where debris is present the soil consists of historical industrial fill and is correlated with chemical impacts.

Within the historical industrial fill material, approximately 23% of borings had samples with exceedances of one or more MPCA 2009 Tier 2 Industrial Soil Reference Values (SRVs). Parameters exceeding the Tier 2 SRVs were limited to the following: 1,2,4-trimethylbenzene (up to 44.3 milligrams per kilogram (mg/kg)), 1,3,5-trimethylbenzene (up to 13.9 mg/kg), benzo(a)pyrene (BaP) equivalents (up to 216 mg/kg), arsenic (up to 29.6 mg/kg), lead (up to 3,810 mg/kg) and mercury (up to 466 mg/kg). A number of metals samples that exceeded their respective 20X toxicity characteristic leaching procedure (TCLP) limits (1 cadmium sample, 2 chromium samples, 107 lead samples and 12 mercury samples) were submitted for TCLP analysis. All samples were below their respective hazardous toxicity limits except for three lead samples. These three samples were collected in fill material from 0.5 to 8 feet bgs at three separate Project locations. Based on the distance between the locations with exceedances and the variable types of fill at each location, no Project-wide correlation can be made between hazardous lead concentrations in soil and type of fill or location. The hazardous lead locations appear random and may be simply due to chance particles of metal in the samples. Additional investigation was recently completed during the Phase II ESA Addendum (SEH, 2019) to delineate the extent and magnitude of soil lead concentrations in these three areas. Delineation soil samples found no additional hazardous levels around these spots.

Elevated concentrations of diesel range organics (DRO) were also commonly present in the historical industrial fill material. Most DRO results were noted by the laboratory as having high boiling point hydrocarbons present in the sample indicating a product heavier or more degraded than typical diesel.

Fifteen borings had petroleum odors and eighteen borings had PID headspace readings greater than 10 parts per million (ppm) (the maximum PID reading was 899.9 ppm). Samples from these borings were associated with elevated DRO results (up to 21,300 mg/kg) and elevated gasoline range organics (GRO) results (up to 1,280 mg/kg). These borings occur in areas of either known petroleum release sites, historical industrial/rail/commercial developments or, in one location, occur in an area with contaminated historical harbor fill material, and represent concentrated releases, not the diffuse contamination found throughout the historical industrial fill material elsewhere in the Project area.

During this investigation, groundwater was generally sampled from the shallow water table. Depths to groundwater varied from 0.4 feet bgs to 22.5 feet bgs. The most common and wide spread parameters detected in groundwater included DRO, VOCs, and select poly-aromatic hydrocarbons (PAHs). Out of a total of 189 groundwater samples analyzed for DRO, 125 (66%) exceeded the Minnesota Department of Health (MDH) health-based guidance (HBG) limit of 50 micrograms per liter (ug/L) and 78 out of the 125 samples also exceeded the National Pollutant Discharge Elimination System (NPDES) general permit limit (GPL) of 200 ug/L. Petroleum release site-related concentrations (DRO with GRO and VOCs associated with PID/visual/olfactory evidence) were limited to four groundwater samples taken from borings located in the 22nd Avenue/Coffee Creek and Low-Level Bridge Demolition investigation areas. Similar to soil results, DRO exceedances in groundwater throughout the Project area generally lacked corresponding concentrations of GRO, petroleum-related VOCs or PID/visual/olfactory evidence. Most DRO results had the laboratory note “T6” indicating that high boiling point

hydrocarbons were present in the sample. Additionally, concentrations of anthracene and BaP that exceeded NPDES GPLs and/or MDH HBGs were commonly associated with the non-petroleum-related DRO concentrations. Chlorinated solvent detections were limited to three groundwater samples taken from borings in two locations (West 21st Avenue/West 2nd Street and W Michigan Street/TH 53). Groundwater in these two areas had concentrations of trichlorethene, vinyl chloride and cis-1,2-dichloroethene that exceeded MDH HBGs and/or NPDES GPLs.

Other low-level concentrations (less than MDH HBGs and NPDES GPLs) were encountered in groundwater sporadically throughout the Project area. Concentrations of two dissolved metals in groundwater (barium and zinc) were detected at concentrations consistent with naturally occurring concentrations.

Boring locations are depicted in **Figure 2** and **Figure 3**. Tables with soil and groundwater analytical results are shown in **Appendix B** and **Appendix C**, respectively.

2.3 Project Wide Phase II ESA Regulatory Criteria and RAP Regulatory Criteria

To evaluate the magnitude of impacts regulatory levels and guidelines, where established, were compared to analytical results for detected chemicals.

2.3.1 Soil

Soil results for the Phase II ESA and subsequently this RAP were compared to established MPCA 2009 SRVs and 2013 Screening Soil Leaching Values (SLVs). Based on the Phase II ESA results excavated soil that meets MPCA UFC is designated for unrestricted reuse on- or off-site. Excavated soil that meets the MPCA Tier 2 Industrial SRVs is designated for reuse on-site if it also meets geotechnical requirements. Additional discussion regarding soil management categories is included in **Section 5.1** of this report.

2.3.1.1 MPCA Unregulated Fill Criteria Definition

The MPCA has defined UFC in Guidance Document c-rem1-01, Best Management Practices for the Off-Site Reuse of Unregulated Fill (MPCA, February 2012). Unregulated fill is excess soil that meets all of the following field screening and contaminant concentration criteria:

- free from solid waste, debris, asbestos-containing material, visual staining, and chemical odor
- organic vapors less than 10 parts per million, as measured by a PID
- for petroleum-impacted soil, less than 100 mg/kg DRO/GRO
- for contaminants detected in soil, less than the MPCA's Tier 1 SRVs and Screening Soil SLVs*

*Naturally-occurring concentrations of some metals sometimes exceed the SRV or SLV. Such soils are not considered impacted in the absence of a contaminant source or other field or laboratory indications of contamination.

The criteria defined above is herein referred to throughout the report as MPCA unregulated fill criteria "MPCA UFC".

Soil results were also compared to the twenty times (20x) Environmental Protection Agency (EPA) hazardous levels for toxicity (40 CFR 261.24 Table 1) in accordance with the MPCA Solid Waste Program requirements for waste disposal. The MPCA recommends the comparison is used to determine the need for TCLP analysis for disposal purposes. TCLP results for individual parameters are compared to EPA hazardous levels.

Soil results were also compared to the total mercury concentrations in the Program Management Decision Memo – Disposal of mercury contaminated soil and renovation/demolition debris in Minnesota Permitted Landfills (MPCA, May 2007).

2.3.2 Groundwater

The Phase II ESA compared groundwater results to MDH HBGs that have been established to evaluate drinking water. These values include Health Risk Limits (HRLs), Health Based Values (HBVs), and Risk Assessment Advice (RAAs) levels. The Phase II ESA also compared groundwater results to the NPDES general permit (MNG790000) which identifies discharge limits for contaminated groundwater discharges. The general permit regulates the discharge of groundwater extracted at cleanup and redevelopment sites. This includes discharges which have been contaminated by past or present activities, from both known and unknown sources of contamination. The Phase II ESA also used NPDES GPLs (limits for discharge to surface water that is used as a drinking water source) for general comparative purposes for groundwater contaminant concentrations.

Groundwater and storm water management are regulated through discharge permits for receiving water bodies, wastewater treatment facilities, and potentially other factors regulated by local and federal authorities. Discharge limits will be based on individual permit requirements.

3 Regulatory Programs

3.1 MPCA Brownfield Program Assurances

MnDOT has enrolled the Project in the MPCA Brownfield Program and has been assigned MPCA site identification number BF0000952. The MPCA issued No Association Determinations (NADs) for MnDOT for right-of-way acquisitions for Work Package 1 in various letters dated from January 2019 through August 2019. This RAP is being completed to satisfy Brownfield Program and in conformance with the NADs.

3.1.1 Stockpile Locations Outside of Project Limits

Due to space limitations in the footprint of the Project, the Contractor is proposing stockpile locations outside of the Project limits. These stockpile locations, while outside of the project limits are considered components on the Project included in the Project wide NADs issued by the MPCA. Stockpile locations outside Project limits will be documented in the RAP Implementation Report(s).

3.2 Deed Restrictions and Institutional Controls

In accordance with Minnesota Statute 115B.175 this RAP serves as application to the Commissioner to approve the construction-related voluntary response activities that will occur on properties within the Project area with existing institutional controls.

Institutional Controls are recorded for the sites listed in **Table 1**. The sites listed in **Table 1** may be included within the Project LOD as temporary easement or permanent right-of-way acquisition for the Project.

It is expected that reuse of low-level contaminated materials in the Project area as described in the RAP will not require MnDOT to implement new institutional controls for the Project. This is based on the widespread occurrence of similar commercial/industrial-associated background contamination throughout the region where the Project is located.

4 Project Wide Response Action Standard Operating Procedures and Methods

The following sections outline the standard operating procedures and methods that will be instituted throughout the Project area. These standard operating procedures and methods will be implemented for the entire Project and will consistently applied in future RAPs completed for Work Packages (1-4).

4.1.1 Project Coordination

MnDOT staff assigned to the Project will coordinate with the general contractor and MnDOT's environmental consultant regarding the construction schedule and logistics related to implementing this RAP. The environmental consultant will communicate with MnDOT, the MPCA, and other interested parties as necessary regarding the environmental monitoring results and any necessary environmental actions.

4.1.2 Community Relations

It is anticipated that MnDOT will lead any necessary community relations efforts for the Project. Community relations activities could include, but are not limited to the following:

- Preparation of fact sheets
- Preparation of public notices
- Scheduling public meetings
- Responding to public concerns or press coverage
- Providing notifications and updates for on-site activities
- Designating a Project contact for the community

4.1.3 Site Health and Safety

Environmental consultants involved in monitoring and sampling activities will be required to meet the training requirements of 29 CFR 1920.120. Specifically, each person will have completed an Occupational Safety & Health Administration (OSHA) certified 40 Hour Hazardous Waste Operations and Emergency Response (HAZWOPER) safety course. In addition, they will have experience in directing contaminated material excavation and be competent in proper screening and sampling procedures.

Prior to the start of the Project, the environmental consultant will prepare a Site Health and Safety Plan (SHSP) for use by their personnel. The SHSP will assign responsibilities, establish personal protection standards and safety practices and procedures, and provide for contingencies that

may arise during site operations. The SHSP procedures will be based on the site conditions and chemical hazards known or expected to be present at the site using site data available at the time it is written. The SHSP is subject to revision when deemed necessary by actual site conditions encountered during field activities.

The construction contractors selected for the Project will be provided with all of the environmental reports completed for the Project. The contractors will be required to comply with all applicable safety regulations imposed by federal and state law for handling pollutants, contaminants, hazardous substances, wastes or materials. Contractor personnel involved with contaminated materials will be expected to be familiar with and to meet applicable Minnesota OSHA requirements.

Asbestos-related work will be conducted by MDH certified personnel operating under State and Federal regulations. Environmental consultants will be required to have their valid MDH Asbestos Inspector certification (or higher level credentials) on-site and available when completing monitoring and sampling activities.

4.1.4 Field Screening of Excavated Material

During excavation activities in soil management category areas (**Section 5.1.2**), except for excavation in Unregulated Soil, an environmental consultant will be on-site to conduct environmental monitoring. An environmental consultant will also be on-call to travel to the Project area to conduct screening should unexpected suspect contaminated materials be encountered outside designated soil management category areas.

Soils will be observed for the presence of visual and olfactory indications of contamination. Headspace monitoring will be completed in accordance with MPCA methodology using a PID equipped with a 10.6-electron-volt lamp to monitor soil for the presence of organic vapors. In locations with non-petroleum contamination, an 11.7-electron-volt lamp will be used to monitor for organic vapors if determined necessary by the environmental consultant. The frequency of samples collected for headspace analysis will be based on the type of soil being excavated. Because most soil contaminants in the Project area are not volatile, PID headspace analysis will not be as beneficial for screening soil as visual observation. The environmental consultant will determine the frequency of PID headspace sampling throughout the Project area based on the homogeneity of the material being excavated, the volume and type of debris encountered and knowledge of the Phase I and Phase II ESA information for the area. A minimum of one sample for headspace analysis will be collected for approximately every 100 cubic yards of soil removed. Samples will be collected with greater frequency (up to approximately one sample for every 10 cubic yards of soil removed) in material that has volatile contamination that can be measured and/or in heterogeneous material. The environmental consultant will have asbestos inspection credentials and will monitor for potential ACM. All screening results will be documented.

4.1.5 Soil Staging

To the extent possible, soil designated for disposal (as described in **Section 5.1.2**) will be direct loaded and hauled to a Minnesota Permitted solid waste or industrial landfill facility. Soil that cannot be immediately hauled to the landfill will be stockpiled as detailed in **Section 4.1.7**.

Soil excavated from several limited areas (as described in **Section 5.1.2**) may require treatment and/or additional testing prior to disposal.

Soil designated for reuse that cannot be immediately reused will be segregated and stockpiled (as detailed in **Section 4.1.7**) for later reuse on-site, or disposed at a Minnesota permitted industrial or solid waste landfill facility. Reuse of Regulated Soil will occur across Work Packages 1-4 and will be limited to the Project.

Excess Unregulated Soil that cannot be immediately reused will be stockpiled on or off-site for unrestricted reuse on or off-site.

Final volume calculations of excavated material for the Project were in process at the time of publication of this RAP.

4.1.6 Laboratory Testing

Additional laboratory testing may be required in the following scenarios:

- If additional characterization is required by the landfill for disposal approval, samples will be collected and analyzed for the parameters required by the receiving landfill.
- In the event that excavated soils are materially different from what has been observed and tested during previous evaluations (based on visual, olfactory and/or PID measurements), samples will be collected and analyzed for characterization.

Sampling procedures will follow MPCA guidelines. The samples will be analyzed for all contaminants of concern as determined by the environmental consultant utilizing field observations and data from the previous investigations, including, but not limited to the following parameters:

- DRO/DRO silica gel cleanup (Wisconsin Method DRO)
- GRO (Wisconsin Method GRO)
- VOCs (EPA Method 8260B)
- SVOCs (EPA Method 8270)
- PAHs (EPA Method 8270 SIM)
- Resource Conservation and Recovery Act (RCRA) Metals (EPA 6010B/7471)
- Minnesota Department of Agriculture (MDA) List 1/2 Pesticides/Herbicides (EPA Method 8321B)
- PCBs (EPA Method 8082A)
- TCLP (40 CFR Part 261 Subpart C)

4.1.7 Soil Stockpile Management

Excavated Regulated Soil that cannot be re-used or immediately hauled to a landfill, will be placed in a temporary stockpile in a location approved by the Project Engineer and MnDOT's environmental consultant. Soils from different areas with suspected different contaminants, soils exhibiting different visual or olfactory characteristics, or soils with substantially different PID readings will be placed in separate stockpiles. Regulated Soil will be covered with minimum ten mil poly plastic sheeting as soon as work on the stockpile has been completed during the day or at a minimum at the end of each working day. The poly will be adequately secured in place. The stockpiles will be constructed on a minimum ten mil poly plastic placed over smooth debris free ground. The stockpile(s) will be bermed, if necessary, to prevent storm water run-on and/or runoff, and to contain free liquids (if any) from saturated soil.

If the Contractor excavates wet Regulated Soil (soil with free draining liquids), material will be stockpiled as detailed in this section or the material will be placed within the excavation to drain (for example benching within the excavation). All free liquids draining from wet Regulated Soil will either be contained by stockpiling or will remain within the excavation.

If laboratory analysis of stockpiled soil is required, sample frequency will be determined based on the homogeneity of the stockpile and MPCA guidance (MPCA Guidance Document 4-04, September 2008):

Number of grab samples required from contaminated soil stockpiles	
Cubic yards of soil in pile	**Number of grab samples**
Less than 50	1
51-500	2
501-1,000	3
1,001-2,000	4
2,001-4,000	5
Each additional 2,000	One additional sample

If the soil is not reasonably homogeneous, the number of samples will be adjusted to sufficiently represent the material and/or meet additional disposal requirements of the landfill.

4.1.8 Hazardous Soil Management

The Phase II ESA found hazardous soil at three locations in the Project where isolated samples exceeded the TCLP hazardous limit for lead. No known listed hazardous waste is expected to be encountered in any other Project areas (based on soil characterization during the Phase II ESA). If soil is encountered that is not representative of the soil that has been characterized, it will be stockpiled and analyzed. If TCLP analytical results exceed any hazardous limit, the soil will be properly containerized, handled, stabilized (if necessary) and disposed in accordance with the CCP (**Section 6**). See **Section 5.1.2.4** for response actions for hazardous lead impacted areas on the Project.

4.1.9 Imported Fill Material

Any imported fill material must meet the MPCA qualifications for unrestricted reuse material. Material sourced from a pit or undisturbed native deposit with no indications of past sources of contamination is considered unrestricted reuse material. Material from any other source must be evaluated for potential impacts prior to import to the site. The contractor must provide sufficient evidence that material meets the unrestricted reuse criteria. Sufficient evidence includes at least one of the following, but may not be limited to the following:

- Evidence that the property is not suspect for impacts based sufficient knowledge of past use of the property and surrounding properties.
- Analytical results that indicate that soil meets unrestricted reuse criteria established by the MCPA

Analytical results that indicate that soil meets restricted reuse criteria established by the MPCA and that reuse has been site-specifically and formally approved by MPCA and local authorities.

4.1.10 Groundwater Management

Contaminated groundwater dewatering will be necessary for construction. Dewatering of storm water that accumulates in excavations with exposed contaminated soil may be necessary. Groundwater may by displaced during installation of footings (for box culvert and bridge work, etc.) and utilities. Water collected from wet stockpiles may be disposed of as contaminated water. Groundwater will be managed under appropriate permits for discharge to the sanitary or storm sewer (**Section 5.2**).

4.1.11 Air Criteria

Air monitoring criteria will be outlined in the MnDOT environmental consultant's, MnDOT's, and the Contractor's SHSP prepared for the Project. Based on the existing information on contaminant levels on the Project, perimeter air monitoring is not anticipated to be required during excavation. Monitoring will be initiated if new conditions warrant.

4.1.12 Engineering Controls

The following engineering controls will be used during excavation activities associated with the removal of impacted soils.

4.1.12.1 Dust Control

Methods will be employed to prevent fugitive dust emissions. Methods will include keeping exposed working areas as small as practicable during excavation and grading. Watering will be employed, as necessary, to control emissions from exposed work areas, access roads and working stockpiles. A balance will be maintained between effective dust control and making the area muddy, causing off-site tracking of contaminants.

4.1.12.2 Decontamination

The streets will be swept daily and/or when visible tracking is observed to prevent possible off-site exposure to contaminants. Street sweepings will be managed appropriately: contaminated street sweepings will be disposed at a permitted industrial or solid waste landfill facility, and non-contaminated street sweepings will reused on or off-site as determined by the Project contractor. If water is employed for equipment decontamination, it will be collected, tested and properly disposed.

4.1.12.3 Vapor Mitigation and Liquid Mitigation

Soil vapor mitigation systems are not expected to be necessary because very little volatile contamination is found within the Project LOD and because utility work for the Project is generally occurring in low- or non-contaminated areas as determined by the Phase II ESA.

In general, the concerns of contaminant migration along utility corridors exist as vapor hazards or liquid hazards. The potential for either of these hazards may warrant the implementation of mitigative measures. The general concern for either hazard is that the backfill material or the utility itself is more permeable than the surrounding soils. Mitigation in the form of trench dams and compatible pipe and gasket materials has been incorporated in the engineering design where appropriate based on the Phase II ESA.

If trench dams, flowable fill, or anti-seep collars are determined by the environmental consultant and the Project engineer to be advisable in any Project utility location where there is a possibility

of liquid contaminant migration, controls will be implemented. If chemical-resistant pipe materials or pipe wrap are determined to be advisable by the Engineer to protect utilities from degradation, controls will be implemented. The use of any engineering control in the Project will be documented in the Project RAP Implementation Report.

4.1.13 Storm Water Pollution Prevention Plan and NPDES Permits

The construction contractor selected for Project construction will be required to obtain a Storm Water Pollution Prevention Plan (SWPPP) and NPDES permit for management of storm water. The contractor is require to follow the best management practices (BMPs) required by these permits.

5 Contaminated Materials Management

The following sections discuss the management of soil, groundwater and regulated materials on the project.

5.1 Soil Management

5.1.1 Soil Management Categories

Based on the Phase II ESA, soil within the Project LOD can be grouped into the following six general categories:

- Unregulated Soil – meets the MPCA definition of unregulated fill (also includes non-impacted, naturally occurring native soil).
- Regulated Soil – exceeds one or more MPCA SLV and/or Tier 1 Residential SRV, but is below the Tier 2 Industrial SRVs. This material is found throughout the Project LOD and is generally typical of legacy contamination found in former industrial areas (key indicator parameters include DRO, PAHs and RCRA metals along with debris) indicating a diffuse anthropogenic origin.
- Discrete Area Soil – exceeds one or more MPCA Tier 2 Industrial SRV and is distinguishable from Regulated Soil based on the magnitude, type and compact areal extent of detected contaminant(s) indicating a concentrated/localized origin.
- Hazardous Lead Impacted Soil – three locations contained lead concentrations exceeding the TCLP hazardous limit for lead. The low number of exceedances and the geographically separate locations of the three samples indicates that soils with hazardous lead concentrations are not associated with large releases but are isolated occurrences within the Project LOD. The three borings with sample exceedances of the TCLP hazardous limit for lead were delineated with additional borings, and sampling and analysis indicated the impacted areas are limited laterally and vertically.
- Mercury Hotspot – one location contained total mercury concentrations (up to 466 mg/kg) above the landfill acceptance criteria but below the TCLP hazardous limit for mercury. This mercury hotspot was delineated with borings and sampling that indicated the hotspot is limited laterally and vertically.
- Undesignated Soil – Project area soils that could not be investigated prior to construction because of access issues.

Soil management category areas are depicted on **Figures 2** and **Figures 3** and are included on a large scale plot in **Appendix D**. Please note that because the soil management categories

overlap, the soil management category areas are depicted on two separate figures. The figures must be used in tandem to understand the soil management category areas in three dimensions.

5.1.2 Soil Response Actions

Following are response action details for each soil category:

5.1.2.1 Unregulated Soil

Unregulated Soil is found in a number of limited areas throughout the Project LOD (See **Figure 3-1** through **Figure 3-13** for locations). Historically recent (post-1970s) trunk highway and interstate roadway embankment was generally found to consist of Unregulated Soil. Unregulated Soil is found both at the surface (as roadway embankment) and at depths (as native material) underlying fill material.

Unregulated Soil (including naturally-occurring native soil) will be managed as unrestricted reuse material both on the Project site, and as excess material off-site.

Based on the MPCA program decision (Best Management Practices for the Off-Site Reuse of Unregulated Fill, February 2012), unregulated fill is soil that meets all of the following field screening and contaminant concentration criteria:

- Free from solid waste, debris, asbestos-containing material, visual staining, and chemical odor
- Organic vapors less than 10 ppm, as measured with a PID
- For petroleum-impacted soil, less than 100 mg/kg DRO/GRO (as measured with laboratory analysis)
- For contaminants detected in soil, less than the MPCA Tier 1 SRVs and Screening SLVs (as measured with laboratory analysis)

In addition, the pH levels of soil reused on-site must be within non-hazardous limits. The soil must have a pH greater than 2 and less than 12.5.

Any soil that meets these criteria qualifies as Unregulated Soil and has no additional environmental restrictions. Any soil that meets these criteria but is not geotechnically suitable for Project design requirements will become the property of the construction contractor for unrestricted use off-site.

5.1.2.2 Regulated Soil

Soil that does not meet MPCA UFC is considered Regulated Soil. Regulated Soil is found throughout the Project LOD (see **Figure 2-1** through **Figure 2-13** for locations) and is particularly associated with the substantial fill that was used in the Duluth Harbor area for former shoreline expansions and accompanying industrial land uses. The majority of Regulated Soil contains low-level concentrations of DRO, PAHs and RCRA metals, as well as varying amounts of debris (primarily wood, slag and concrete).

Regulated Soil that must be excavated for the Project will be managed as restricted reuse material on the Project site. All Regulated Soil that must be excavated for the Project will be reused to the extent possible provided it meets the following criteria:

- Soil analytical results for all non-petroleum parameters must be below the Tier 2 Industrial SRVs.

- Petroleum-impacted soil must be less than 10 ppm as measured by a PID.
- The soil must be geotechnically suitable for reuse as determined by the Project engineer.

Regulated Soil will be reused either in the excavation from which it originated, or in trunk highway embankment areas (excluding drainage surface conveyances, ponds and/or other water bodies).

Reuse of Regulated Soil in recreational trail corridors will require placement of the reuse soil below the trail's engineered base (which includes a minimum of 24 inches of granular base, 8 inches of aggregate base, and 6 inches of pavement/topsoil/sod depending on location), providing a minimum of 38 inches of separation between Regulated Soil and the final grade.

Regulated Soil that does not meet RAP reuse criteria will be properly disposed at a Minnesota permitted industrial or solid waste landfill facility.

Regulated Soil that cannot be reused within the Project LOD because of lack of capacity for reuse will be properly disposed at a Minnesota permitted industrial or solid waste landfill facility. Reuse of Regulated Soil will occur across Work Packages 1-4 and will be limited to the Project. Reusable Regulated Soil may be stored for a longer period of time so it can be used between different Work Packages (across multiple construction seasons).

5.1.2.3 Discrete Area Soil

Discrete Area Soil is found in several locations throughout the Project area. The largest area of Discrete Area Soil is located north of the intersection of I-35 and TH 53 where several former petroleum release sites are located.

Discrete Area Soil that must be excavated for the Project will be managed by being disposed at a Minnesota permitted industrial or solid waste landfill facility. Discrete Area Soil is defined as material that meets the following criteria:

- Soil analytical results for a minimum of one parameter exceed the Tier 2 Industrial SRV.
- Petroleum-impacted soil exceeds 10 ppm as measured by a PID.

Discrete Area Soil contains soil that is clearly not associated with background historical industrial fill based on contaminant concentrations and/or debris type. Discrete Area Soil contamination can often be attributed to releases from either on or off-site sources or it is associated with contaminated fill material.

The following Discrete Area Soils are defined in Work Package 1 (see **Figure 2-1** through **Figure 2-13** for locations).

- DIS-015A - from 0 to 20 (PAHs, Metals above T2SRV. Petroleum, Solvents, PCBs above MPCA UFC.)
- DIS-018B - from 10 to 15 (PAH above T2SRV. Metals, Petroleum, PCBs, Solvents above MPCA UFC. Potential for debris.)
- DIS-020A - from 0 to 20 (PAH above T2SRV. Metals, Petroleum above MPCA UFC. Potential for debris.)
- DIS-022B - from 8 to 20 (PAH above T2SRV. Metals, Petroleum above MPCA UFC. Potential for debris.)
- DIS-024A - from 0 to 20 (PAHS above T2SRV. Petroleum above MPCA UFC. Potential for debris.)

- DIS-026A - from 0 to 10 (PAHs, Metals above T2SRV. Petroleum, Metals above MPCA UFC. Potential for debris.)
- DIS-033B - from 4 to 15 (PAHs above T2SRV. Potential for debris.)
- DIS-037A - from 0 to 5 (Mercury, PAH above T2SRV. Petroleum above MPCA UFC. Potential for debris.)
- DIS-038A - from 0 to 10 (PAHS above T2SRV. Metals, Petroleum above MPCA UFC. Potential for debris.)
- DIS-040B - from 5 to 11 (Mercury above T2SRV.)
- DIS-042A - from 0 to 13.5 (Mercury, PAH above T2SRV.)
- DIS-045B - from 5 to 16 (PAHs above T2SRV. Petroleum above MPCA UFC.)
- DIS-046A - from 0 to 2.5 (Petroleum above MPCA UFC.)
- DIS-060A - from 0 to 7 (Petroleum above MPCA UFC. Potential for debris.)
- DIS-063A - from 0 to 8 (Petroleum above UFC.)
- DIS-064A - from 0 to 3 (Mercury above T2SRV.)
- DIS-070B - from 3 to 10 (Mercury above T2SRV. Petroleum above MPCA UFC.)
- DIS-073B - from 3 to 7 (Metals, Petroleum above MPCA UFC. Potential for debris.)
- DIS-074A - from 0 to 7 (Metals, Petroleum above MPCA UFC. Potential for debris.)
- DIS-079A - from 0 to 8.5 (Metals, Petroleum above MPCA UFC. Potential for debris.)
- DIS-080B - from 3 to 8.5 (Lead above T2SRV. Petroleum above MPCA UFC. Potential for debris.)
- DIS-084A - from 0 to 16 (PAHs above T2SRV. Petroleum above MPCA UFC. Potential for debris.)
- DIS-085B - from 3 to 11.5 (PAHS above T2SRV. Metals, Petroleum above MPCA UFC. Potential for debris.)
- DIS-093A - from 0 to 9 (PAH, Mercury above T2SRV. Potential for debris.)

5.1.2.4 Hazardous Lead Impacted Soil

Hazardous Lead Impacted Soil is found in three isolated locations in the Project area and are depicted on **Figure 2**. One soil sample in each of the locations exceeds the TCLP hazardous limit for lead.

Hazardous Lead Impacted Soil that must be excavated for the Project will be treated prior to disposal.

Soil will be stockpiled (as detailed in **Section 4.1.7**) and/or containerized (such as in a roll-off) and mixed with a stabilizer agent. The stabilizing agent will be EnviroBlend® FP or equivalent at an appropriate rate determined by the Contractor. Following stabilization, composite samples will be collected from the stabilized stockpile and analyzed to confirm stabilized metal concentrations are below the TCLP hazardous limit. The stabilization mixing process may be repeated if necessary until analytical results are below the TCLP hazardous limit.

Following confirmation that stabilized soil meets the TCLP hazardous limit, soil will be disposed of at a Minnesota permitted industrial or solid waste landfill facility.

The Hazardous Lead Impacted Soil areas were delineated with borings and sampling as part of the Phase II ESA Addendum (SEH, 2019). Because this work indicated the areas are limited laterally and vertically, no sidewall or bottom confirmation samples will be required following excavation in the areas.

5.1.2.5 Mercury Hotspot

A Mercury Hotspot is found in one location in the Project LOD (depicted on **Figure 2**) where one soil sample contained a total mercury concentration above the landfill acceptance criteria, but was below the TCLP hazardous limit for mercury.

Soil that must be excavated in the area of the Mercury Hotspot will be stockpiled and sampled (as detailed in **Section 4.1.7**), and tested (as detailed in **Section 4.1.6**) for both total and TCLP mercury. The analytical results will be used to obtain landfill acceptance of the material. Upon receiving landfill approval, the soil will be disposed at a permitted industrial or solid waste landfill facility. If out of state disposal is required, the Contractor will use a MnDOT approved contractor from the MnDOT RMMT contractor list for handling and disposal.

The Mercury Hotspot was delineated with borings and sampling as part of the Phase II ESA Addendum (SEH, 2019). Because this work indicated the hotspot is limited laterally and vertically, no sidewall or bottom confirmation samples will be required following excavation in the area.

5.1.2.6 Undesignated Soil

Undesignated Soil is defined as soil within the Project LOD (depicted on **Figure 2**) that could not be investigated prior to construction because of access issues.

All excavation work completed in Undesignated Soil areas will be monitored by the environmental consultant as described in **Section 4.1.4**. The environmental consultant will determine if soil must be stockpiled (as detailed in **Section 4.1.7**), and tested (as detailed in **Section 4.1.6**). The soil will be categorized and managed based on analytical results.

5.1.3 Soil Stockpile Areas

The Contractor will manage storage of regulated and discrete area soils in accordance with **Section 4.1.7** Soil Stockpile Management. The Contractor has proposed stockpile locations both inside and outside of the Project LOD. The Contractor anticipates constructing a long term stockpile that will be designed to accommodate multiple piles in rows with an area designated for collection of free liquids (groundwater) from the piles. Free liquids from stockpiles will be managed in accordance with **Section 5.2**.

5.2 Groundwater Management

Groundwater analytical results are included in **Appendix C**. It is anticipated that most groundwater will be discharged to WLSSD. The WLSSD permit will define the discharge limits for WLSSD. It is anticipated that dewatering on some areas of the project will encounter groundwater that will require pre-treatment to lower contaminant concentrations below WLSSD permit limits. The groundwater treatment system will be designed to meet permit limits and will be determined by the contractor. It is anticipated that the minimum pretreatment will include an oil water separator and sediment removal with optional additional treatment in the form of granular activated carbon filtration or alternative equivalent contaminant removal system.

Alternatively, groundwater may be discharged under a NPDES/State Disposal System (SDS) Industrial Groundwater Pump out Permit to the storm sewer system. It is anticipated that discharge to the storm sewer would require pre-treatment to lower contaminant concentrations below NPDES/SDS permit limits. The groundwater treatment system will be designed to meet permit limits and will be determined by the contractor. It is anticipated that the minimum pretreatment will include an oil water separator, sediment removal and granular activated carbon filtration or alternative equivalent contaminant removal system.

Small volumes of potentially contaminated groundwater may be collected, tested, transported and disposed at an approved facility under conditions of the facility discharge permit.

5.3 Regulated Waste

Asbestos containing waste material (ACWM) in historical industrial fill is located on the project. ACM and ACWM located within the Project will be removed and disposed in accordance with all applicable state and federal requirements under the management of the MnDOT OES Regulated Material Management Team.

6 Construction Contingency Plan

The environmental consultant for the Project will be prepared to respond if regulated materials are unexpectedly encountered during excavation. In the event that unforeseen regulated materials are encountered during construction, appropriate notifications and regulations will be followed. The following sections outline the CCP procedures and methods that will be instituted throughout the Project.

6.1 Contamination Indicators

Indicators of potentially contaminated soil, groundwater or surface water include, but are not limited to the following:

- Odor including gasoline, diesel, creosote (odor of railroad ties), mothballs, or other chemical-like odors in soil excavation areas.
- Soil with unusual staining (such as black or green staining not associated with organic content), or with an oily appearance, or any unusual soil texture or color.
- A rainbow sheen on the surface of water (groundwater or ponded rainwater) or soil.
- Indications of a release through the use of a PID or other field screening instrument.
- Indicators of regulated wastes include, but are not limited to the following:
- Cans, bottles, scrap metal, wood, glass (indicates dumping/burial of solid waste and a possible dump with associated chemical contamination).
- Asphalt and concrete rubble (indicates dumping/burial of demolition waste with associated chemical contamination).
- Shingles, roofing materials, vermiculite, transite siding, floor tiles, insulation, or any fibrous material (demolition debris that could be associated with ACM or associated contamination).
- In-place intact active or inactive transite pipes (steam or water pipes) or conduit (contains ACM).
- Culverts or other pipes with tar-like coating (potentially contains ACM).

- Wood Ash (potentially contains lead, asbestos or other chemicals) or coal ash or slag (potentially contains metals).
- Sandblast or foundry sand residue (potentially contains lead or other metals).
- Treated wood, including, but not limited to products referred to as brown-or green-treat, and creosote (potentially contains arsenic, chromium, copper or PAHs).
- Chemical containers such as drums and other containers (potential source of chemical contaminants within intact containers, or surrounding damaged containers)
- Underground Storage Tanks/Aboveground Storage Tanks (USTs/ASTs) (potential source of petroleum or other chemical contaminants within intact USTs/ASTs, or surrounding damaged USTs/ASTs).
- Intact filled-in basement or buried concrete slab from demolished building with insulation or intact floor tiles (potential ACM), waste traps (potentially contains oily waste), cesspools (potentially contains chemical or oil wastes) and sumps (potentially contains chemical waste).

6.2 Notification

The Project Engineer and/or the MnDOT OES Project Manager will proceed with the following notifications in the order listed:

Contact #1: 911 (if the incident/release represents an immediate danger to life or health)

Contact #2: Project Environmental Compliance Manager and environmental consultant (to conduct and document a detailed inspection and evaluation of the unexpected material)

Contact #3: Minnesota State Duty Officer (in the event of a reportable release in accordance with Minnesota Statute §115.061)

Contact #4: MPCA Project Managers (notifications made by MnDOT personnel or by environmental consultant as delegated by MnDOT)

6.3 Incident Response

In the event that unexpected contaminated soil, water, debris or potentially contaminated waste materials are encountered during construction, the Project contractor will immediately stop work in the vicinity and notify the Project Engineer and/or MnDOT environmental consultant.

The construction contractor will not resume work in the suspect area until approved by the Project Engineer with the assistance of MnDOT's environmental consultant. Work outside the vicinity of the suspect area may continue if the Project Engineer (in consultation with MnDOT's environmental consultant) determine that the areal extent of the contamination has been defined and work can continue in the surrounding area.

The environmental consultant will investigate and characterize all unexpected contaminated soil, water or regulated waste materials. Visual and olfactory indications of contamination will be documented. Samples of the potentially impacted soil or regulated materials will be collected from excavation base and sidewalls (if accessible) or stockpiles for PID screening and laboratory analysis. Potentially impacted water will be collected from excavations. Soil and/or regulated material sample analytical parameters will be determined based on field observations, site

history, and MPCA guidelines. Field screening activities will not proceed until the situation is analyzed, and health and safety considerations resolved in accordance with the Project's SHSP.

The results of the preliminary screening will be evaluated by MnDOT and the environmental consultant. The construction contractor will not be allowed to continue work in the area until the type and magnitude of contamination is documented, and an appropriate response action is determined in accordance with the Project RAP. If a situation is encountered that is not covered by the Project RAP, the response action will be determined in consultation with, and as approved by the MPCA.

6.4 Asbestos

Asbestos may be encountered in three different forms:

- Isolated ACM - The ACM occurs as isolated fragments that can be segregated by hand and containerized (such as a fragment of roofing paper),
- ACWM - The ACM occurs in larger quantities that cannot be segregated by hand (such as numerous fragments of transite buried with other demolition material), and
- Inactive Intact ACM - The ACM is still intact as part of an inactive utility (such as asbestos-wrapped steam pipe, an asbestos water pipe or asbestos conduit).

All ACM/ACWM will be abated by a licensed asbestos contractor who will complete all required notifications and obtain all required approvals from the MPCA and/or MDH prior to completing ACM/ACWM abatement. The asbestos abatement contractor will manage removal (excavation/disposal/abatement) of all ACM and ACWM such that all removal activities will result in no visible dust emissions. Excavation, containerization, loading and hauling of ACM/ACWM will be completed in accordance with all applicable laws, rules and regulations. Prior to abatement, an Emission Control Plan will be prepared.

6.5 Underground Storage Tanks

In the event a petroleum UST is encountered, the following actions will be taken:

- An MPCA-certified UST supervisor that is also a certified contractor or in the employ of a certified contractor will oversee the removal of the tank.
- The MPCA tank removal notification forms will be submitted.
- The tank removal will be completed in accordance with all safety and environmental protection precautions as required by law including, but not limited to: drain all connecting pipes, remove fuel and fuel/water mixture from the tank to the extent practicable, purge all explosive vapors from the tank, inspect the removed tank for evidence of leaks, and document the condition of the tank.
- Soil samples in the tank excavation cavity will be screened with a PID, and soil samples (and groundwater samples if encountered) collected for laboratory analysis in accordance with the MPCA requirements.
- Metal tanks dismantled on-site will be disposed by recycling them as metal scrap; fiberglass tanks will be disposed in a permitted solid waste or industrial landfill.
- Removed petroleum product will be recycled at a permitted facility, and removed tank bottom/sludge will be managed as a hazardous waste for disposal/recycling at a permitted fuel recycling facility.

6.6 Buried Containers

In the event that drums or other storage containers are unearthed during excavation activities, they will be removed and their condition evaluated by appropriately trained personnel. If the containers are established to be in poor condition, the contents will be transferred to DOT-approved overpack drums. The drums will be placed in a secure location. The contents of the containers will be sampled and characterized for disposal in accordance with appropriate state and federal requirements.

Soil from the area around the container will be screened for indications of contamination and potentially impacted soil will be managed in accordance with the RAP (including collection of analytical samples to characterize the material).

6.7 Reporting

Any incidents managed in accordance with the CCP will be documented as part of the Project RAP Implementation Report.

7 RAP Implementation Report

A RAP Implementation Report documenting the completion of the Project RAP tasks will be completed and submitted to the MPCA. The report will include, but not be limited to: summary of the environmental work completed for the Project, copies of waste manifests and landfill weigh tickets, daily logs, analytical reports, and any deviations from this RAP.

8 Summary

SEH has prepared this Project RAP/CCP for MnDOT. On behalf of MnDOT, SEH requests that the MPCA review and approve this RAP/CCP. Please also provide a written response to this RAP that is addressed to MnDOT.

9 References

Minnesota Department of Health (MDH), August 2018, *Benzo(a)pyrene and Groundwater*

Minnesota Geological Survey (MGS), 2001, *Geologic Map of the Duluth Complex and Related Rocks, Northeastern Minnesota*

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MGS, 2016, *Quaternary Lithostratigraphic Units of Minnesota*, RI-68

Minnesota Pollution Control Agency (MPCA), September 2011, *Polycyclic Aromatic Hydrocarbons*, Guidance Document p-eao2-03

MPCA, February 2012, *Best Management Practices for the Off-Site Reuse of Unregulated Fill*, Guidance Document c-rem1-01

MPCA, May 2013, *Soil Leaching Values*, Guidance Document c-r1-04

MPCA, July 2018, *Soil Sample Collection and Analysis Procedures*, Guidance Document c-prp4-04

Short Elliott Hendrickson Inc., January 2018, *Phase I Environmental Site Assessment, Modified Phase I Environmental Site Assessment: I-35, I-535, Trunk Highway 53 Twin Ports Interchange, Duluth, Minnesota*

Short Elliott Hendrickson Inc., February 2019, *Modified Phase I ESA Addendum Twin Ports Interchange – Michigan Avenue and Superior Street, Duluth, Minnesota*

Short Elliott Hendrickson Inc., April 2019, *Modified Phase I ESA Addendum Twin Ports Interchange – Trunk Highway 53, Duluth, Minnesota*

Short Elliott Hendrickson Inc., May 2019, *Modified Phase I ESA Addendum Twin Ports Interchange – Work Package 1, Duluth, Minnesota*

Short Elliott Hendrickson Inc., August 2019, *Modified Phase I ESA Addendum Twin Ports Interchange – Piedmont Avenue, Duluth, Minnesota*

Short Elliott Hendrickson Inc., October 2019, *Phase II ESA, Twin Ports Interchange – Work Package 1, Duluth, Minnesota*, SP 6982-322, 6980-60, 6915-136

Short Elliott Hendrickson Inc., December 2019, *Phase II ESA Addendum, Twin Ports Interchange – Work Package 1, Duluth, Minnesota*, SP 6982-322, 6980-60, 6915-136

United States Geological Survey (USGS), 1977, *Water Resources of the St. Louis River Watershed, Northeastern Minnesota*, OFR 77-608

Wisconsin Department of Natural Resources (DNR) (a, b), September 1995, *Modified DRO; Method for Determining Diesel Range Organics*, PUBL-SW-140 and SW-141

cc

Tables

Table 1 - Deed Restrictions and Institutional Controls

Table 1
Deed Restrictions and Institutional Controls

Construction RAP/CCP
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 6982-322 (I-35), 6980-60 (I-535), 6915-136 (TH 53)

Site Name	Address	Parcel ID	Database Name	Database Site ID	Status
BNSF - Glacier Park Sequence - #188	367 Garfield Ave	010-0045-00081; 010-1080-00709; 010-3950-01295	Affidavit - Contaminated Property	IC-VP12641	IC Description: Deed Notice IC Filing Location: St. Louis County Additional Information: None Entered
Arthur Avenue Corridor	602 Helberg Dr	010391006940; 010391007050; 010393000310; 010394000030	Affidavit - Contaminated Property	IC-BF0000133	Residual contamination consists of PAHs and VOCs in the groundwater on Tract 13; PAHs and VOCs in the groundwater and PAHs and arsenic in the soil on Tract 16; PAHs in the groundwater on Tract 28.5; and PAHs in the soil on Tract 32. Any person who is planning any use or activity which may encounter or has the potential to disturb the contamination should contact the MPCA prior to commencement of planned activities. Any disturbance of soil in the upper 4 feet does not need prior MPCA approval. One of 4 documents recorded on 4/21/2017, the recording stamp is only on the first document (not this affidavit).
Duluth Glass & Mirror Co	2304 W Superior St	010-1120-02910	Affidavit - Contaminated Property	IC-VP14230	IC Description: Non-residential site use. No disturbance to the response action. See RCRA1097 IC Filing Location: St. Louis County, recorded 8/15/05, doc #00989083 Additional Information: St. Louis County, recorded 8/15/05, doc #00989083
Black Goose Inc	1932 W Michigan St	010112000450	Restrictive Covenant	IC-VP5000	Additional Information: None Entered
Clyde Industrial Park	115 South 30th Avenue West	010-3190-00280; 010-3919-00010; 010-3919-00020; 010-3919-00040; 010-3919-00050; 010-3919-00060; 010-3919-00070	Environmental Covenant	IC-VP18990	IC Filing Location: St. Louis County Doc No 01087838, recorded on 8/7/2008 Additional Information: EC signed by Michael Kanner
Joe Kovich Construction	1120 Garfield Av	010391003090; 010391003130; 010391003140; 010391003150; 010391003160; 010391003170	Affidavit - Contaminated Property	IC-SR0001417	Notice that there is residual soil contamination at depths greater than 4 feet below ground surface in some areas. Soil general impacted with metals and PAHs.
Soo Line - Parcel 5	2314 W Michigan St	010111000280	Affidavit - Contaminated Property	IC-VP13450	Additional Information: None Entered

Notes:
BNSF - Burlington Northern Santa Fe
EC: Environmental Covenant
IC - Institutional Control
PAH - Polyaromatic Hydrocarbon
VOC - Volatile Organci Compound
RCRA - Resource Conservation & Recovery Act
MPCA - Minnesota Pollution Control Agency

Figures

Figure 1 – Project Location
Figure 2 – Contaminated Soil and Asbestos Containing Waste Material Areas
Figure 3 – Unregulated Soil Areas

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Print Date: 12/17/2019

User Name: msherrill
Projection: Projection: UTM Zone 15 N
Source: MDH
SEH, MnDOT, St Louis County
Google, ESRI Baselayer

Project Location

Construction Response Action Plan/Construction Contingency Plan
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 6982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

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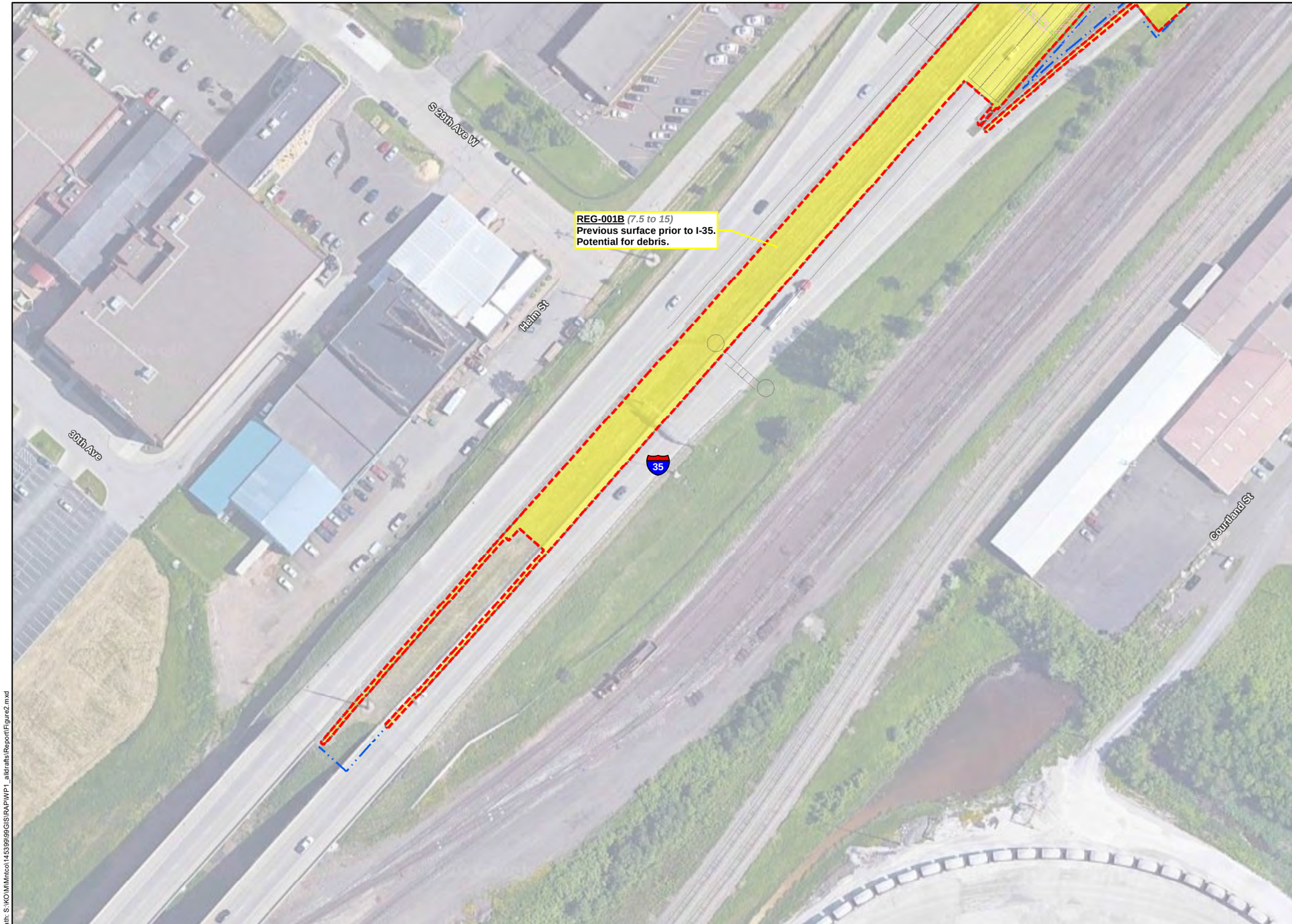

Legend

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DIS-070B *(0 to 15)*
Fill
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Metals above MPCA UFC.
Potential for Debris.

Polygon Depth (ft bgs)
Soil Type
Soil Characterization

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- ft - Feet
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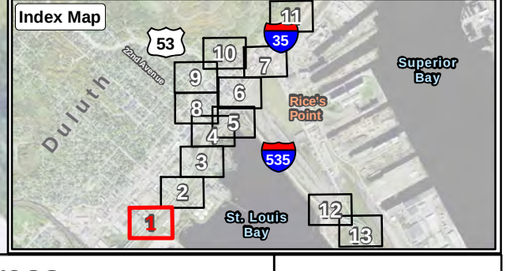
N

0 20 40 80 Feet

Index Map



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Contaminated Soil and Asbestos Containing Waste Material Areas

Construction Response Action Plan/Construction Contingency Plan
Twin Ports Interchange - Work Package 1
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SP 6982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

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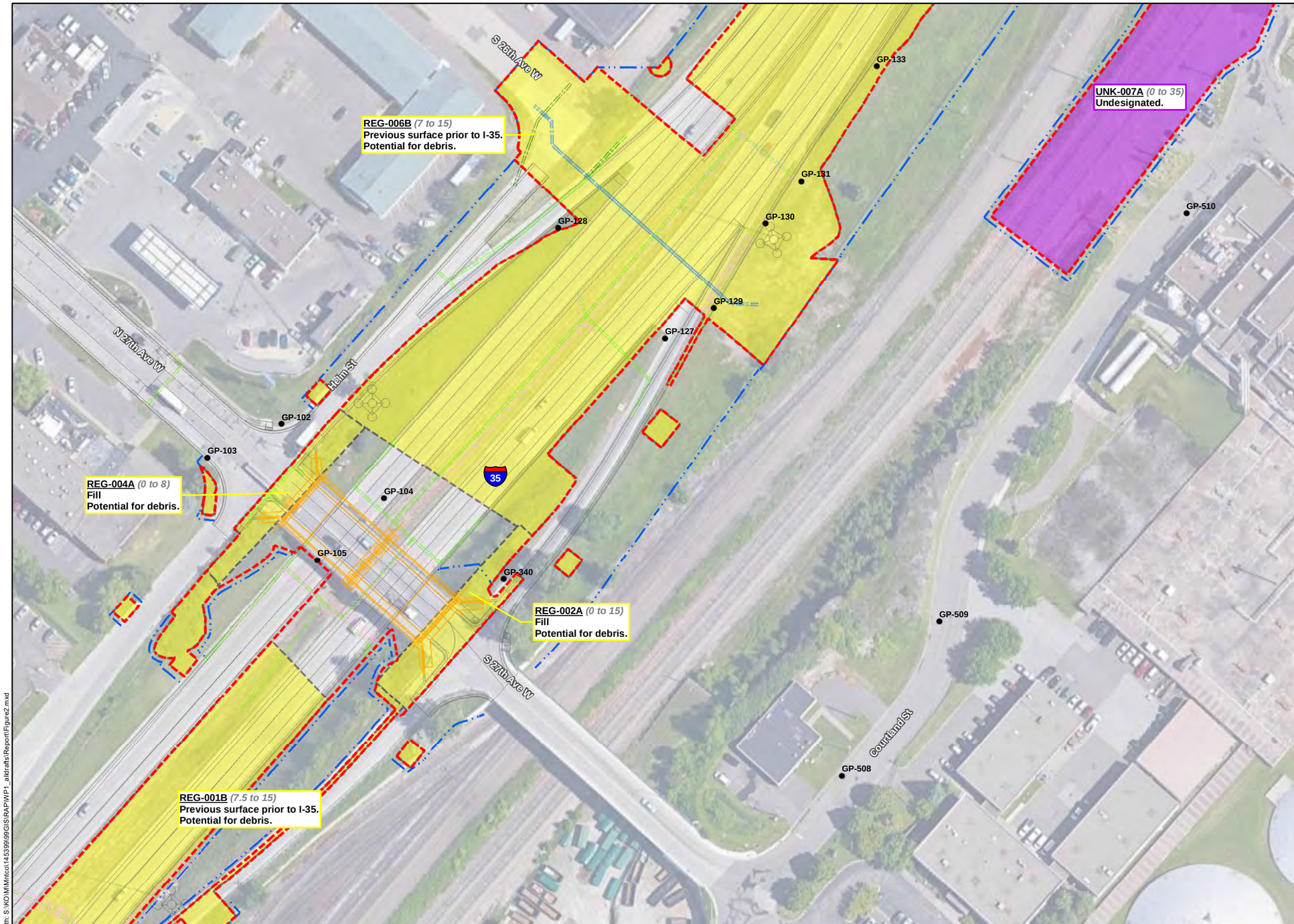

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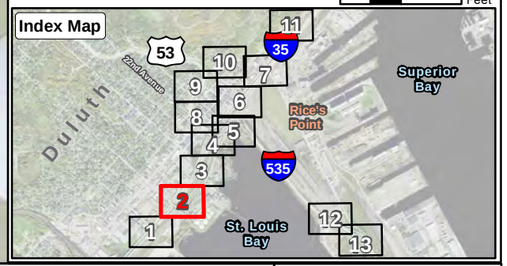

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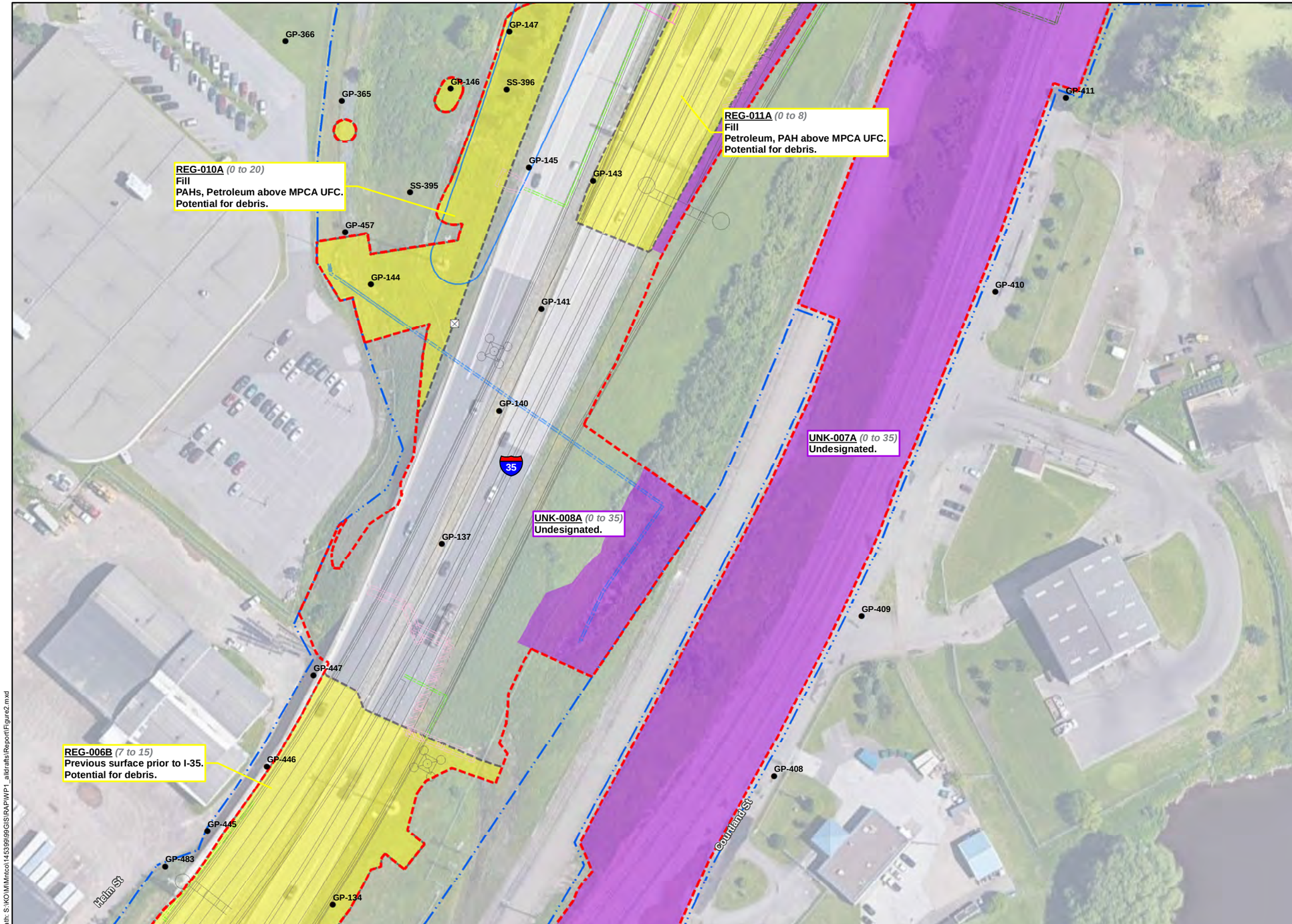

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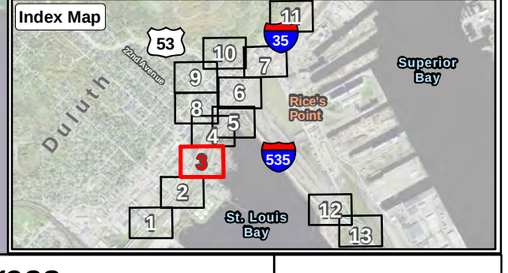

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Figure 2-3

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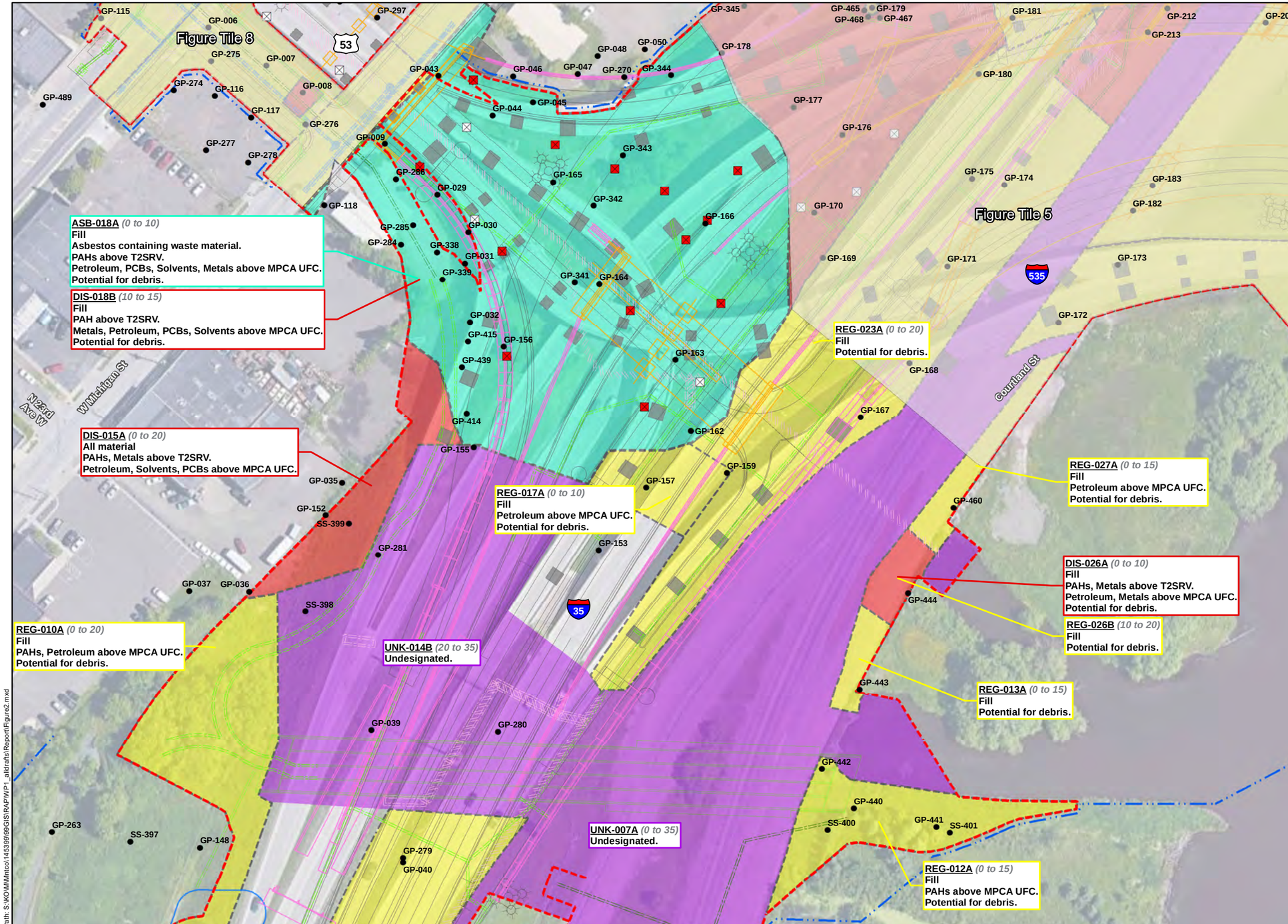

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C - (Soil at depth below B layer)

Polygon Type (3 Characters)

DIS-070B (0 to 15)
Fill
PAHs Above T2SRV.
Metals above MPCA UFC.
Potential for Debris.

Polygon Depth (ft bgs)
Soil Type
Soil Characterization

Polygon Type Definitions
- ASB - Asbestos containing waste material / Disposal Area (Teal)
- HLI - Hazardous Lead Impacted Soil (Blue)
- MRC - Mercury Hotspot (Orange)
- DIS - Disposal Area (Red)
- REG - Regulated Soil Area (Yellow)
- UNR - Unregulated Soil Area (Green)
- UNK - Undesignated Soil (Purple)

Notes
- T2SRV - Tier 2 industrial soil reference value
- MPCA - Minnesota Pollution Contol Agency
- UFC - MPCA's Unregulated Fill Criteria
- PCBs - Polychlorinated biphenyl
- PAHs - Polycyclic aromatic hydrocarbons
- ft - Feet
- bgs - Below ground surface

0 20 40 80 Feet

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www.sehinc.com

Project: MNTCO 151179
Print Date: 12/17/2019

User Name: msherrill
Projection: Projection: UTM Zone 15 N
Source: MDH
SEH, MnDOT, St Louis County

Contaminated Soil and Asbestos Containing Waste Material Areas

Construction Response Action Plan/Construction Contingency Plan
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 6982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

Figure 2-4

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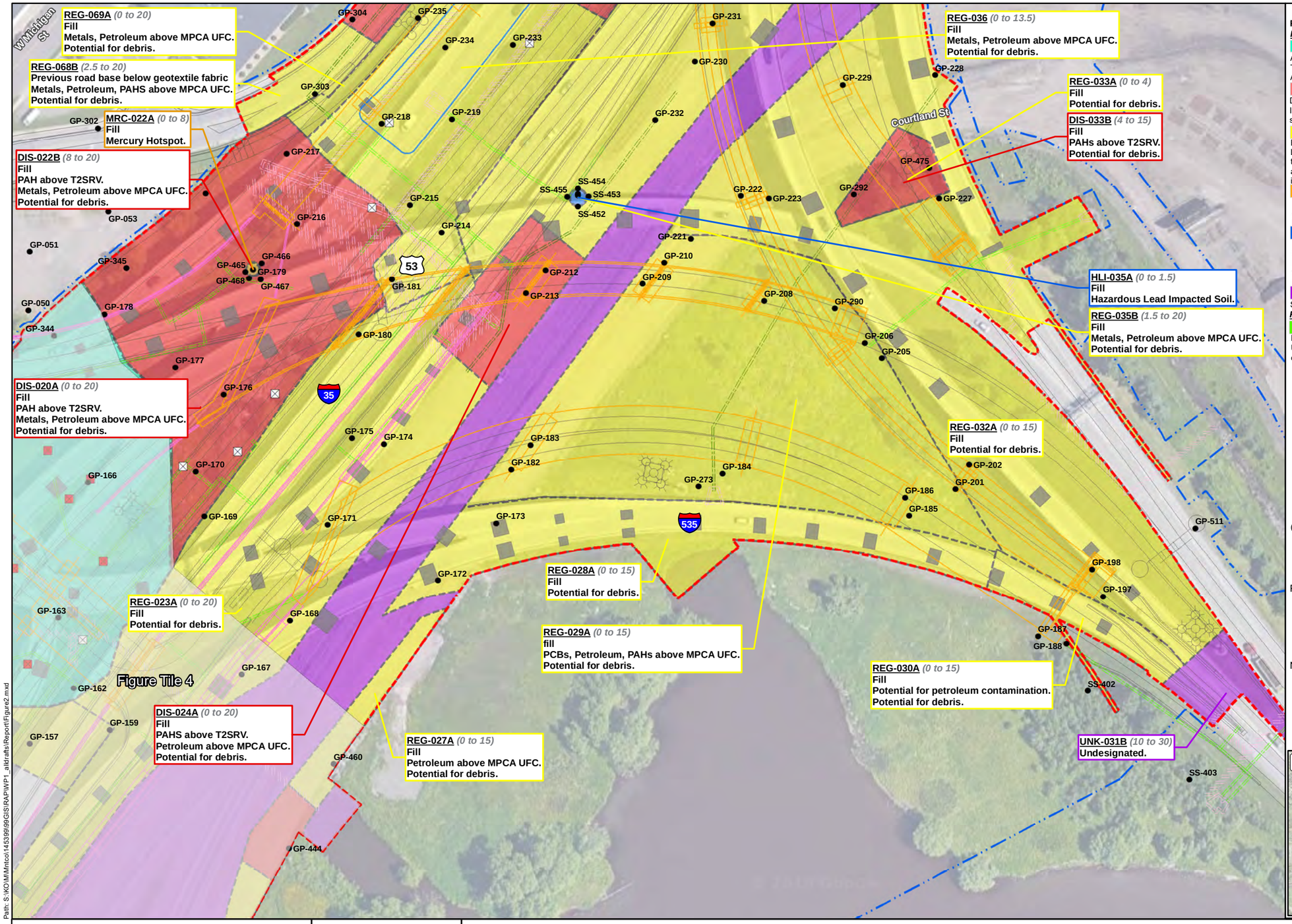

Legend

Response Action Areas extend to Work Package 1 Construction Limits

Response Action Areas depicted on Figure 2.

ACWM / Landfill Disposal Area
All disturbance or removal of the ACWM will be managed as regulated ACWM. The asbestos abatement contractor will perform abatement and disposal of ACWM to ensure compliance with all applicable federal and state regulations.

Discrete Area Soil
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Regulated Soil
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Mercury Hotspot
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Undesignated Soil
Several Project areas could not be investigated because of access issues.

Response Action Areas depicted on Figure 3

Unregulated Soil Areas
Material that is assumed to be unregulated based on extrapolated results. Unless other conditions are encountered during excavation this material can be used on or off site.

- Boring Location (SEH)
- Test Pits Locations (WSB)
- ACWM* Identified
- ACWM* not Identified
- *Asbestos Containing Waste Material
- In-place Below Ground Structure to Remain

Work Package 1 (90% Design)
Work Package 2 (pre-60% Design)
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- Bridge
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- Pond
- Drain Structure
- Water Main
- Drain Structure Removal

Response Action Plan Polygon "Callout"

Polygon Reference (3 digit number)
Map depicts relative polygon depth
A - (Soils at surface to depth bgs)
B - (Soil at depth below A layer)
C - (Soil at depth below B layer)

Polygon Type (3 Characters)

DIS-070B (0 to 15)
Fill
PAHs Above T2SRV.
Metals above MPCA UFC.
Potential for Debris.

Polygon Depth (ft bgs)
Soil Type
Soil Characterization

Polygon Type Definitions
- ASB - Asbestos containing waste material / Disposal Area (Teal)
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Notes
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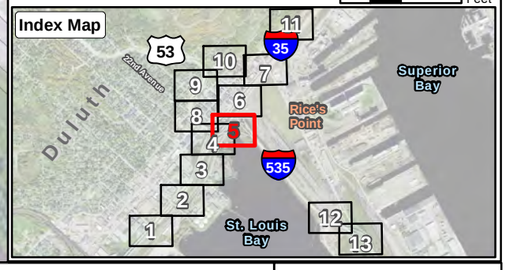
- UFC - MPCA's Unregulated Fill Criteria
- PCBs - Polychlorinated biphenyl
- PAHs - Polycyclic aromatic hydrocarbons
- ft - Feet
- bgs - Below ground surface

0 20 40 80 Feet

Index Map



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Project: MNTCO 151179
Print Date: 12/17/2019

User Name: msherrill
Projection: Projection: UTM Zone 15 N
Source: MDH
SEH, MnDOT, St Louis County

Contaminated Soil and Asbestos Containing Waste Material Areas

Construction Response Action Plan/Construction Contingency Plan
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 6982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

Figure 2-5

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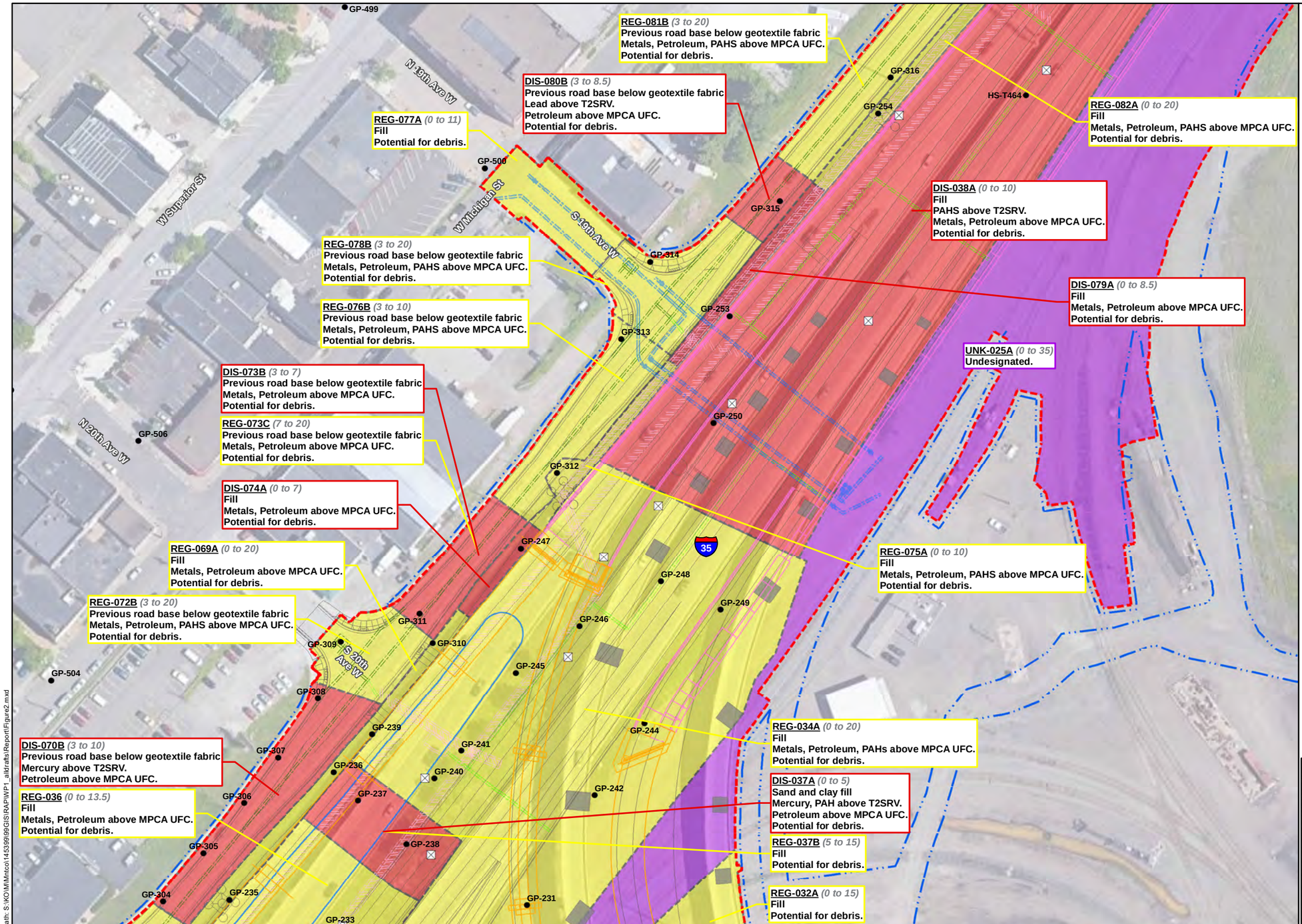

Legend

Response Action Areas extend to Work Package 1 Construction Limits

Response Action Areas depicted on Figure 2.

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Undesignated Soil
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Response Action Areas depicted on Figure 3

Unregulated Soil Areas
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- Boring Location (SEH)
- Test Pits Locations (WSB)
- ACWM* Identified
- ACWM* not Identified
- *Asbestos Containing Waste Material
- In-place Below Ground Structure to Remain

Work Package 1 (90% Design)
Work Package 2 (pre-60% Design)
- Limits of Disturbance (WP 1)
- Construction Limits (WP 1)
- Bridge
- Retaining Wall
- Pond
- Drain Structure
- Water Main
- Drain Structure Removal

Response Action Plan Polygon "Callout"

Polygon Reference (3 digit number)
Map depicts relative polygon depth
A - (Soils at surface to depth bgs)
B - (Soil at depth below A layer)
C - (Soil at depth below B layer)
Polygon Type (3 Characters)

DIS-070B *(0 to 15)*
Fill
PAHs Above T2SRV.
Metals above MPCA UFC.
Potential for Debris.

Polygon Depth (ft bgs)
Soil Type
Soil Characterization

Polygon Type Definitions
- ASB - Asbestos containing waste material / Disposal Area (Teal)
- HLI - Hazardous Lead Impacted Soil (Blue)
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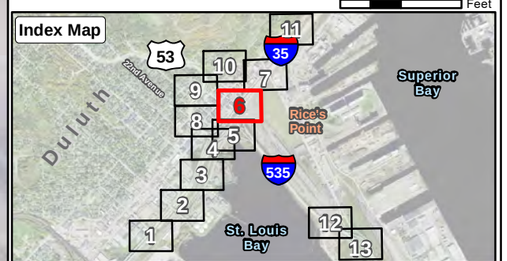
Notes
- T2SRV - Tier 2 industrial soil reference value
- MPCA - Minnesota Pollution Contol Agency
- UFC - MPCA's Unregulated Fill Criteria
- PCBs - Polychlorinated biphenyl
- PAHs - Polycyclic aromatic hydrocarbons
- ft - Feet
- bgs - Below ground surface

N

0 20 40 80 Feet

Index Map



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Contaminated Soil and Asbestos Containing Waste Material Areas

Construction Response Action Plan/Construction Contingency Plan
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 6982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

Figure 2-6

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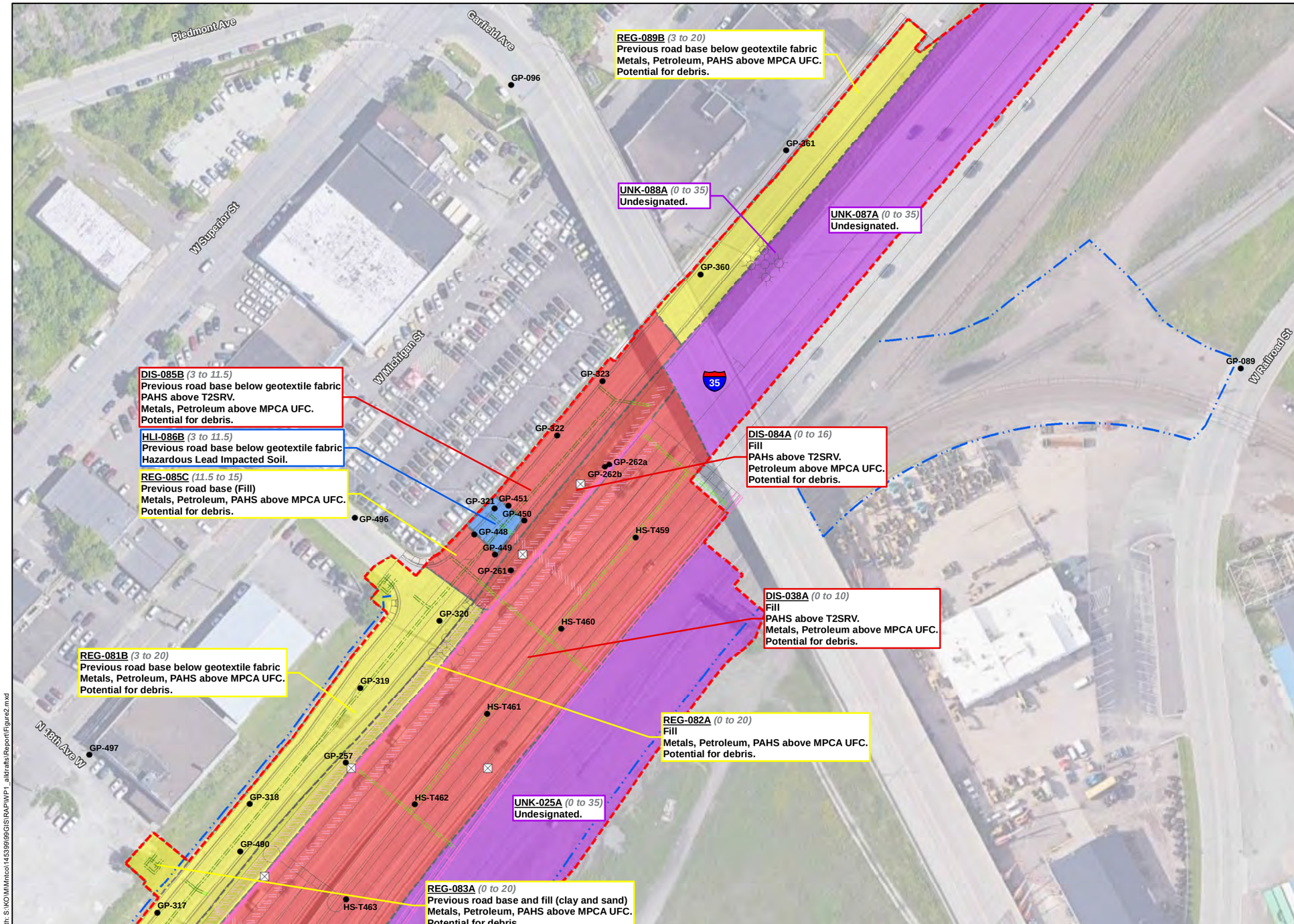

Legend

Response Action Areas extend to Work Package 1 Construction Limits

Response Action Areas depicted on Figure 2.

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Undesignated Soil
Several Project areas could not be investigated because of access issues.

Response Action Areas depicted on Figure 3

Unregulated Soil Areas
Material that is assumed to be unregulated based on extrapolated results. Unless other conditions are encountered during excavation this material can be used on or off site.

Boring Location (SEH)
Test Pits Locations (WSB)
ACWM* Identified
ACWM* not Identified
*Asbestos Containing Waste Material
In-place Below Ground Structure to Remain

Work Package 1 (90% Design)
Work Package 2 (pre-60% Design)
Limits of Disturbance (WP 1)
Construction Limits (WP 1)
Bridge
Retaining Wall
Pond
Drain Structure
Water Main
Drain Structure Removal

Response Action Plan Polygon "Callout"

Polygon Reference (3 digit number)
Map depicts relative polygon depth
A - (Soils at surface to depth bgs)
B - (Soil at depth below A layer)
C - (Soil at depth below B layer)

Polygon Type (3 Characters)

DIS-070B *(0 to 15)*
Fill
PAHs Above T2SRV.
Metals above MPCA UFC.
Potential for Debris.

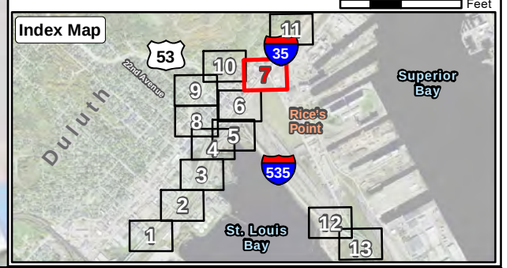
Polygon Depth (ft bgs)
Soil Type
Soil Characterization

Polygon Type Definitions
ASB - Asbestos containing waste material / Disposal Area (Teal)
HLI - Hazardous Lead Impacted Soil (Blue)
MRC - Mercury Hotspot (Orange)
DIS - Disposal Area (Red)
REG - Regulated Soil Area (Yellow)
UNR - Unregulated Soil Area (Green)
UNK - Undesignated Soil (Purple)

Notes
T2SRV - Tier 2 industrial soil reference value
MPCA - Minnesota Pollution Contol Agency
UFC - MPCA's Unregulated Fill Criteria
PCBs - Polychlorinated biphenyl
PAHs - Polycyclic aromatic hydrocarbons
ft - Feet
bgs - Below ground surface

0 20 40 80 Feet

Index Map



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Contaminated Soil and Asbestos Containing Waste Material Areas

Construction Response Action Plan/Construction Contingency Plan
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 6982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

Figure 2-7

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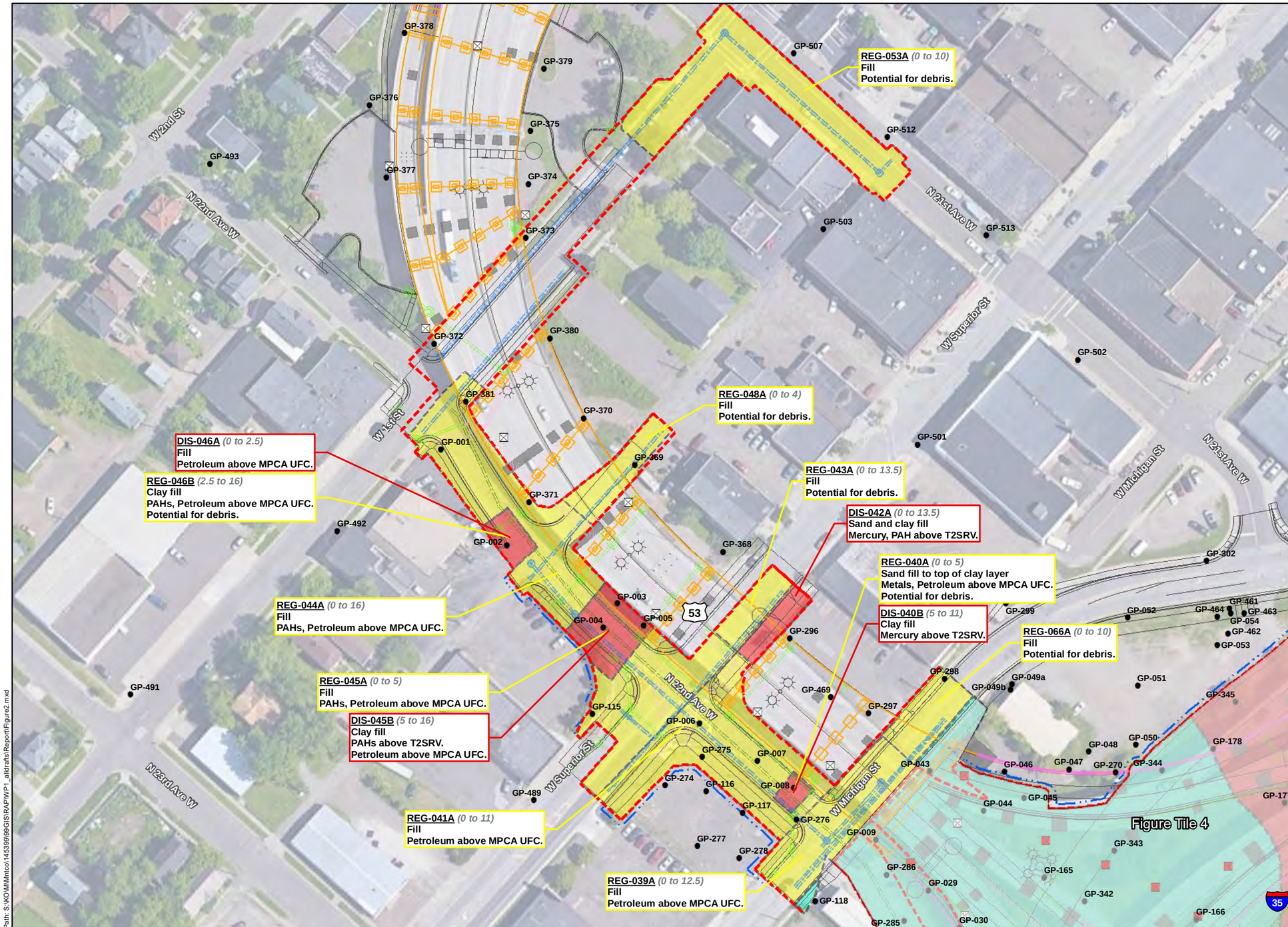

Legend

Response Action Areas extend to Work Package 1 Construction Limits

Response Action Areas depicted on Figure 2.

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Undesignated Soil
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Work Package 1 (90% Design)
Work Package 2 (pre-60% Design)
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- Bridge
- Retaining Wall
- Pond
- Drain Structure
- Water Main
- Drain Structure Removal

Response Action Plan Polygon "Callout"

Polygon Reference (3 digit number)

Map depicts relative polygon depth
A - (Soils at surface to depth bgs)
B - (Soil at depth below A layer)
C - (Soil at depth below B layer)

Polygon Type (3 Characters) → **DIS-070B** *(0 to 15)*
Fill
PAHs Above T2SRV.
Metals above MPCA UFC.
Potential for Debris.

Polygon Depth (ft bgs)
Soil Type
Soil Characterization

Polygon Type Definitions
- ASB - Asbestos containing waste material / Disposal Area (Teal)
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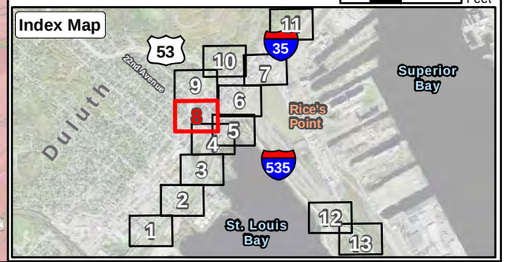
0 20 40 80 Feet

Index Map



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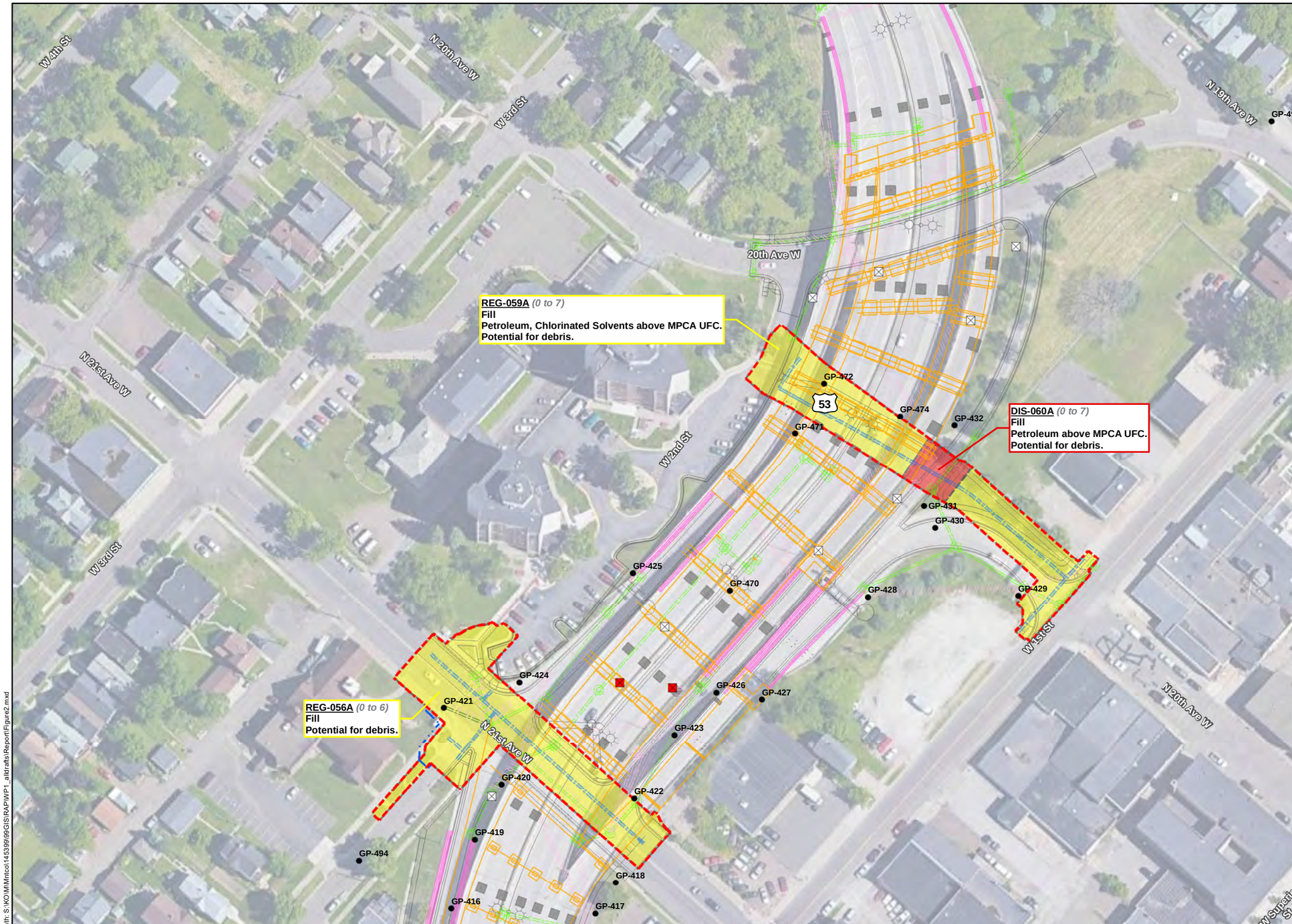

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- Construction Limits (WP 1)
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Polygon Reference (3 digit number)

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B - (Soil at depth below A layer)
C - (Soil at depth below B layer)

Polygon Type (3 Characters)

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Metals above MPCA UFC.
Potential for Debris.

Polygon Depth (ft bgs)
Soil Type
Soil Characterization

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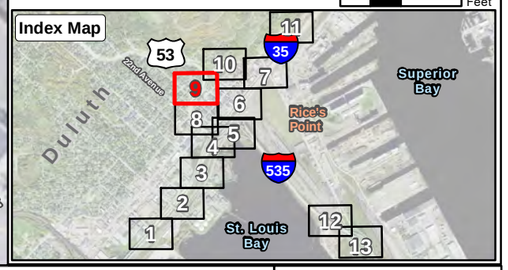
0 20 40 80 Feet

Index Map



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Projection: Projection: UTM Zone 15 N
Source: MDH
SEH, MnDOT, St Louis County

Contaminated Soil and Asbestos Containing Waste Material Areas

Construction Response Action Plan/Construction Contingency Plan
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 6982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

Figure 2-9

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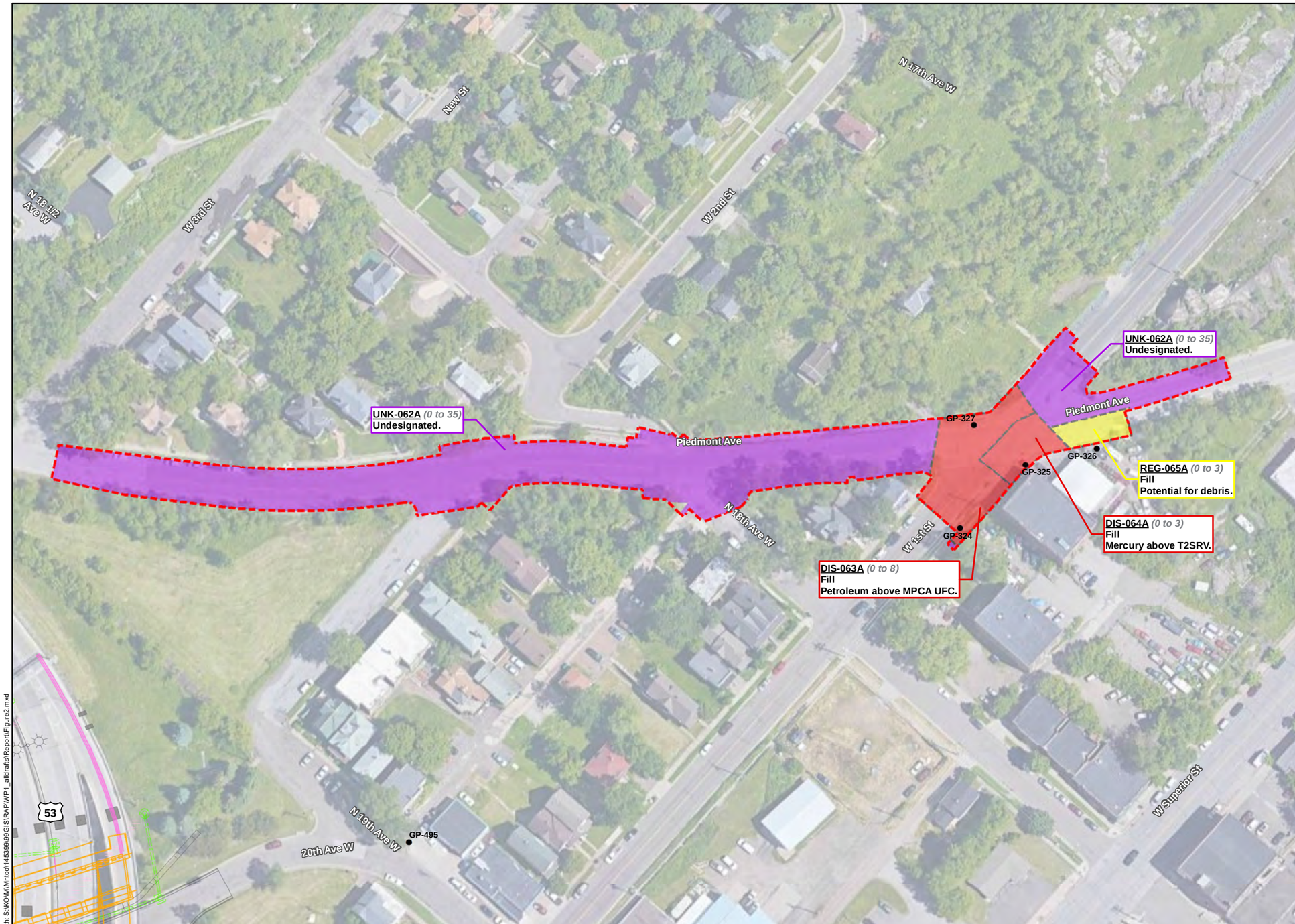

Legend

Response Action Areas extend to Work Package 1 Construction Limits

Response Action Areas depicted on Figure 2.

ACWM / Landfill Disposal Area
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Response Action Plan Polygon "Callout"

Map depicts relative polygon depth
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C - (Soil at depth below B layer)

Polygon Type (3 Characters) → DIS
Polygon Reference (3 digit number) → 070
Polygon Depth (ft bgs) → B
Soil Type → 0 to 15
Soil Characterization → Fill; PAHs Above T2SRV.; Metals above MPCA UFC.; Potential for Debris.

Polygon Type Definitions
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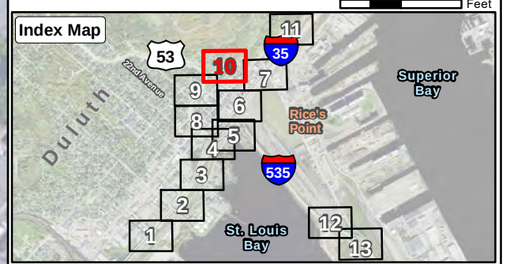
- UNK - Undesignated Soil (Purple)

Notes
- T2SRV - Tier 2 industrial soil reference value
- MPCA - Minnesota Pollution Contol Agency
- UFC - MPCA's Unregulated Fill Criteria
- PCBs - Polychlorinated biphenyl
- PAHs - Polycyclic aromatic hydrocarbons
- ft - Feet
- bgs - Below ground surface

0 20 40 80 Feet



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Project: MNTCO 151179
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Figure 2-10

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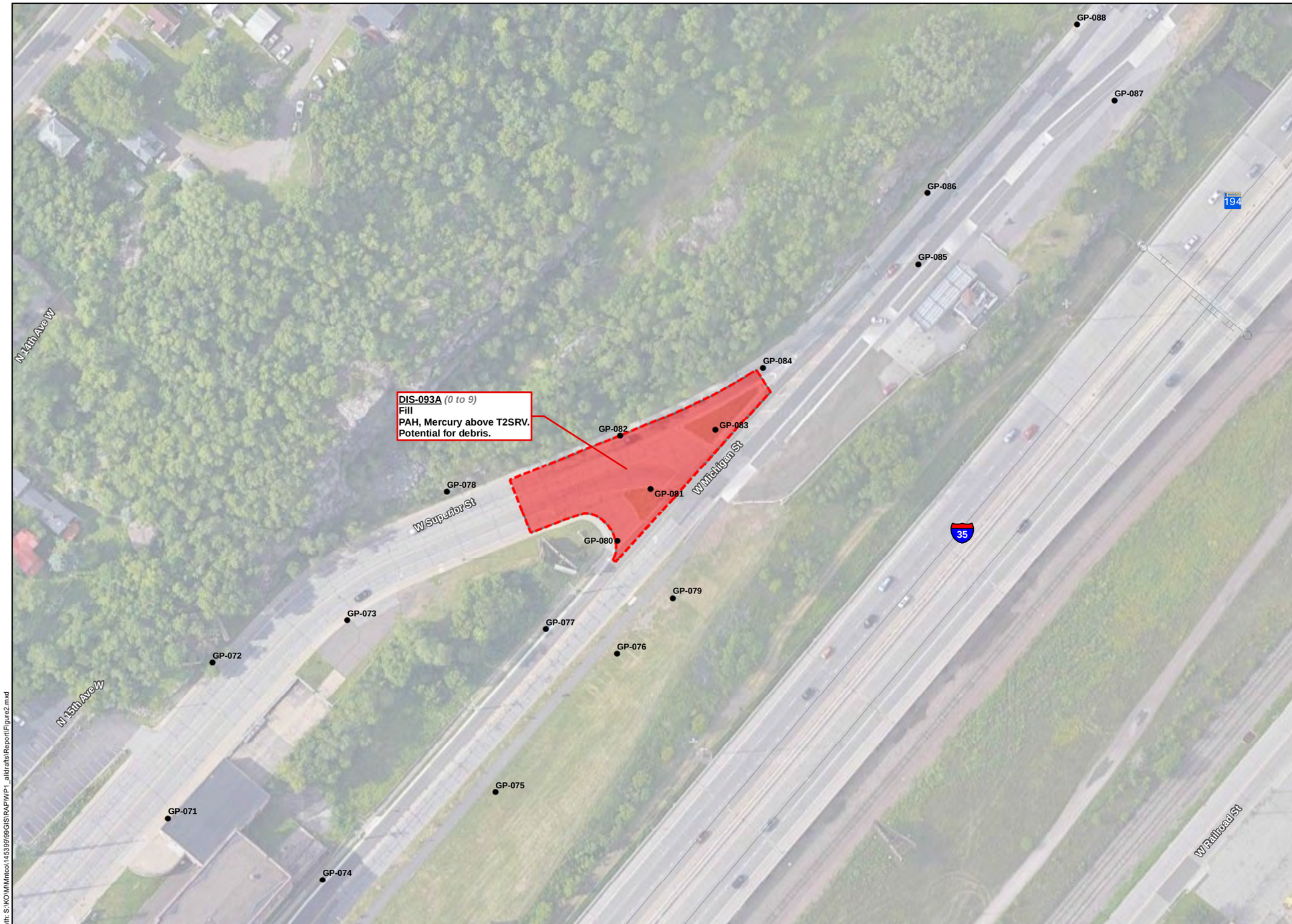

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Response Action Areas extend to Work Package 1 Construction Limits

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Response Action Plan Polygon "Callout"

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Map depicts relative polygon depth
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Polygon Type (3 Characters)

DIS-070B *(0 to 15)* — Polygon Depth (ft bgs)
Fill — Soil Type
PAHs Above T2SRV.
Metals above MPCA UFC.
Potential for Debris.
Soil Characterization

Polygon Type Definitions
- ASB - Asbestos containing waste material / Disposal Area (Teal)
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- ft - Feet
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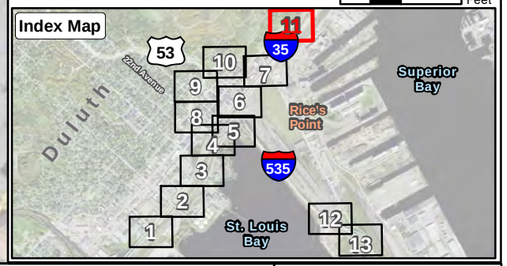
N

0 20 40 80 Feet



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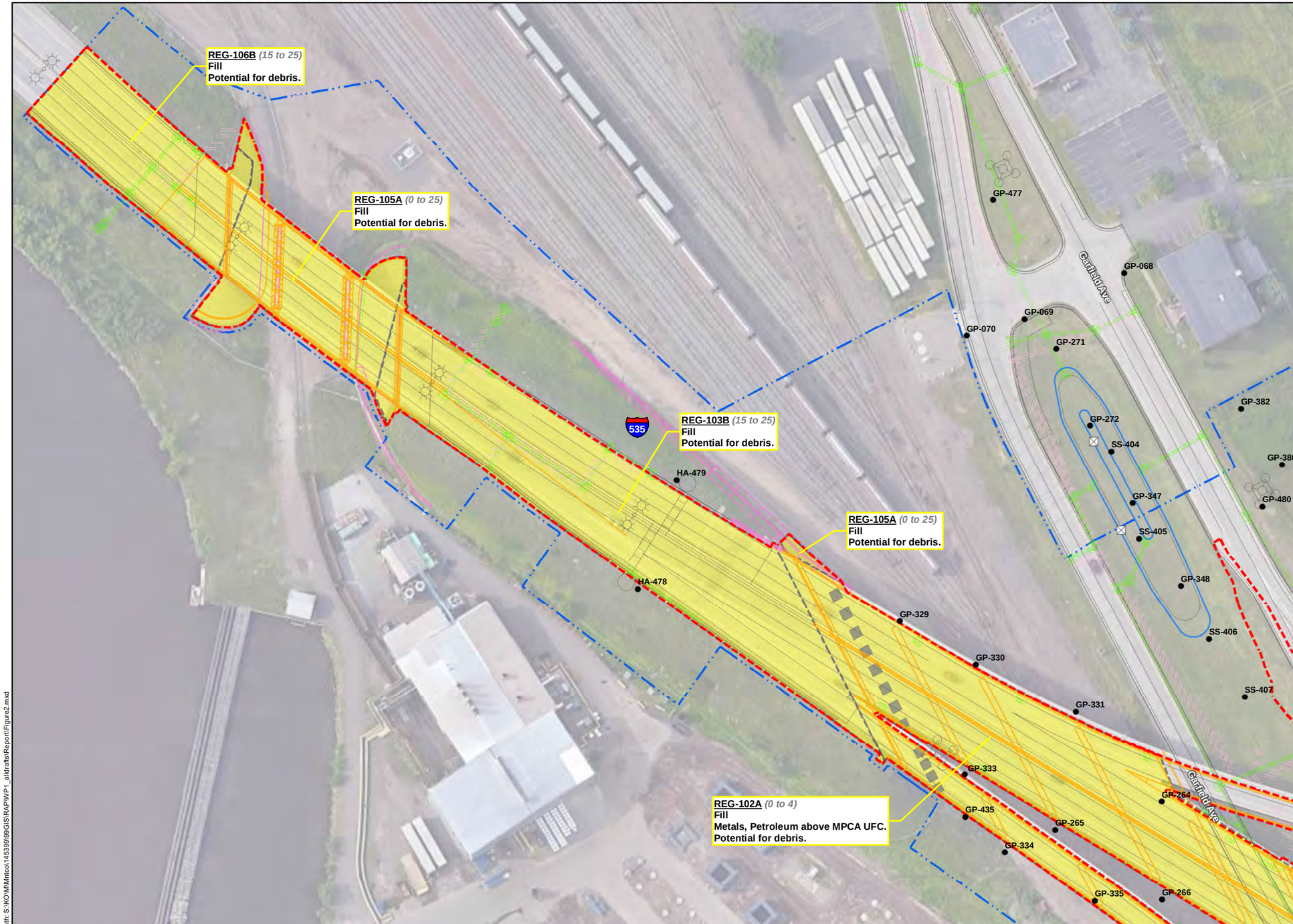

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Polygon Depth (ft bgs)
Soil Type
Soil Characterization

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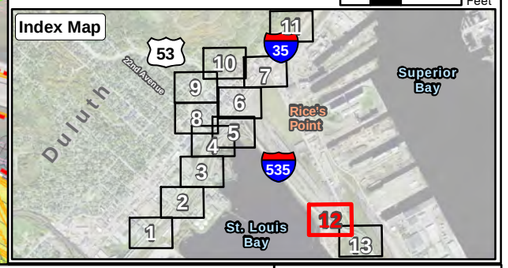
0 20 40 80 Feet

Index Map



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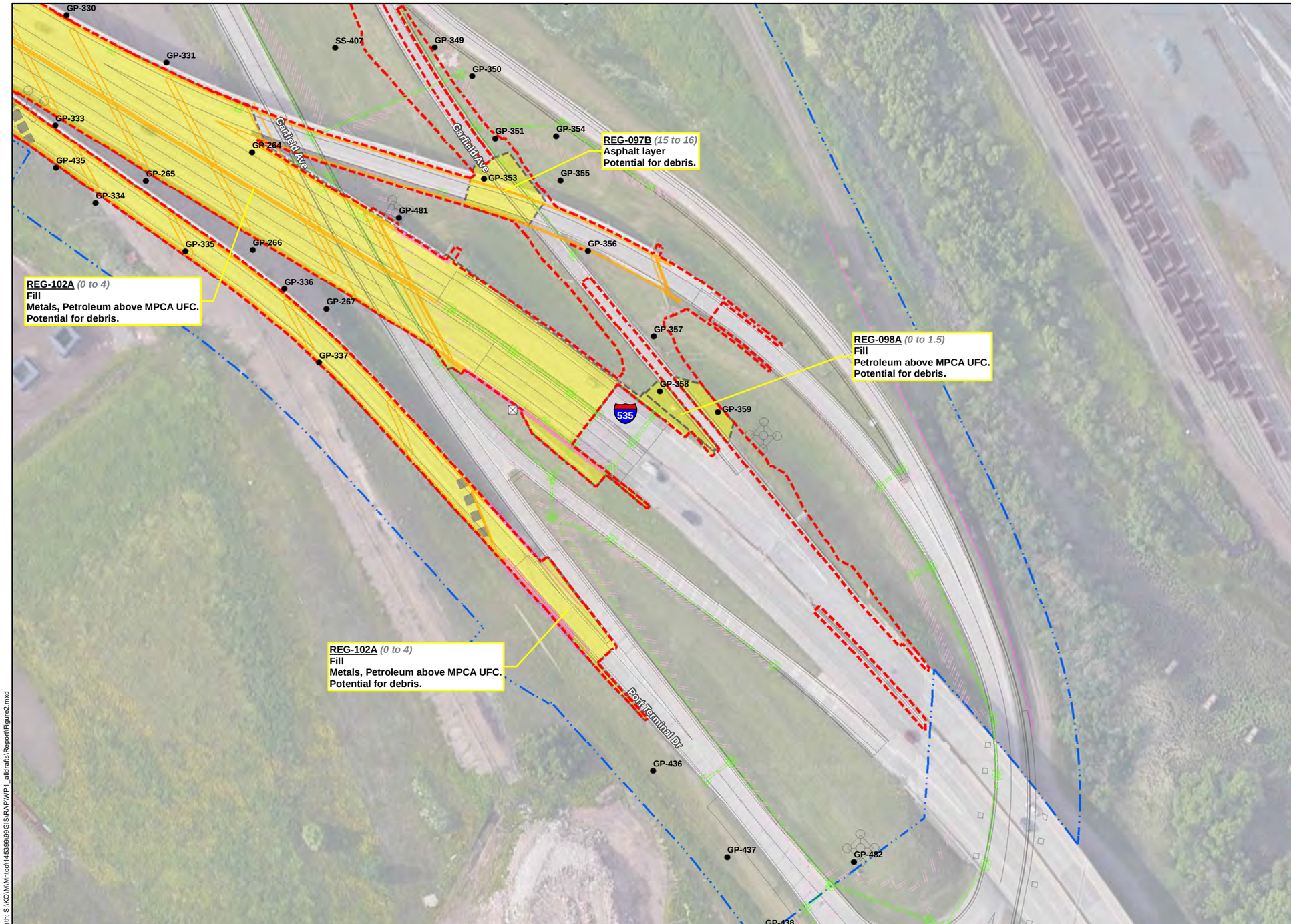

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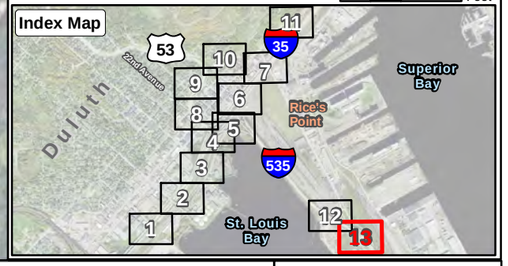

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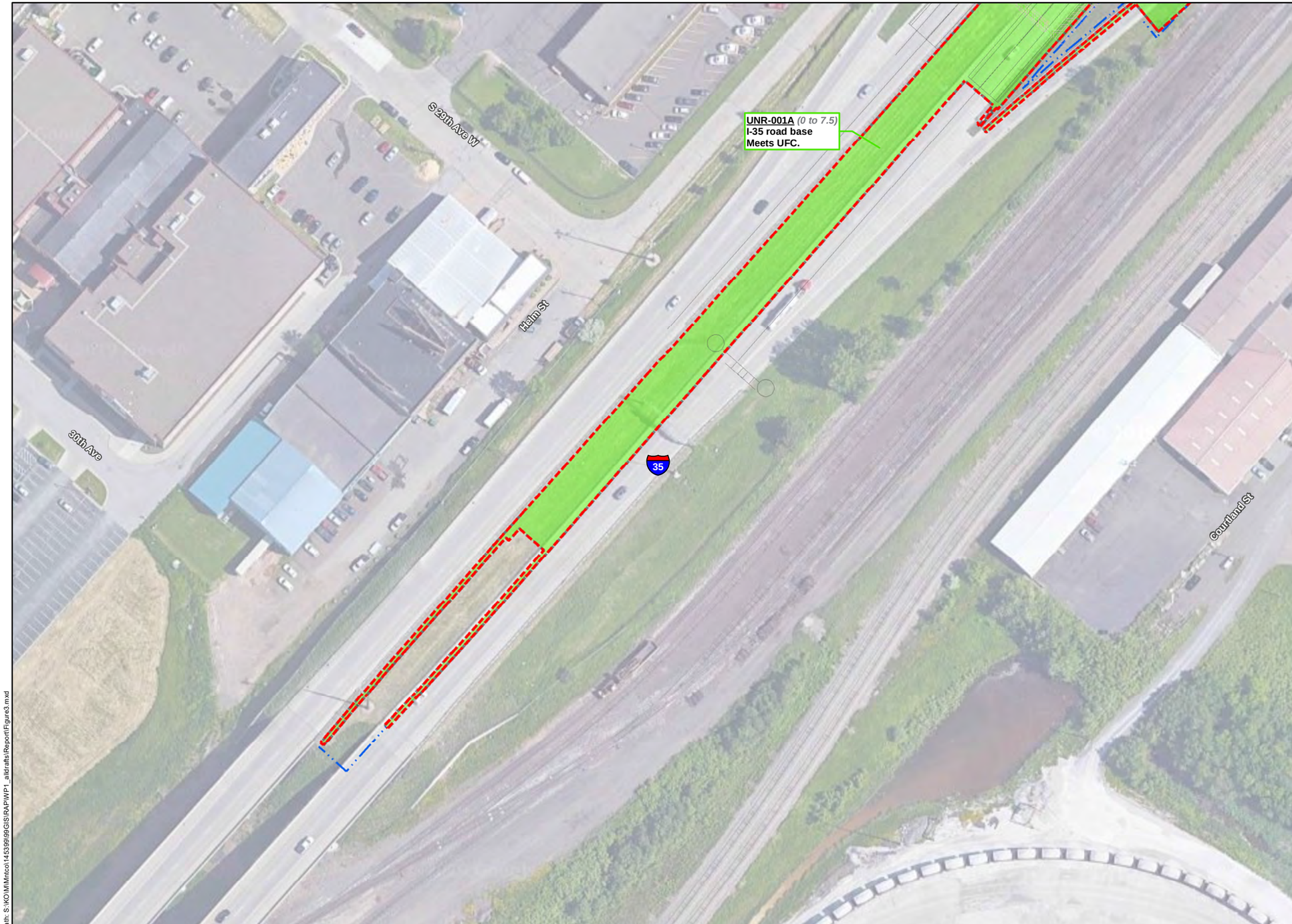

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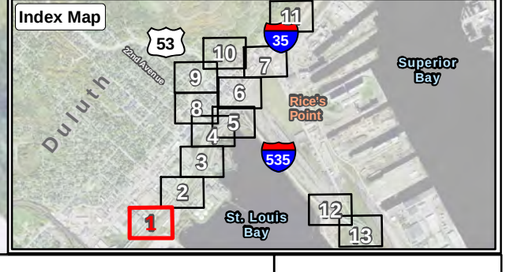

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Figure 3-1

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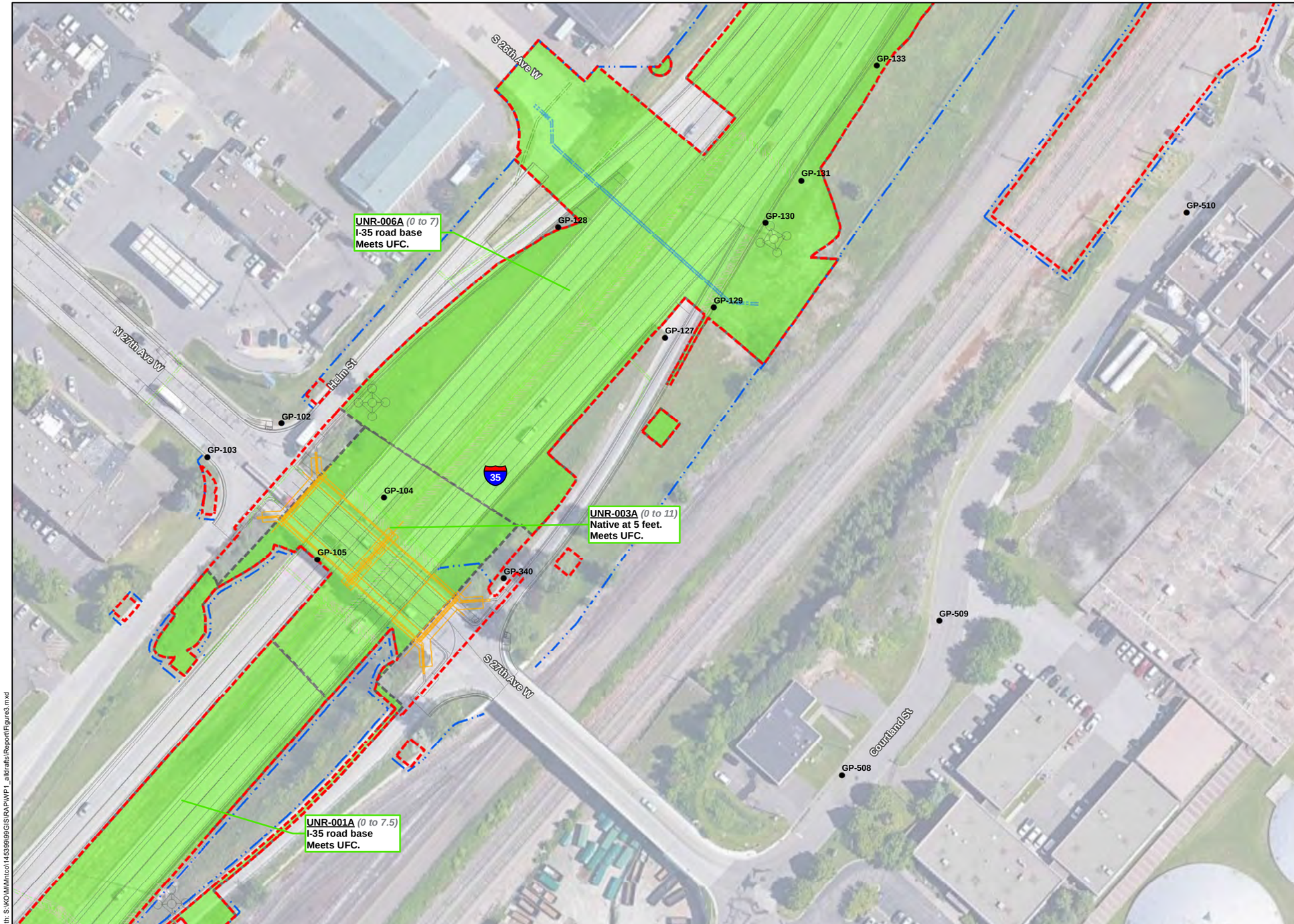

Legend

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Response Action Areas depicted on Figure 2.

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Undesignated Soil
Several Project areas could not be investigated because of access issues.

Response Action Areas depicted on Figure 3

Unregulated Soil Areas
Material that is assumed to be unregulated based on extrapolated results. Unless other conditions are encountered during excavation this material can be used on or off site.

- Boring Location (SEH)
- Test Pits Locations (WSB)
- ACWM* Identified
- ACWM* not Identified
- *Asbestos Containing Waste Material
- Inplace Below Ground Structure to Remain

Work Package 1 (90% Design)
Work Package 2 (pre-60% Design)
- Limits of Disturbance (WP 1)
- Construction Limits (WP 1)
- Bridge
- Retaining Wall
- Pond
- Drain Structure
- Water Main
- Drain Structure Removal

Response Action Plan Polygon "Callout"

Polygon Reference (3 digit number)

Map depicts relative polygon depth
A - (Soils at surface to depth bgs)
B - (Soil at depth below A layer)
C - (Soil at depth below B layer)

Polygon Type (3 Characters)

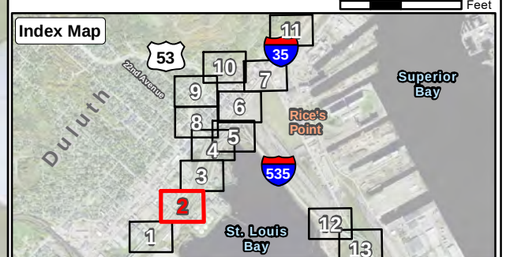
DIS-070B *(0 to 15)*
Fill
PAHs Above T2SRV.
Metals above MPCA UFC.
Potential for Debris.

Polygon Depth (ft bgs)
Soil Type
Soil Characterization

Polygon Type Definitions
- ASB - Asbestos containing waste material / Disposal Area (Teal)
- HLI - Hazardous Lead Impacted Soil (Blue)
- MRC - Mercury Hotspot (Orange)
- DIS - Disposal Area (Red)
- REG - Regulated Soil Area (Yellow)
- UNR - Unregulated Soil Area (Green)
- UNK - Undesignated Soil (Purple)

Notes
- T2SRV - Tier 2 industrial soil reference value
- MPCA - Minnesota Pollution Contol Agency
- UFC - MPCA's Unregulated Fill Criteria
- PCBs - Polychlorinated biphenyl
- PAHs - Polycyclic aromatic hydrocarbons
- ft - Feet
- bgs - Below ground surface

0 20 40 80 Feet



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Project: MNTCO 151179
Print Date: 12/17/2019

User Name: msherrill
Projection: Projection: UTM Zone 15 N
Source: MDH
SEH, MnDOT, St Louis County

Unregulated Soil Areas

Construction Response Action Plan/Construction Contingency Plan
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 6982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

Figure 3-2

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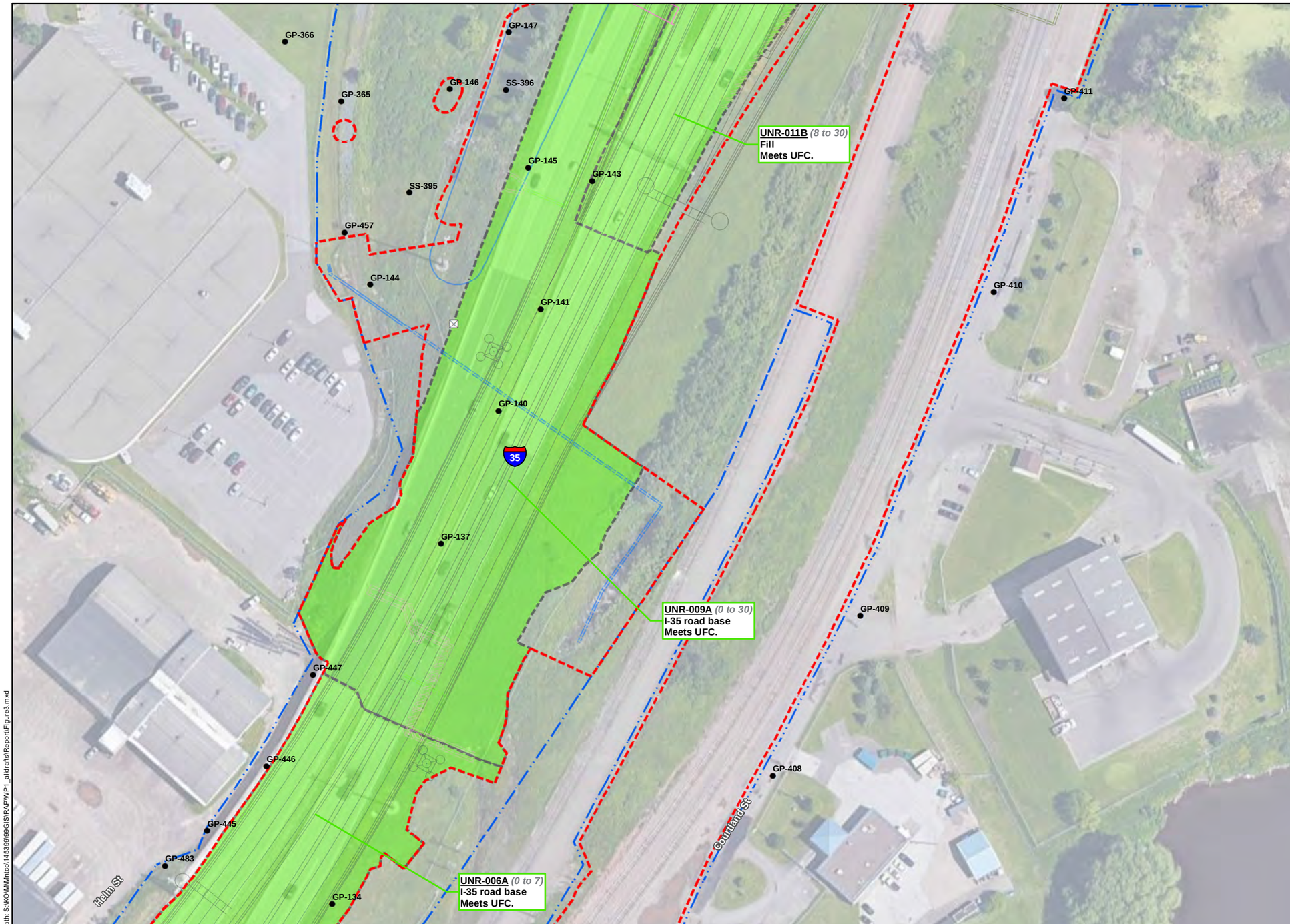

Legend

Response Action Areas extend to Work Package 1 Construction Limits

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Undesignated Soil
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Response Action Areas depicted on Figure 3

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- Drain Structure Removal

Response Action Plan Polygon "Callout"

Polygon Reference (3 digit number)
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B - (Soil at depth below A layer)
C - (Soil at depth below B layer)
Polygon Type (3 Characters)
DIS-070B *(0 to 15)* — Polygon Depth (ft bgs)
Fill — Soil Type
PAHs Above T2SRV.
Metals above MPCA UFC.
Potential for Debris. — Soil Characterization

Polygon Type Definitions
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Notes
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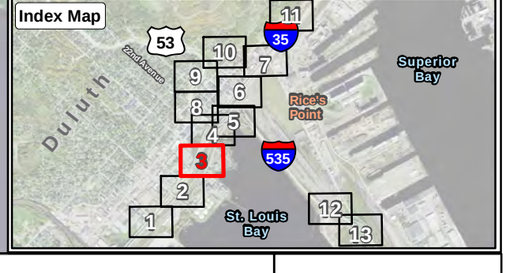
- UFC - MPCA's Unregulated Fill Criteria
- PCBs - Polychlorinated biphenyl
- PAHs - Polycyclic aromatic hydrocarbons
- ft - Feet
- bgs - Below ground surface

N
0 20 40 80
Feet



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Projection: Projection: UTM Zone 15 N
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SEH, MnDOT, St Louis County

Unregulated Soil Areas

Construction Response Action Plan/Construction Contingency Plan
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 6982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

Figure 3-3

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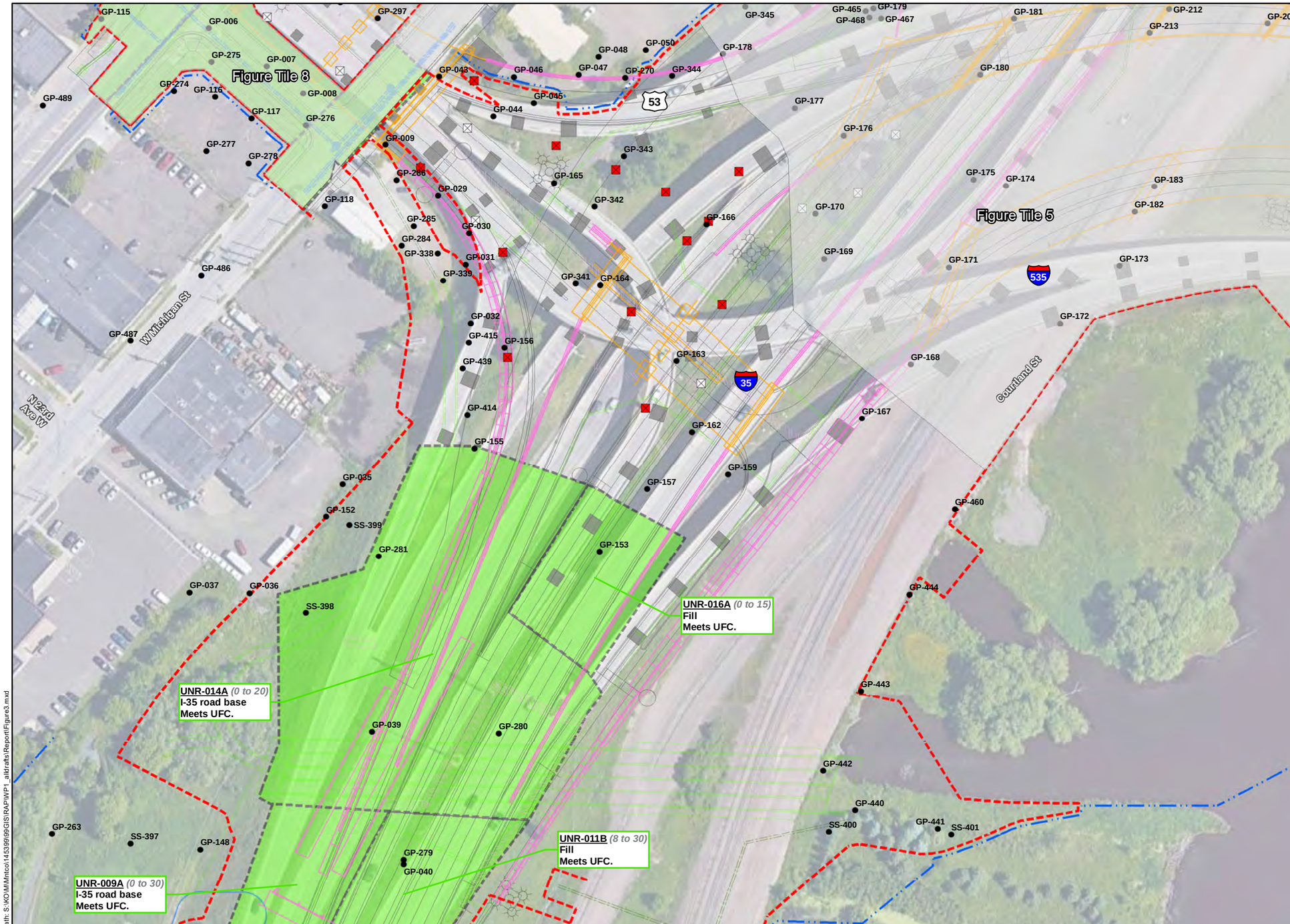

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Response Action Areas extend to Work Package 1 Construction Limits

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Undesignated Soil
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Response Action Areas depicted on Figure 3

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Response Action Plan Polygon "Callout"

Polygon Reference (3 digit number)

Map depicts relative polygon depth
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Polygon Type (3 Characters)

DIS-070B *(0 to 15)*
Fill
PAHs Above T2SRV.
Metals above MPCA UFC.
Potential for Debris.

Polygon Depth (ft bgs)
Soil Type
Soil Characterization

Polygon Type Definitions
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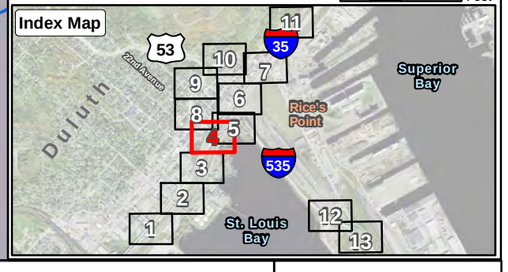
0 20 40 80 Feet



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Project: MNTCO 151179
Print Date: 12/17/2019

User Name: msherrill
Projection: Projection: UTM Zone 15 N
Source: MDH
SEH, MnDOT, St Louis County

Unregulated Soil Areas

Construction Response Action Plan/Construction Contingency Plan
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 6982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

Figure 3-4

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Legend

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Work Package 2 (pre-60% Design)
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- Retaining Wall
- Pond
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- Water Main
- Drain Structure Removal

Response Action Plan Polygon "Callout"

Polygon Type (3 Characters) → DIS-070B (0 to 15) ← Polygon Reference (3 digit number)
Fill
PAHs Above T2SRV.
Metals above MPCA UFC.
Potential for Debris.

Map depicts relative polygon depth
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C - (Soil at depth below B layer)

Polygon Depth (ft bgs)
Soil Type
Soil Characterization

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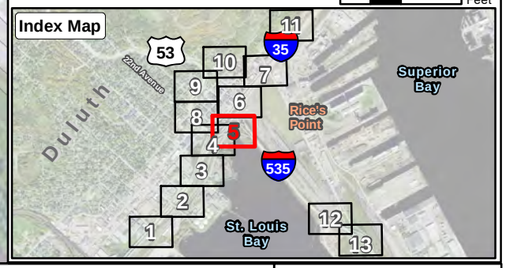
N

0 20 40 80 Feet

Index Map



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Unregulated Soil Areas

Construction Response Action Plan/Construction Contingency Plan
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 6982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

Figure 3-5

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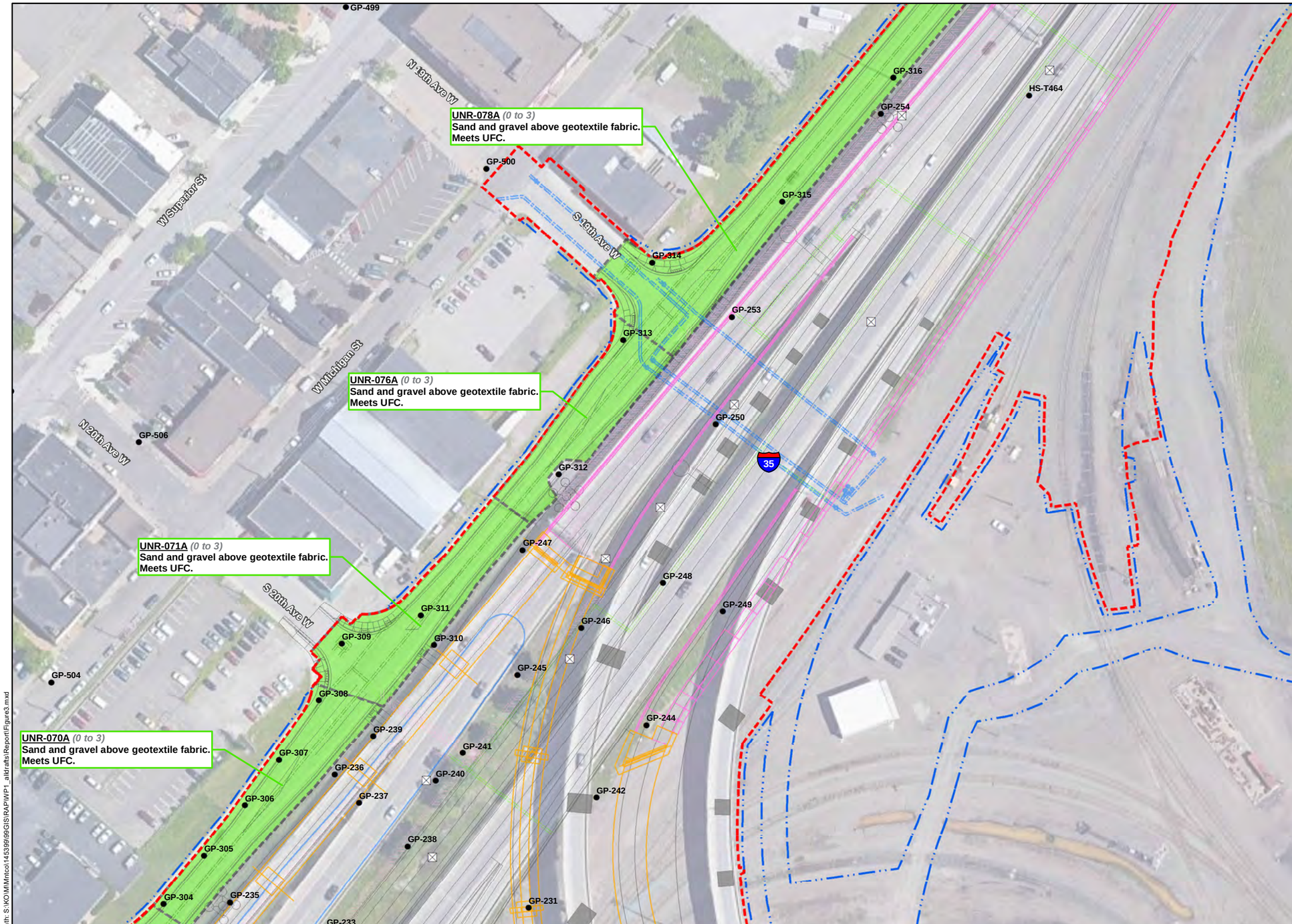

Legend

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Response Action Plan Polygon "Callout"

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Polygon Type (3 Characters)

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Polygon Depth (ft bgs)
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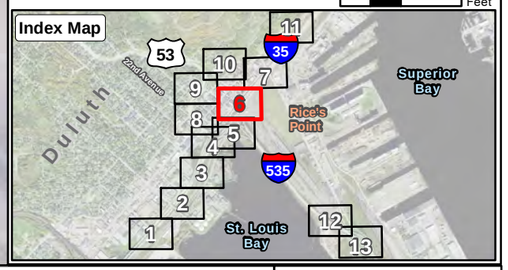
Index Map



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Unregulated Soil Areas

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Duluth, Minnesota
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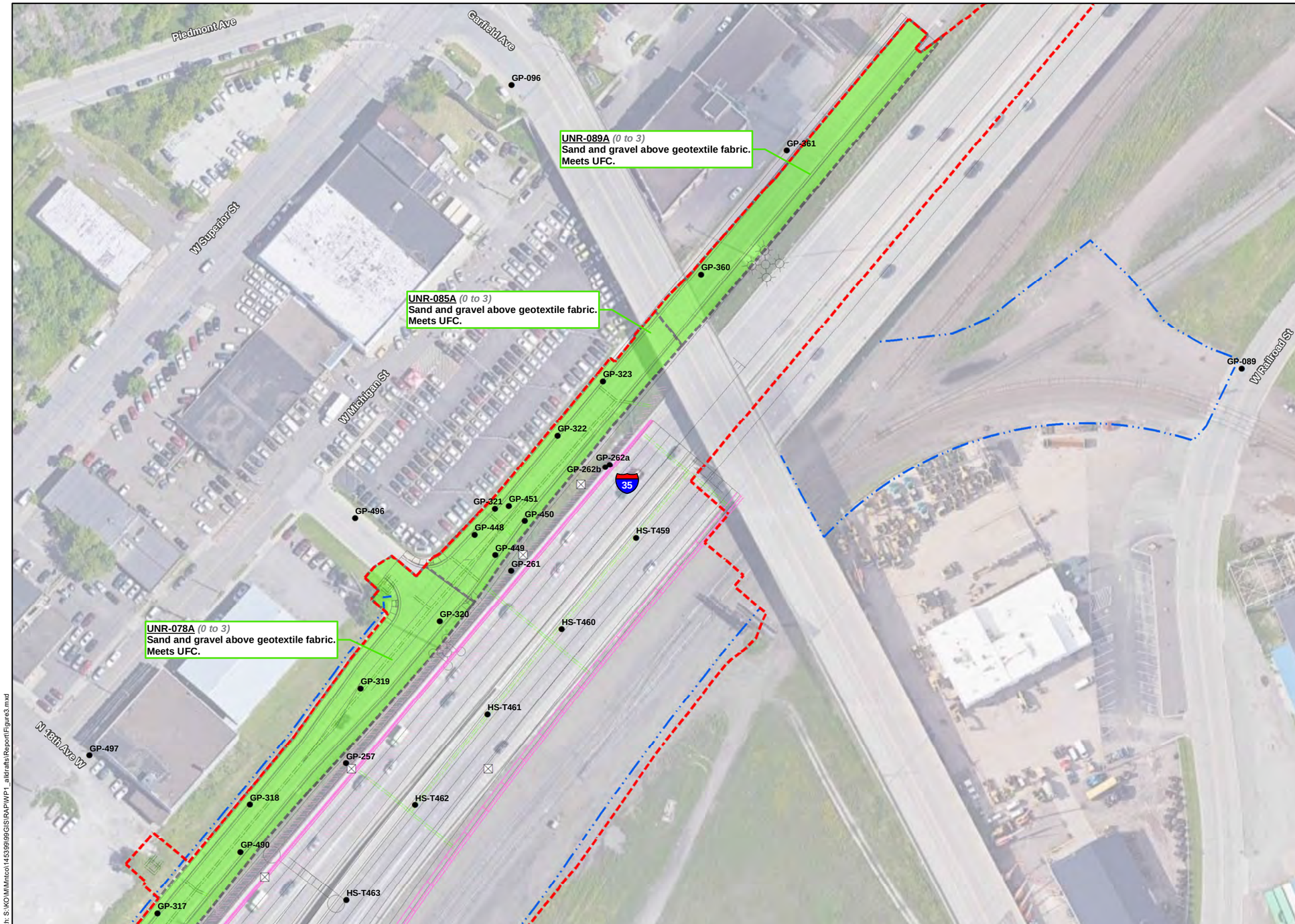

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Response Action Plan Polygon "Callout"

Polygon Reference (3 digit number)

Map depicts relative polygon depth
A - (Soils at surface to depth bgs)
B - (Soil at depth below A layer)
C - (Soil at depth below B layer)

Polygon Type (3 Characters)

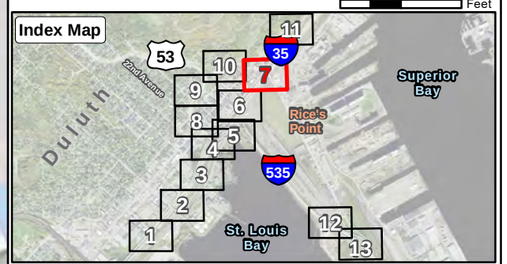
DIS-070B *(0 to 15)*
Fill
PAHs Above T2SRV.
Metals above MPCA UFC.
Potential for Debris.

Polygon Depth (ft bgs)
Soil Type
Soil Characterization

Polygon Type Definitions
- ASB - Asbestos containing waste material / Disposal Area (Teal)
- HLI - Hazardous Lead Impacted Soil (Blue)
- MRC - Mercury Hotspot (Orange)
- DIS - Disposal Area (Red)
- REG - Regulated Soil Area (Yellow)
- UNR - Unregulated Soil Area (Green)
- UNK - Undesignated Soil (Purple)

Notes
- T2SRV - Tier 2 industrial soil reference value
- MPCA - Minnesota Pollution Contol Agency
- UFC - MPCA's Unregulated Fill Criteria
- PCBs - Polychlorinated biphenyl
- PAHs - Polycyclic aromatic hydrocarbons
- ft - Feet
- bgs - Below ground surface

0 20 40 80 Feet



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Project: MNTCO 151179
Print Date: 12/17/2019

User Name: msherrill
Projection: Projection: UTM Zone 15 N
Source: MDH
SEH, MnDOT, St Louis County

Unregulated Soil Areas

Construction Response Action Plan/Construction Contingency Plan
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 6982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

Figure 3-7

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Legend

Response Action Areas extend to Work Package 1 Construction Limits

Response Action Areas depicted on Figure 2.

ACWM / Landfill Disposal Area
All disturbance or removal of the ACWM will be managed as regulated ACWM. The asbestos abatement contractor will perform abatement and disposal of ACWM to ensure compliance with all applicable federal and state regulations.

Discrete Area Soil
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Mercury Hotspot
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Hazardous Lead Impacted Soil
Hazardous Lead Impacted Soil contains lead concentrations exceeding the Toxic Characteristic Leaching Procedure (TCLP) limit for characteristically hazardous for lead. The low number and scattered occurrence of these samples indicates that soil with hazardous lead concentrations are not associated with large releases but are isolated occurrences within Project limits.

Undesignated Soil
Several Project areas could not be investigated because of access issues.

Response Action Areas depicted on Figure 3

Unregulated Soil Areas
Material that is assumed to be unregulated based on extrapolated results. Unless other conditions are encountered during excavation this material can be used on or off site.

Boring Location (SEH)
Test Pits Locations (WSB)
ACWM* Identified
ACWM* not Identified
*Asbestos Containing Waste Material
In-place Below Ground Structure to Remain

Work Package 1 (90% Design)
Work Package 2 (pre-60% Design)
Limits of Disturbance (WP 1)
Construction Limits (WP 1)
Bridge
Retaining Wall
Pond
Drain Structure
Water Main
Drain Structure Removal

Response Action Plan Polygon "Callout"

Polygon Type (3 Characters) → **DIS-070B** *(0 to 15)* — Polygon Reference (3 digit number)
Fill
PAHs Above T2SRV.
Metals above MPCA UFC.
Potential for Debris.

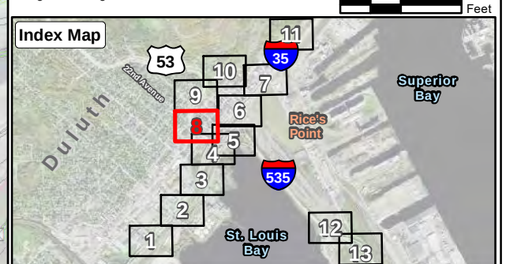
Map depicts relative polygon depth
A - (Soils at surface to depth bgs)
B - (Soil at depth below A layer)
C - (Soil at depth below B layer)

Polygon Depth (ft bgs)
Soil Type
Soil Characterization

Polygon Type Definitions
ASB - Asbestos containing waste material / Disposal Area (Teal)
HLI - Hazardous Lead Impacted Soil (Blue)
MRC - Mercury Hotspot (Orange)
DIS - Disposal Area (Red)
REG - Regulated Soil Area (Yellow)
UNR - Unregulated Soil Area (Green)
UNK - Undesignated Soil (Purple)

Notes
T2SRV - Tier 2 industrial soil reference value
MPCA - Minnesota Pollution Contol Agency
UFC - MPCA's Unregulated Fill Criteria
PCBs - Polychlorinated biphenyl
PAHs - Polycyclic aromatic hydrocarbons
ft - Feet
bgs - Below ground surface

0 20 40 80 Feet



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Project: MNTCO 151179
Print Date: 12/17/2019

User Name: msherrill
Projection: Projection: UTM Zone 15 N
Source: MDH
SEH, MnDOT, St Louis County

Unregulated Soil Areas

Construction Response Action Plan/Construction Contingency Plan
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 6982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

Figure 3-8

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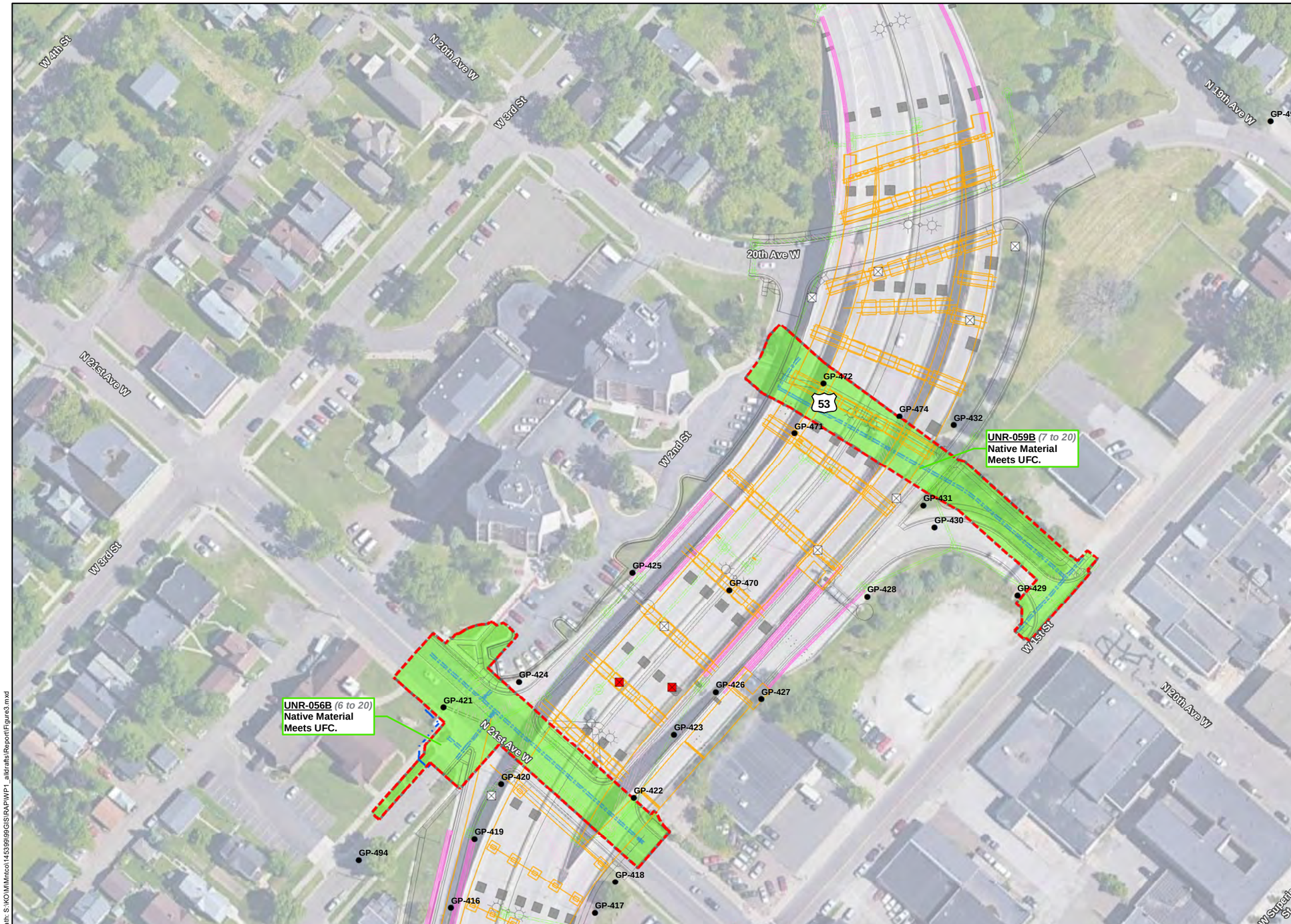

Legend

Response Action Areas extend to Work Package 1 Construction Limits

Response Action Areas depicted on Figure 2.

ACWM / Landfill Disposal Area

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Discrete Area Soil

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Regulated Soil

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Hazardous Lead Impacted Soil

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Undesignated Soil

Several Project areas could not be investigated because of access issues.

Response Action Areas depicted on Figure 3

Unregulated Soil Areas

Material that is assumed to be unregulated based on extrapolated results. Unless other conditions are encountered during excavation this material can be used on or off site.

- Boring Location (SEH)
- Test Pits Locations (WSB)
- ACWM* Identified
- ACWM* not Identified
- *Asbestos Containing Waste Material
- Inplace Below Ground Structure to Remain

Work Package 1 (90% Design)
Work Package 2 (pre-60% Design)
- Limits of Disturbance (WP 1)
- Construction Limits (WP 1)
- Bridge
- Retaining Wall
- Pond
- Drain Structure
- Water Main
- Drain Structure Removal

Response Action Plan Polygon "Callout"

Polygon Reference (3 digit number)

Map depicts relative polygon depth
A - (Soils at surface to depth bgs)
B - (Soil at depth below A layer)
C - (Soil at depth below B layer)

Polygon Type (3 Characters)

DIS-070B *(0 to 15)* — Polygon Depth (ft bgs)
Fill — Soil Type
PAHs Above T2SRV.
Metals above MPCA UFC.
Potential for Debris. — Soil Characterization

Polygon Type Definitions
- ASB - Asbestos containing waste material / Disposal Area (Teal)
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- MRC - Mercury Hotspot (Orange)
- DIS - Disposal Area (Red)
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Notes
- T2SRV - Tier 2 industrial soil reference value
- MPCA - Minnesota Pollution Contol Agency
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- PCBs - Polychlorinated biphenyl
- PAHs - Polycyclic aromatic hydrocarbons
- ft - Feet
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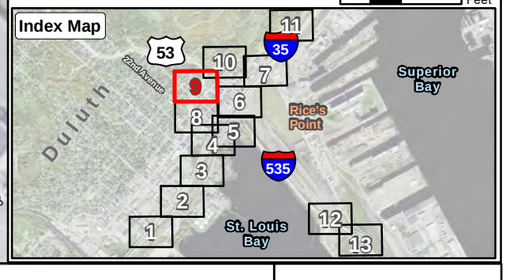
0 20 40 80 Feet



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Print Date: 12/17/2019

User Name: msherrill
Projection: Projection: UTM Zone 15 N
Source: MDH
SEH, MnDOT, St Louis County

Unregulated Soil Areas

Construction Response Action Plan/Construction Contingency Plan
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 6982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

Figure 3-9

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Legend

Response Action Areas extend to Work Package 1 Construction Limits

Response Action Areas depicted on Figure 2.

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Undesignated Soil
Several Project areas could not be investigated because of access issues.

Response Action Areas depicted on Figure 3

Unregulated Soil Areas
Material that is assumed to be unregulated based on extrapolated results. Unless other conditions are encountered during excavation this material can be used on or off site.

- Boring Location (SEH)
- Test Pits Locations (WSB)
  - ACWM* Identified
  - ACWM* not Identified
  - *Asbestos Containing Waste Material
- Inplace Below Ground Structure to Remain

Work Package 1 (90% Design)
Work Package 2 (pre-60% Design)
- Limits of Disturbance (WP 1)
- Construction Limits (WP 1)
- Bridge
- Retaining Wall
- Pond
- Drain Structure
- Water Main
- Drain Structure Removal

Response Action Plan Polygon "Callout"

Polygon Reference (3 digit number)
Map depicts relative polygon depth
A - (Soils at surface to depth bgs)
B - (Soil at depth below A layer)
C - (Soil at depth below B layer)
Polygon Type (3 Characters)

DIS-070B *(0 to 15)* — Polygon Depth (ft bgs)
Fill — Soil Type
PAHs Above T2SRV.
Metals above MPCA UFC.
Potential for Debris. — Soil Characterization

Polygon Type Definitions
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Notes
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- ft - Feet
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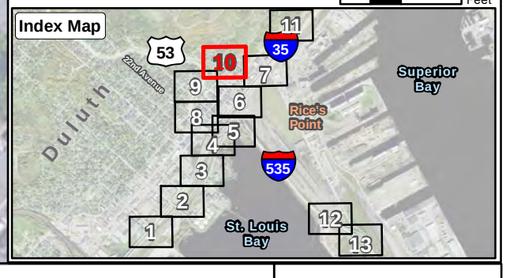
0 20 40 80 Feet



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Project: MNTCO 151179
Print Date: 12/17/2019

User Name: msherrill
Projection: Projection: UTM Zone 15 N
Source: MDH
SEH, MnDOT, St Louis County

Unregulated Soil Areas

Construction Response Action Plan/Construction Contingency Plan
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 6982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

Figure 3-10

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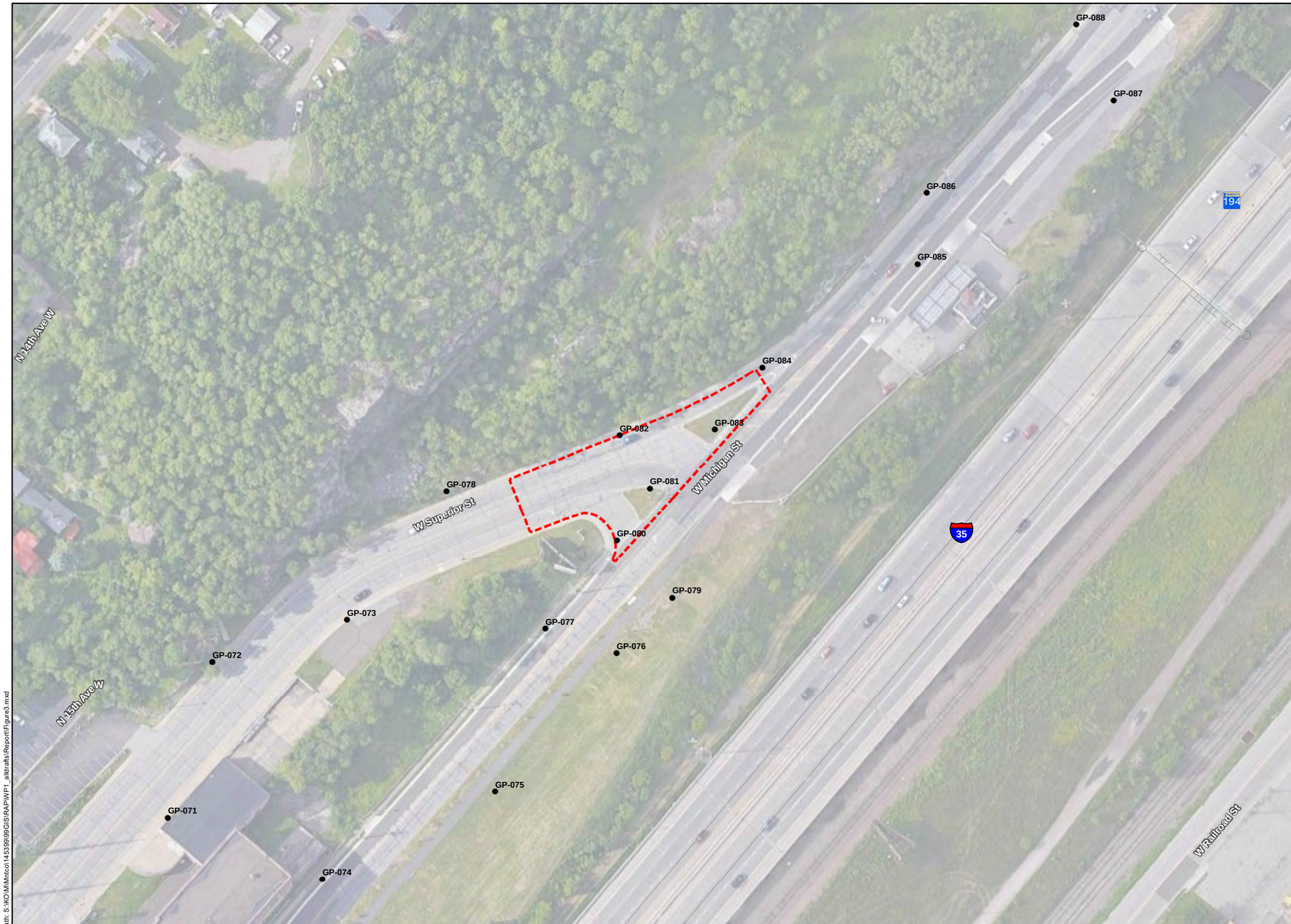

Legend

Response Action Areas extend to Work Package 1 Construction Limits

Response Action Areas depicted on Figure 2.

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Undesignated Soil

Several Project areas could not be investigated because of access issues.

Response Action Areas depicted on Figure 3

Unregulated Soil Areas

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- Test Pits Locations (WSB)
  - ACWM* Identified
  - ACWM* not Identified
  - *Asbestos Containing Waste Material
- Inplace Below Ground Structure to Remain

Work Package 1 (90% Design)
Work Package 2 (pre-60% Design)
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- Construction Limits (WP 1)
- Bridge
- Retaining Wall
- Pond
- Drain Structure
- Water Main
- Drain Structure Removal

Response Action Plan Polygon "Callout"

Polygon Reference (3 digit number)

Map depicts relative polygon depth
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B - (Soil at depth below A layer)
C - (Soil at depth below B layer)

Polygon Type (3 Characters)

DIS-070B *(0 to 15)*
Fill
PAHs Above T2SRV.
Metals above MPCA UFC.
Potential for Debris.

Polygon Depth (ft bgs)
Soil Type
Soil Characterization

Polygon Type Definitions
- ASB - Asbestos containing waste material / Disposal Area (Teal)
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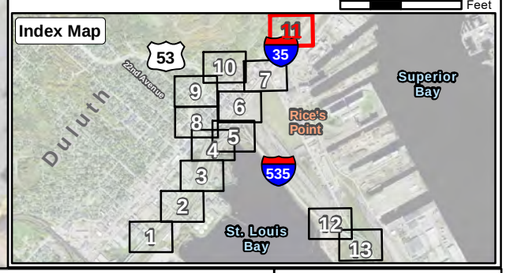

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Unregulated Soil Areas

Construction Response Action Plan/Construction Contingency Plan
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
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Figure 3-11

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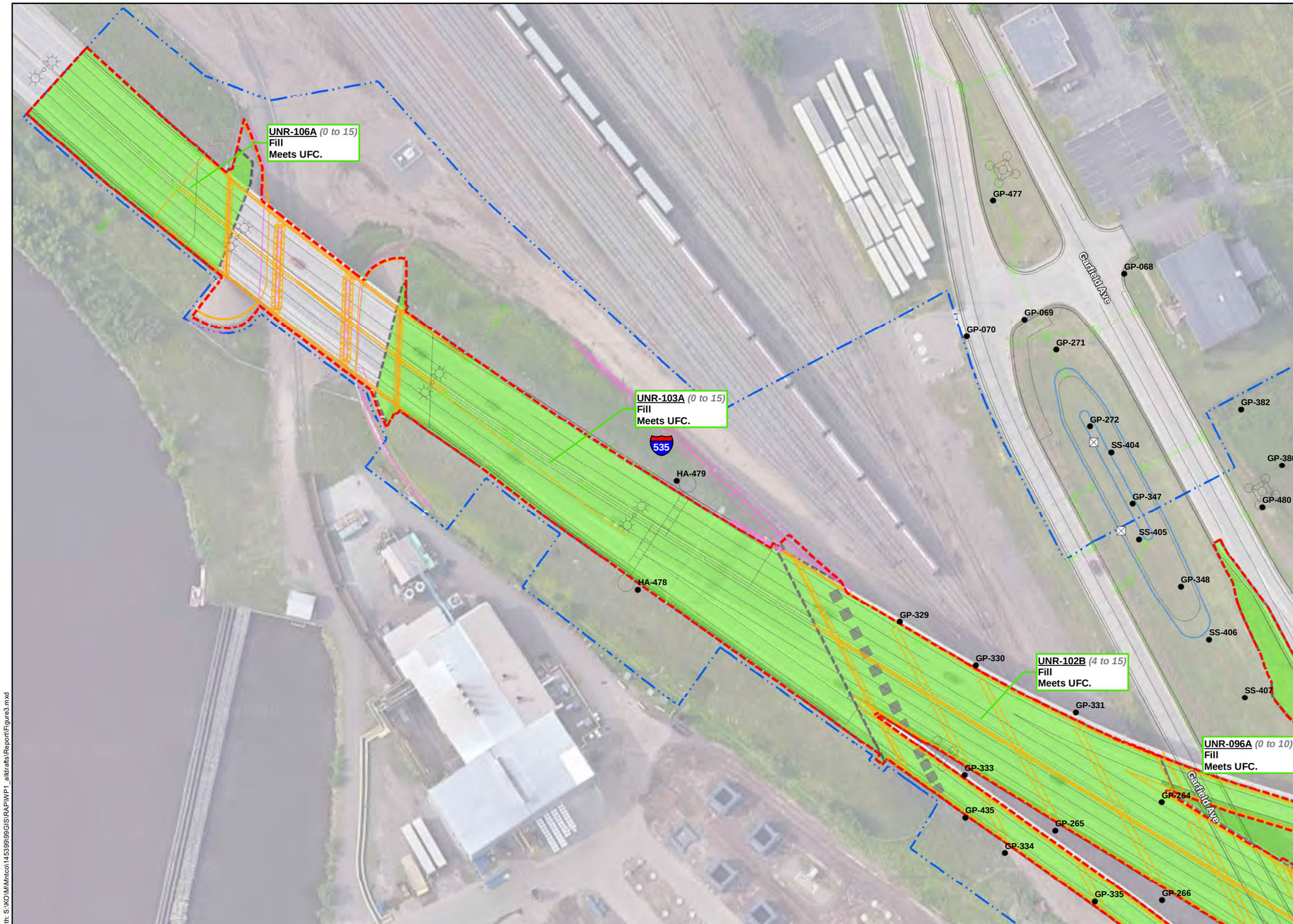

Legend

Response Action Areas extend to Work Package 1 Construction Limits

Response Action Areas depicted on Figure 2.

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Undesignated Soil

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Response Action Areas depicted on Figure 3

Unregulated Soil Areas

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- Test Pits Locations (WSB)
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  - ACWM* not Identified
  - *Asbestos Containing Waste Material
- Inplace Below Ground Structure to Remain

Work Package 1 (90% Design)
Work Package 2 (pre-60% Design)
- Limits of Disturbance (WP 1)
- Construction Limits (WP 1)
- Bridge
- Retaining Wall
- Pond
- Drain Structure
- Water Main
- Drain Structure Removal

Response Action Plan Polygon "Callout"

Map depicts relative polygon depth
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C - (Soil at depth below B layer)

Polygon Reference (3 digit number)

Polygon Type (3 Characters)

DIS-070B *(0 to 15)* — Polygon Depth (ft bgs)
Fill — Soil Type
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Metals above MPCA UFC.
Potential for Debris. — Soil Characterization

Polygon Type Definitions
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- PCBs - Polychlorinated biphenyl
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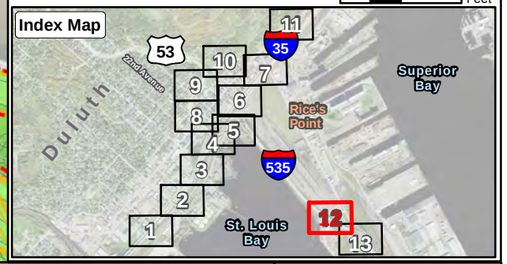
- ft - Feet
- bgs - Below ground surface

N

0 20 40 80 Feet

Index Map



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Unregulated Soil Areas

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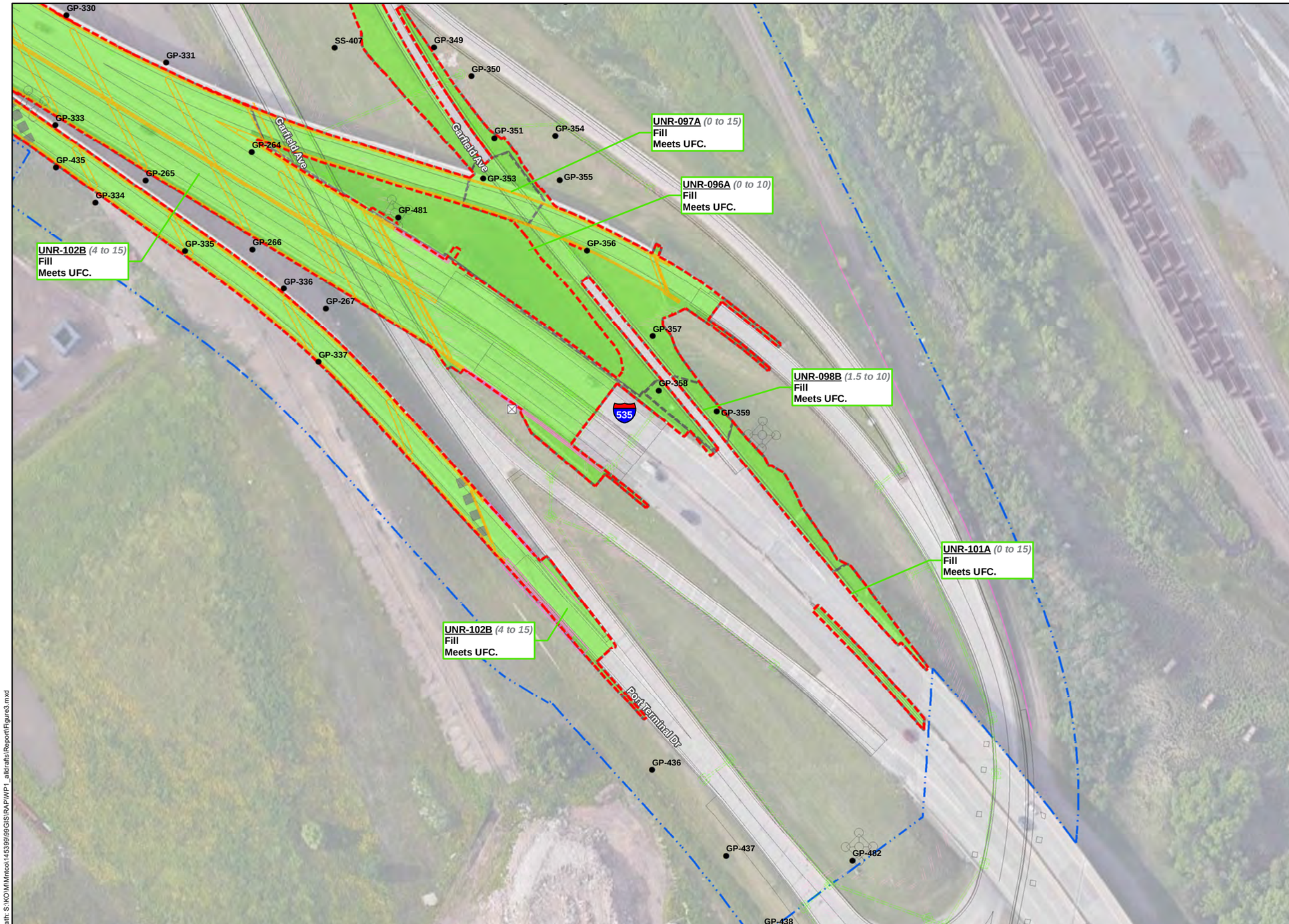
SP 6982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

Figure 3-12

This map is neither a legally recorded map nor a survey map and is not intended to be used as one. This map is a compilation of records, information, and data gathered from various sources listed on this map and is to be used for reference purposes only. SEH does not warrant that the Geographic Information System (GIS) Data used to prepare this map are error free, and SEH does not represent that the GIS Data can be used for navigational, tracking, or any other purpose requiring exacting measurement of distance or direction or precision in the depiction of geographic features. The user of this map acknowledges that SEH shall not be liable for any damages which arise out of the user's access or use of data provided.



Legend

Response Action Areas extend to Work Package 1 Construction Limits

Response Action Areas depicted on Figure 2.

ACWM / Landfill Disposal Area
All disturbance or removal of the ACWM will be managed as regulated ACWM. The asbestos abatement contractor will perform abatement and disposal of ACWM to ensure compliance with all applicable federal and state regulations.

Discrete Area Soil
Discrete Area Soil contains higher level contamination (exceeding one or more Tier 2 Industrial SRVs). Discrete Area Soil is commonly associated with historical point source releases of contaminants.

Regulated Soil
Regulated Soil contains low level contamination [exceeding one or more MPCA Soil Leaching Value (SLV) and/or Tier 1 Residential Soil Reference Value (SRV) but less than all Tier 2 Industrial SRVs]. Regulated Soil is found throughout the Project limits and is generally associated with non-point source releases from decades of industrial land uses.

Mercury Hotspot
Mercury in one known location in the project is above the landfill acceptance criteria (total mercury in soil of 466 mg/kg). The mercury hotspot was delineated with borings and sampling indicated that the hotspot is limited laterally and vertically.

Hazardous Lead Impacted Soil
Hazardous Lead Impacted Soil contains lead concentrations exceeding the Toxic Characteristic Leaching Procedure (TCLP) limit for characteristically hazardous for lead. The low number and scattered occurrence of these samples indicates that soil with hazardous lead concentrations are not associated with large releases but are isolated occurrences within Project limits.

Undesignated Soil
Several Project areas could not be investigated because of access issues.

Response Action Areas depicted on Figure 3

Unregulated Soil Areas
Material that is assumed to be unregulated based on extrapolated results. Unless other conditions are encountered during excavation this material can be used on or off site.

- Boring Location (SEH)
- Test Pits Locations (WSB)
- ACWM* Identified
- ACWM* not Identified
- *Asbestos Containing Waste Material
- Inplace Below Ground Structure to Remain

Work Package 1 (90% Design)
Work Package 2 (pre-60% Design)
- Limits of Disturbance (WP 1)
- Construction Limits (WP 1)
- Bridge
- Retaining Wall
- Pond
- Drain Structure
- Water Main
- Drain Structure Removal

Response Action Plan Polygon "Callout"

Polygon Reference (3 digit number)
Map depicts relative polygon depth
A - (Soils at surface to depth bgs)
B - (Soil at depth below A layer)
C - (Soil at depth below B layer)

Polygon Type (3 Characters)

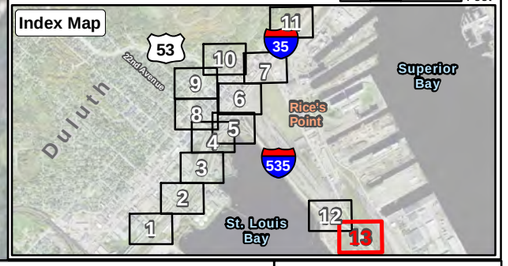
DIS-070B *(0 to 15)*
Fill
PAHs Above T2SRV.
Metals above MPCA UFC.
Potential for Debris.

Polygon Depth (ft bgs)
Soil Type
Soil Characterization

Polygon Type Definitions
- ASB - Asbestos containing waste material / Disposal Area (Teal)
- HLI - Hazardous Lead Impacted Soil (Blue)
- MRC - Mercury Hotspot (Orange)
- DIS - Disposal Area (Red)
- REG - Regulated Soil Area (Yellow)
- UNR - Unregulated Soil Area (Green)
- UNK - Undesignated Soil (Purple)

Notes
- T2SRV - Tier 2 industrial soil reference value
- MPCA - Minnesota Pollution Contol Agency
- UFC - MPCA's Unregulated Fill Criteria
- PCBs - Polychlorinated biphenyl
- PAHs - Polycyclic aromatic hydrocarbons
- ft - Feet
- bgs - Below ground surface

0 20 40 80 Feet



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SEH
3535 VADNAIS CENTER DR.
ST. PAUL, MN 55110
PHONE: (651) 490-2000
FAX: (888) 908-8166
TF: (800) 325-2055
www.sehinc.com

Project: MNTCO 151179
Print Date: 12/17/2019

User Name: msherrill
Projection: Projection: UTM Zone 15 N
Source: MDH
SEH, MnDOT, St Louis County

Unregulated Soil Areas

Construction Response Action Plan/Construction Contingency Plan
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 6982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

Figure 3-13

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Appendix A

Select Construction Plans

MINNESOTA DEPARTMENT OF TRANSPORTATION

CONSTRUCTION PLAN FOR WORK PACKAGE I - GRADING, BITUMINOUS MILL AND SURFACING, BOX CULVERT, LIGHTING, SIGNALS, TMS, ADA IMPROVEMENTS, AND BRIDGE NOS 69902, 69905, 69909, 69X19

LOCATED ON TH 35 FROM 0.28 MILES SOUTH OF 27TH AVE W TO 0.1 MILES NORTH OF GARFIELD AVE
LOCATED ON TH 53 FROM W MICHIGAN ST TO 0.18 MILES SOUTH OF W 6TH ST
LOCATED ON TH 535 FROM 0.13 MILES SOUTH OF GARFIELD AVE TO 1.0 MILES NORTH OF GARFIELD AVE

FED. PROJ. NO. PENDING

STATE PROJ. NO. 6982-322WP1 (TH 35)
GROSS LENGTH 6988.93 FEET 1.324 MILES
BRIDGES-LENGTH FEET MILES
EXCEPTIONS-LENGTH FEET MILES
NET LENGTH 6988.93 FEET 1.324 MILES
REF. POINT 254+00.489 TO REF. POINT 255+00.813
NOTE: LENGTH AND DESCRIPTION BASED ON THE TH 35 NB ALIGNMENT

STATE PROJ. NO. 6915-136WP1 (TH 53)
GROSS LENGTH 2431.22 FEET 0.460 MILES
BRIDGES-LENGTH 1629.661 FEET 0.309 MILES
EXCEPTIONS-LENGTH 1629.661 FEET 0.309 MILES
NET LENGTH 801.559 FEET 0.151 MILES
REF. POINT 001+00.682 TO REF. POINT 002+00.142
NOTE: LENGTH AND DESCRIPTION BASED ON THE TH 53 ALIGNMENT

STATE PROJ. NO. 6980-60WP1 (TH 535)
GROSS LENGTH 5987.30 FEET 1.134 MILES
BRIDGES-LENGTH FEET MILES
EXCEPTIONS-LENGTH 2439.26 FEET 0.462 MILES
NET LENGTH 3548.04 FEET 0.672 MILES
REF. POINT 000+00.499 TO REF. POINT 001+00.633
NOTE: LENGTH AND DESCRIPTION BASED ON THE TH 535 INP AND TH 535 NB TO TH 53 SB RAMP ALIGNMENTS

SP 6980-60WP1 EQUATION
TH 535 INP 45+85.53 BK* =
TH 535 NB 500+00.00 AH
*SWITCHES DIRECTION OF STATIONING

EX BRIDGE 69802
EX BRIDGE 69802A
EX BRIDGE 69802B
EX BRIDGE 69802C
EX BRIDGE 69802D
EX BRIDGE 69802E

END SP 6915-136WP1 (TH 53)
TH 53 STA 124+50.00

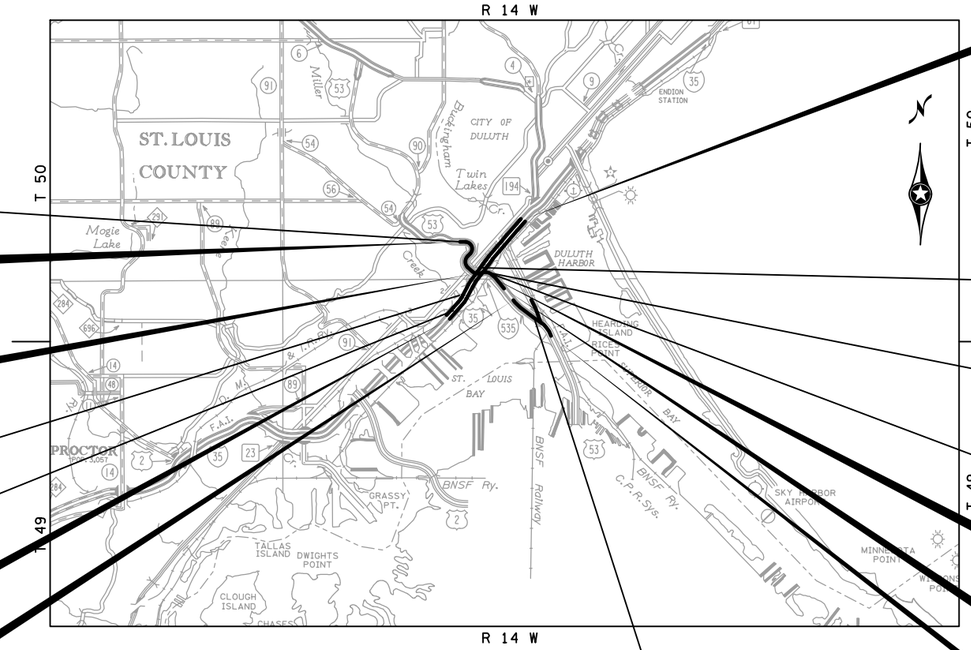
BEGIN SP 6915-136WP1 (TH 53)
TH 53 STA 100+18.78

REMOVE EX BRIDGE 91069
CONST BRIDGE 69X19

REMOVE EX BRIDGE 69834
CONST BRIDGE 69909

BEGIN SP 6982-322WP1 (TH 35)
TH 35 NB STA 94+37.67

BEGIN EXCEPTION
TH 535 INP STA 62+27.60



END SP 6982-322WP1 (TH 35)
TH 35 NB STA 164+26.60

REMOVE EX BRIDGE 69801A
REMOVE EX BRIDGE 69801F
REMOVE EX BRIDGE 69801G
REMOVE EX BRIDGE 69801H
REMOVE EX BRIDGE 69801I
REMOVE EX BRIDGE 69801J
REMOVE EX BRIDGE 69801K
REMOVE EX BRIDGE 69801L
REMOVE EX BRIDGE 69801M
REMOVE EX BRIDGE 69801N
EX BRIDGE 69881
REMOVE EX BRIDGE 69881A
REMOVE EX BRIDGE 69881B
EX BRIDGE 69881N

REMOVE EX BRIDGE 69801B
REMOVE EX BRIDGE 69801C
REMOVE EX BRIDGE 69801D
REMOVE EX BRIDGE 69801E
CONST BRIDGE 69902

REMOVE EX BRIDGE 69882
REMOVE EX BRIDGE 69882A
REMOVE EX BRIDGE 69882B
REMOVE EX BRIDGE 69882N
REMOVE EX BRIDGE 69824
REMOVE EX BRIDGE 69825
CONST BRIDGE 69905

END SP 6980-60WP1 (TH 535)
TH 535 NB TO TH 35 SB RAMP
STA 521+64.52

END EXCEPTION
TH 535 NB STA 507+97.19

BEGIN SP 6980-60WP1 (TH 535)
TH 535 INP STA 84+08.31

REMOVE EX BRIDGE 69808
REMOVE EX BRIDGE 69808A
REMOVE EX BRIDGE 69809
REMOVE EX BRIDGE 69810

SCALES

PLAN	100'
PROFILE	100' HORIZ. 10' VERT.
INDEX MAP	5000'
GENERAL LAYOUT	600'/300'

DESIGN DESIGNATION - TH 53

Design ESALS = 3,381,000
ADT (Current Year) 2020 = 12,110 — Design Speed 40 MPH
ADT (Future Year) 2040 = 17,310 — Based on STOPPING Sight Distance
DHV (Design Hr. Vol.) = — Height of eye 3.5' Height of object 2.0'
D (Directional Distr.) = % — Design Speed not achieved at: N/A
T (Heavy Commercial) = 7.5 %
STA. TO STA. MPH
STA. TO STA. MPH

DESIGN DESIGNATION - TH 35

Design ESALS = 9,962,000
ADT (Current Year) 2020 = 40,930 — Design Speed 55 MPH
ADT (Future Year) 2040 = 45,770 — Based on STOPPING Sight Distance
DHV (Design Hr. Vol.) = — Height of eye 3.5' Height of object 2.0'
D (Directional Distr.) = % — Design Speed not achieved at: N/A
T (Heavy Commercial) = 7.5 %
STA. TO STA. MPH
STA. TO STA. MPH

DESIGN DESIGNATION - TH 535

Design ESALS = 5,894,000
ADT (Current Year) 2020 = 21,730 — Design Speed 55 MPH
ADT (Future Year) 2040 = 29,560 — Based on STOPPING Sight Distance
DHV (Design Hr. Vol.) = — Height of eye 3.5' Height of object 2.0'
D (Directional Distr.) = % — Design Speed not achieved at: N/A
T (Heavy Commercial) = 7.5 %
STA. TO STA. MPH
STA. TO STA. MPH

PLAN REVISIONS		
DATE	SHEET NO.	APPROVER

I HEREBY CERTIFY THAT THE FINAL FIELD REVISIONS, IF ANY, WERE PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: LICENSE #
DATE: SIGNATURE:

FOR PLANS AND UTILITIES SYMBOLS SEE TECHNICAL MANUAL

STATE PROJ. NO.	CHARGE IDENTIFIER
6982-322WP1	

PROJECT LOCATION
COUNTY : ST. LOUIS
DISTRICT : 1

GOVERNING SPECIFICATIONS

THE 2018 EDITION OF THE MINNESOTA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR CONSTRUCTION" SHALL GOVERN.

INDEX

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2-3	GENERAL LAYOUT
4-10	STATEMENT OF ESTIMATED QUANTITIES
11-12	SOIL AND CONSTRUCTION NOTES
13-29	INPLACE UTILITY TABULATION
30-41	INPLACE TOPOGRAPHY & UTILITY PLAN
42	PROPOSED UTILITY CONDUIT
43	STANDARD PLATES
44-46	EARTHWORK TABULATIONS AND SUMMARY
47-56	TABULATIONS
57-122	CITY UTILITIES
123-131	WESTERN LAKE SUPERIOR SANITARY SEWER PLANS
132-143	TYPICAL SECTIONS
144-147	MISCELLANEOUS DETAILS
148-153	ENVIRONMENTAL MANAGEMENT PLAN
154-191	STANDARD PLAN SHEETS
192-207	STAGING PLANS
208-255	TEMPORARY ALIGNMENT PLAN AND TABULATIONS
256-289	BYPASS PLANS
290-311	ALIGNMENT PLAN AND TABULATIONS
312-327	REMOVAL PLANS
328-332	CONSTRUCTION PLAN
333-338	INTERSECTION DETAILS
339-341	CONSTRUCTION PLAN DETAILS
342-345	PROFILES
346-349	BITUMINOUS PAVING DETAILS
350	SUPERELEVATION PLANS
351-362	DRAINAGE REMOVAL PLAN
363-375	DRAINAGE PLAN
376-389	DRAINAGE PROFILES AND TABULATION
390-410	DRAINAGE DETAILS
411-415	BOX CULVERT PLAN
416-420	MILLER AND COFFEE CREEK GRADING PLAN
421-428	STORM WATER POLLUTION PREVENTION PLAN
429-466	STAGED DRAINAGE, EROSION & SEDIMENT CONTROL
467-471	TURF ESTABLISHMENT PLAN
472-475	TRAFFIC BARRIER DETAILS AND TABULATION
476-478	CONTOUR PLANS
479-591	TRAFFIC CONTROL PLAN
592-644	DETOUR LAYOUTS
645-650	PERMANENT PAVEMENT MARKINGS
651-668	LIGHTING PLAN
669-677	TEMPORARY LIGHTING PLAN
678-702	SIGNING
703-712	TMS CONSTRUCTION PLANS
713-722	TEMPORARY SIGNAL SYSTEM
723-786	RAILROAD PLAN
787-788	CROSS SECTION MATCHLINE LAYOUT
789-862	CROSS SECTIONS

THIS PLAN CONTAINS 862 SHEETS

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DESIGN SQUAD

RECOMMENDED FOR APPROVAL 20
DISTRICT TRANSPORTATION ENGINEER

RECOMMENDED FOR APPROVAL 20
DISTRICT MATERIALS ENGINEER

RECOMMENDED FOR APPROVAL 20
DISTRICT WATER RESOURCES/HYDRAULICS ENGINEER

RECOMMENDED FOR APPROVAL 20
DISTRICT TRAFFIC ENGINEER

RECOMMENDED FOR APPROVAL 20
STATE PRE-LETTING ENGINEER

OFFICE OF LAND MANAGEMENT APPROVAL 20
DIRECTOR, LAND MANAGEMENT

APPROVED 20
STATE DESIGN ENGINEER

APPROVED 20
STATE BRIDGE ENGINEER

STATE PROJ. NO. 6915-136WP1 (TH 53 = 106), STATE PROJ. NO. 6980-60WP1 (TH 535 = 390)
STATE PROJ. NO. 6982-322WP1 (TH 35 = 103) SHEET NO. 1 OF 862 SHEETS

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SHEET TITLE		SHEET VIEW														
		SEGMENT 1							SEGMENT 2				SEGMENT 3		①SEGMENT 4	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
ALIGNMENT PLAN	PLAN SHEET NO.	290	291	292	293	294	295	296	297	298	297	298	299	300	301	301
INPLACE TOPOGRAPHY & UTILITY PLAN	PLAN SHEET NO.	30	31	32	33	34	35	36	37	38	37	38	39	40	41	41
REMOVAL PLANS	PLAN SHEET NO.	312	313	314	315	316	317	318	321	--	322	323	324	325	326	327
CONSTRUCTION PLAN	PLAN SHEET NO.	--	--	--	--	328	329	--	--	--	330	--	--	--	331	332
DRAINAGE PLAN	PLAN SHEET NO.	363	364	365	366	367	368	369	--	371	370	371	372	373	374	375
TURF ESTABLISHMENT PLAN	PLAN SHEET NO.	--	--	--	--	467	--	--	--	--	468	--	--	--	469	470
PERMANENT PAVEMENT MARKINGS	PLAN SHEET NO.	--	--	--	--	647	--	--	--	--	648	--	--	--	649	650
SIGNING	PLAN SHEET NO.	682	683	684	685	686	687	694	692	691	693	691	696	697	698	699

SPECIFIC NOTES:

① SEE SHEET GL301 FOR PLAN LOCATION.

600

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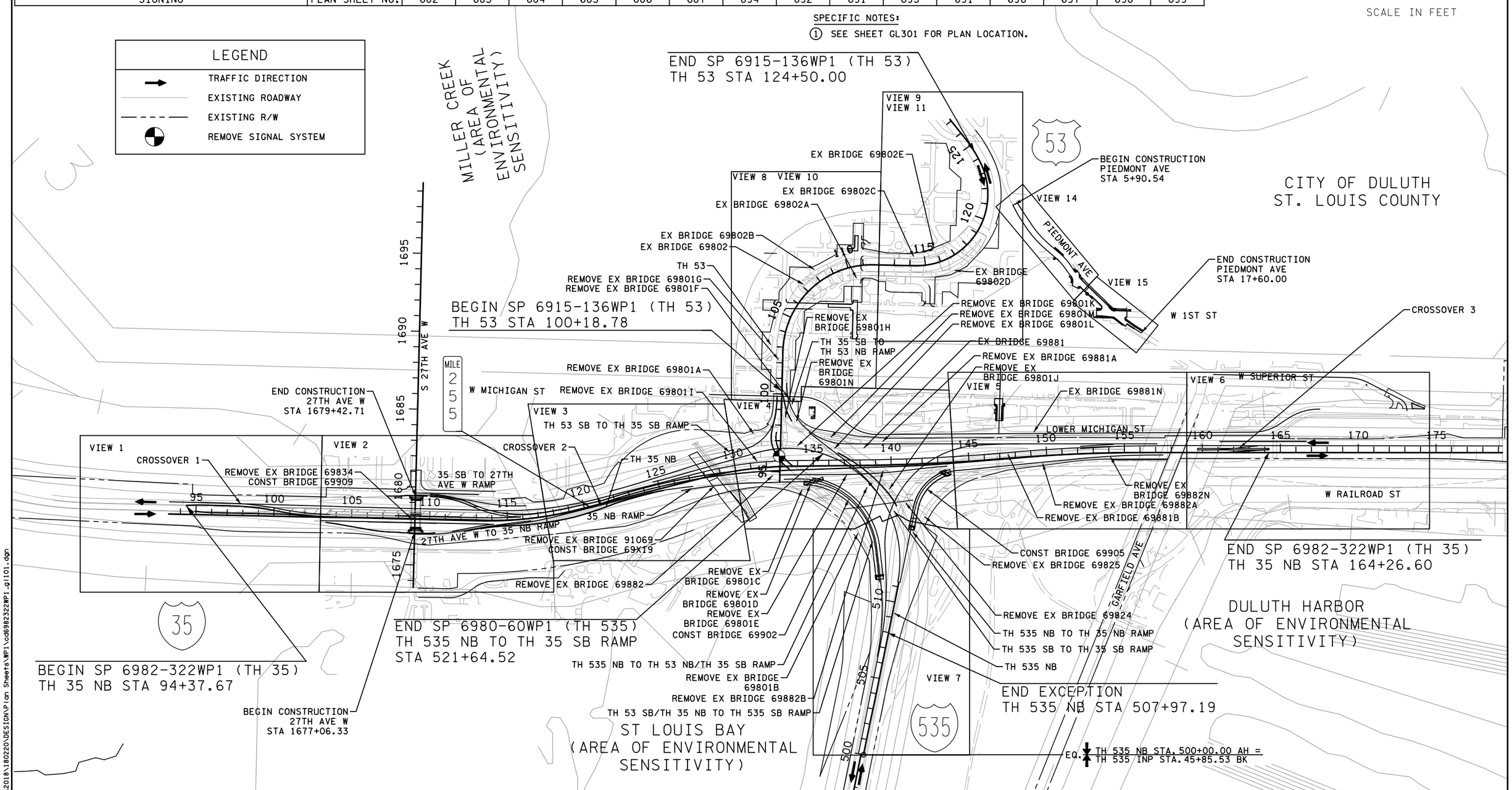

NO	DATE	DWN	CKD	REVISIONS

ALLIANT

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SIGNATURE:

DATE _____ LICENSE #

GENERAL LAYOUT

SEGMENT 1 & 2

SP 6982-322WP1 (TH 35)

SHEET NO. 2 OF 862 SHEETS

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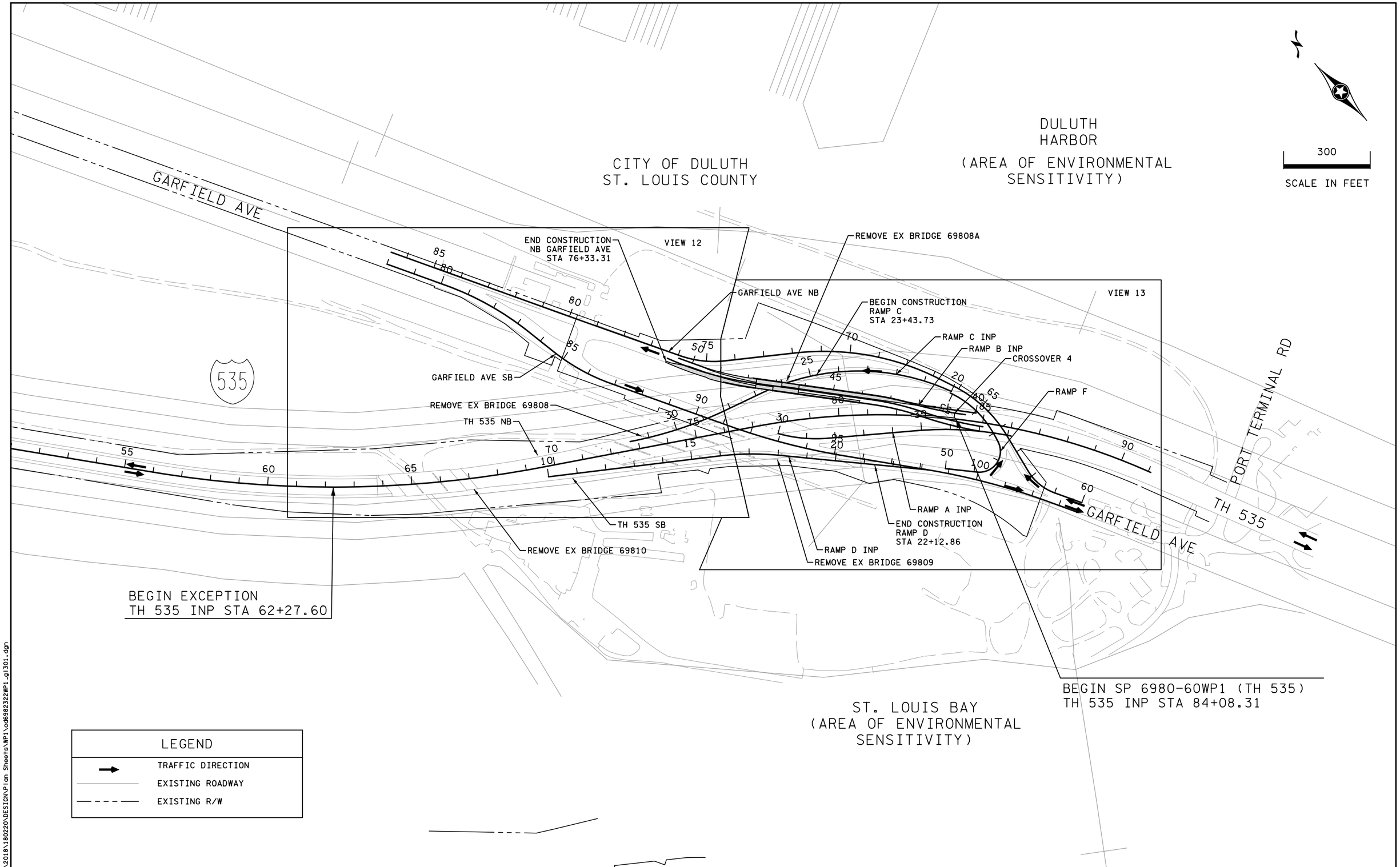

LEGEND	
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— — — —	EXISTING R/W

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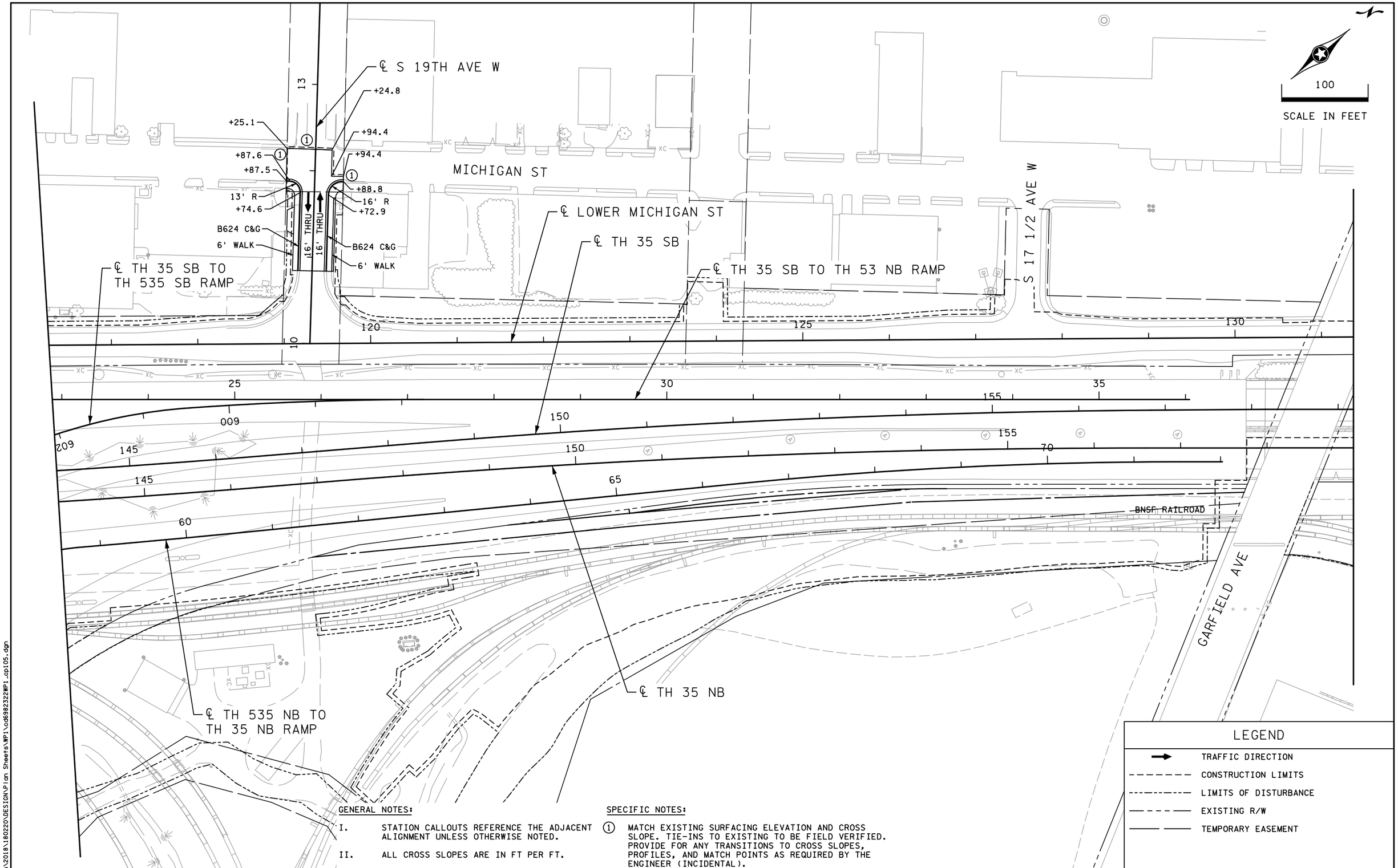
GENERAL LAYOUT
SEGMENT 3

SP 6982-322WP1 (TH 35)

SHEET NO. 3 OF 862 SHEETS



GENERAL NOTES:

I. STATION CALLOUTS REFERENCE THE ADJACENT ALIGNMENT UNLESS OTHERWISE NOTED.

II. ALL CROSS SLOPES ARE IN FT PER FT.

SPECIFIC NOTES:

1 MATCH EXISTING SURFACING ELEVATION AND CROSS SLOPE. TIE-INS TO EXISTING TO BE FIELD VERIFIED. PROVIDE FOR ANY TRANSITIONS TO CROSS SLOPES, PROFILES, AND MATCH POINTS AS REQUIRED BY THE ENGINEER (INCIDENTAL).

NO	DATE	DWN	CKD	REVISIONS

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CONSTRUCTION PLAN

TH 35 NB STA 144+00 TO STA 159+00

SP 6982-322WP1 (TH 35)

SHEET NO. 328 OF 862 SHEETS

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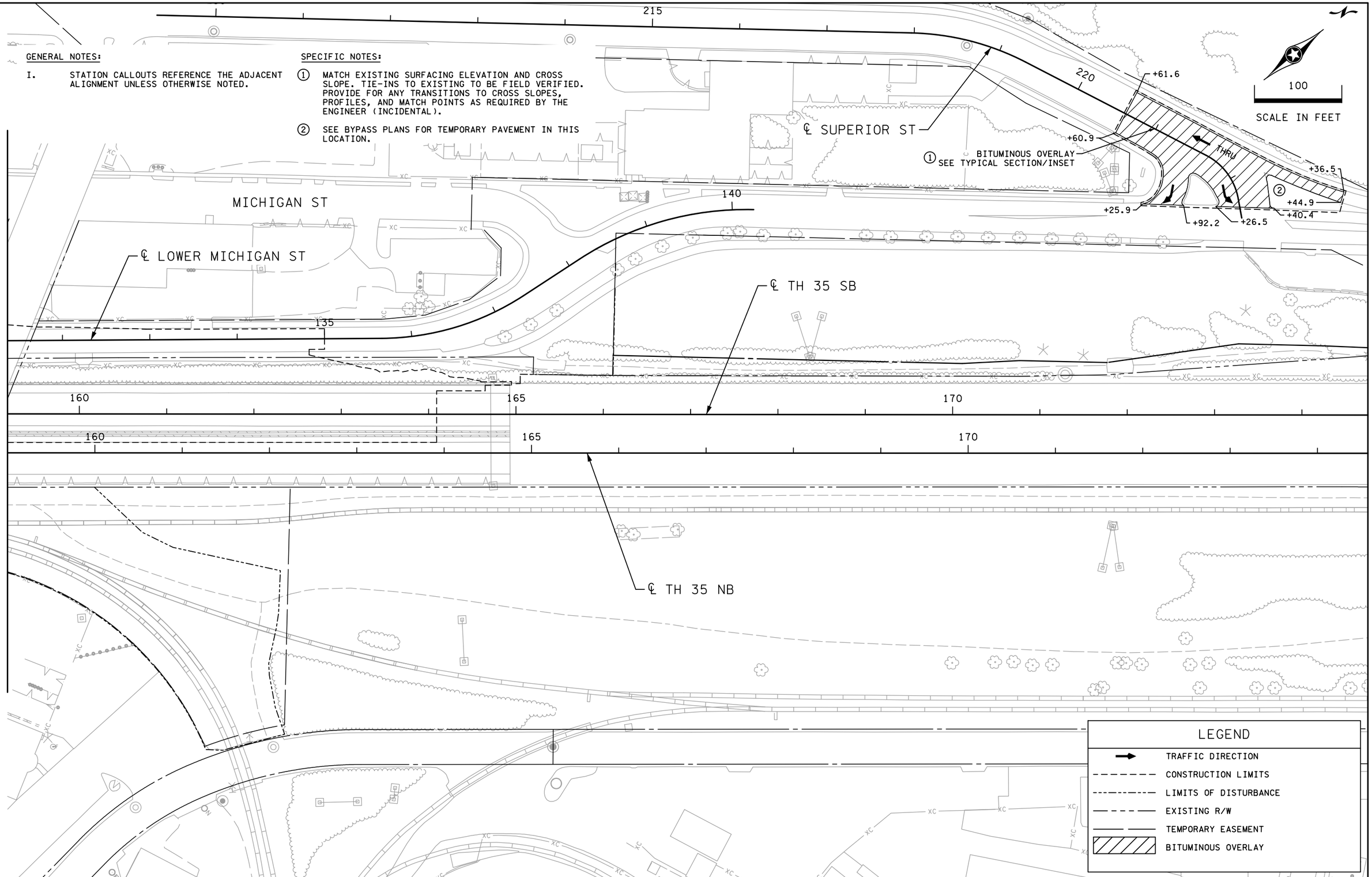
GENERAL NOTES:

I. STATION CALLOUTS REFERENCE THE ADJACENT ALIGNMENT UNLESS OTHERWISE NOTED.

SPECIFIC NOTES:

1. MATCH EXISTING SURFACING ELEVATION AND CROSS SLOPE. TIE-INS TO EXISTING TO BE FIELD VERIFIED. PROVIDE FOR ANY TRANSITIONS TO CROSS SLOPES, PROFILES, AND MATCH POINTS AS REQUIRED BY THE ENGINEER (INCIDENTAL).

2. SEE BYPASS PLANS FOR TEMPORARY PAVEMENT IN THIS LOCATION.



LEGEND

- TRAFFIC DIRECTION
- CONSTRUCTION LIMITS
- LIMITS OF DISTURBANCE
- EXISTING R/W
- TEMPORARY EASEMENT
- BITUMINOUS OVERLAY

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CONSTRUCTION PLAN

TH 35 NB STA 159+00 TO STA 174+58

SP 6982-322WP1 (TH 35)

SHEET NO. 329 OF 862 SHEETS

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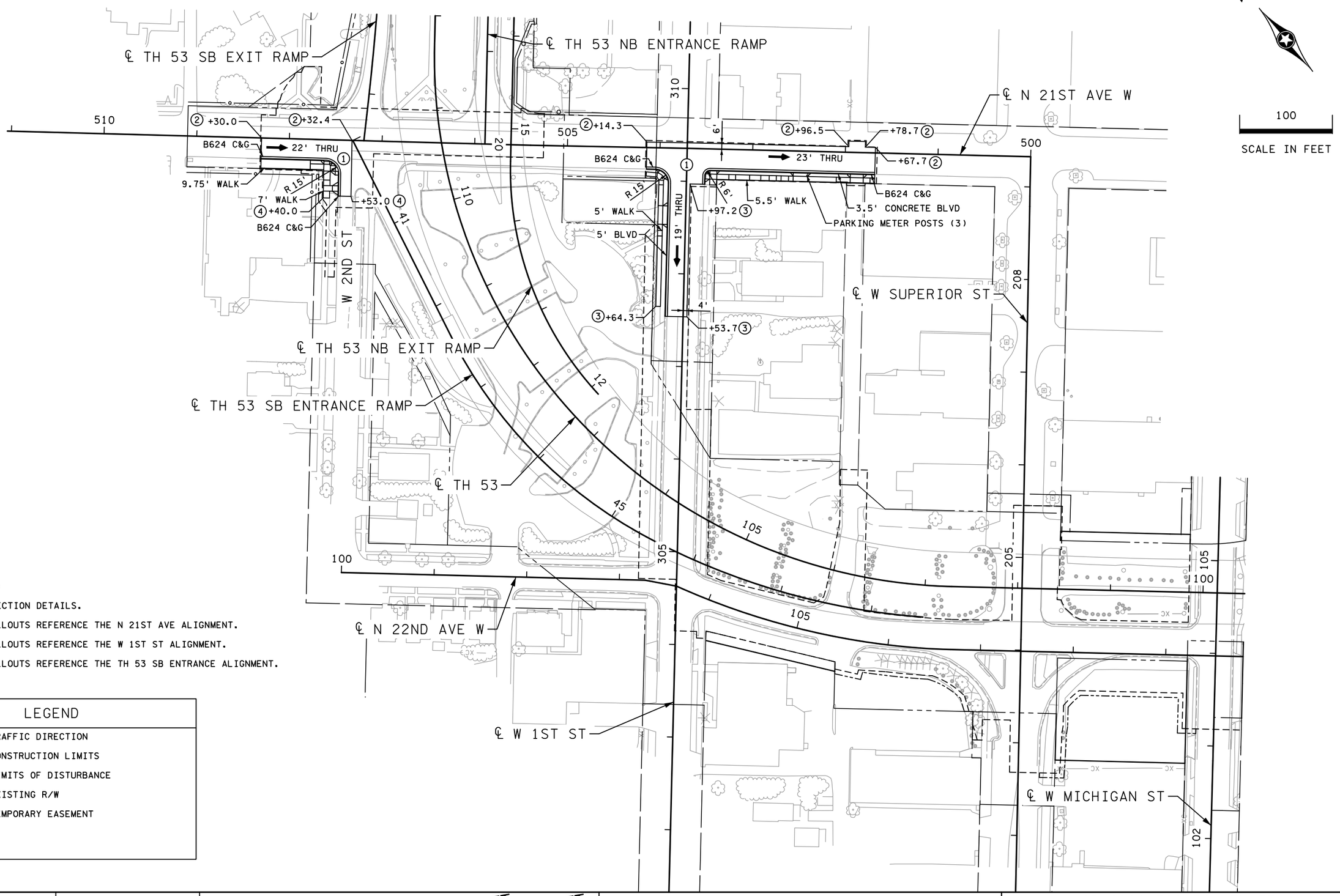

SPECIFIC NOTES:

1. SEE INTERSECTION DETAILS.
2. STATION CALLOUTS REFERENCE THE N 21ST AVE ALIGNMENT.
3. STATION CALLOUTS REFERENCE THE W 1ST ST ALIGNMENT.
4. STATION CALLOUTS REFERENCE THE TH 53 SB ENTRANCE ALIGNMENT.

LEGEND	
→	TRAFFIC DIRECTION
- - - - - - -	CONSTRUCTION LIMITS
-·-·-·-·-	LIMITS OF DISTURBANCE
— - - - —	EXISTING R/W
——— ———	TEMPORARY EASEMENT

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ISTHMUS ENGINEERING

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CONSTRUCTION PLAN
LOCAL ROADS (TH 53 STA 99+55 TO STA 112+00)

SP 6982-322WP1 (TH 35)

SHEET NO. 330 OF 862 SHEETS

GENERAL NOTES:

I. STATION CALLOUTS REFERENCE THE ADJACENT ALIGNMENT UNLESS OTHERWISE NOTED.

SPECIFIC NOTES:

① MATCH EXISTING SURFACING ELEVATION AND CROSS SLOPE. TIE-INS TO EXISTING TO BE FIELD VERIFIED. PROVIDE FOR ANY TRANSITIONS TO CROSS SLOPES, PROFILES, AND MATCH POINTS AS REQUIRED BY THE ENGINEER (INCIDENTAL).

② MATCH INPLACE WALK

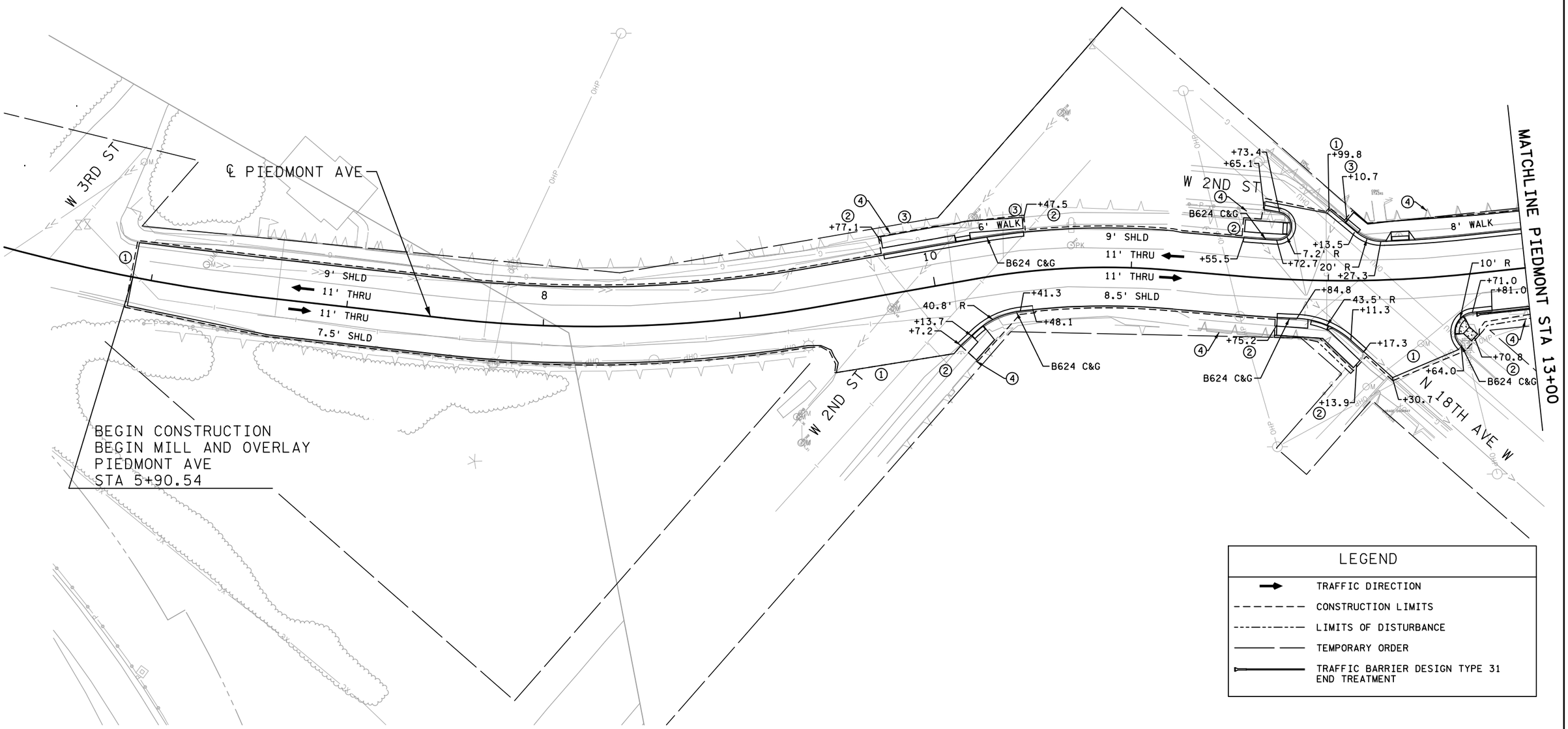
③ MATCH INPLACE STEPS

④ AREA OF ENVIRONMENTAL SENSITIVITY

N

50

SCALE IN FEET



LEGEND

➡	TRAFFIC DIRECTION
- - - - - - -	CONSTRUCTION LIMITS
- - - - - - - -	LIMITS OF DISTURBANCE
——— ———	TEMPORARY ORDER
▷———	TRAFFIC BARRIER DESIGN TYPE 31 END TREATMENT

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NO	DATE	DWN	CKD	REVISIONS

Kimley»Horn

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PRINT NAME:
SIGNATURE:
DATE LICENSE #

DRAFT COPY DRAFT COPY

CONSTRUCTION PLAN

PIEDMONT AVE STA 5+90 TO STA 13+00

SP 6982-322WP1 (TH 35)

SHEET NO. 331 OF 862 SHEETS

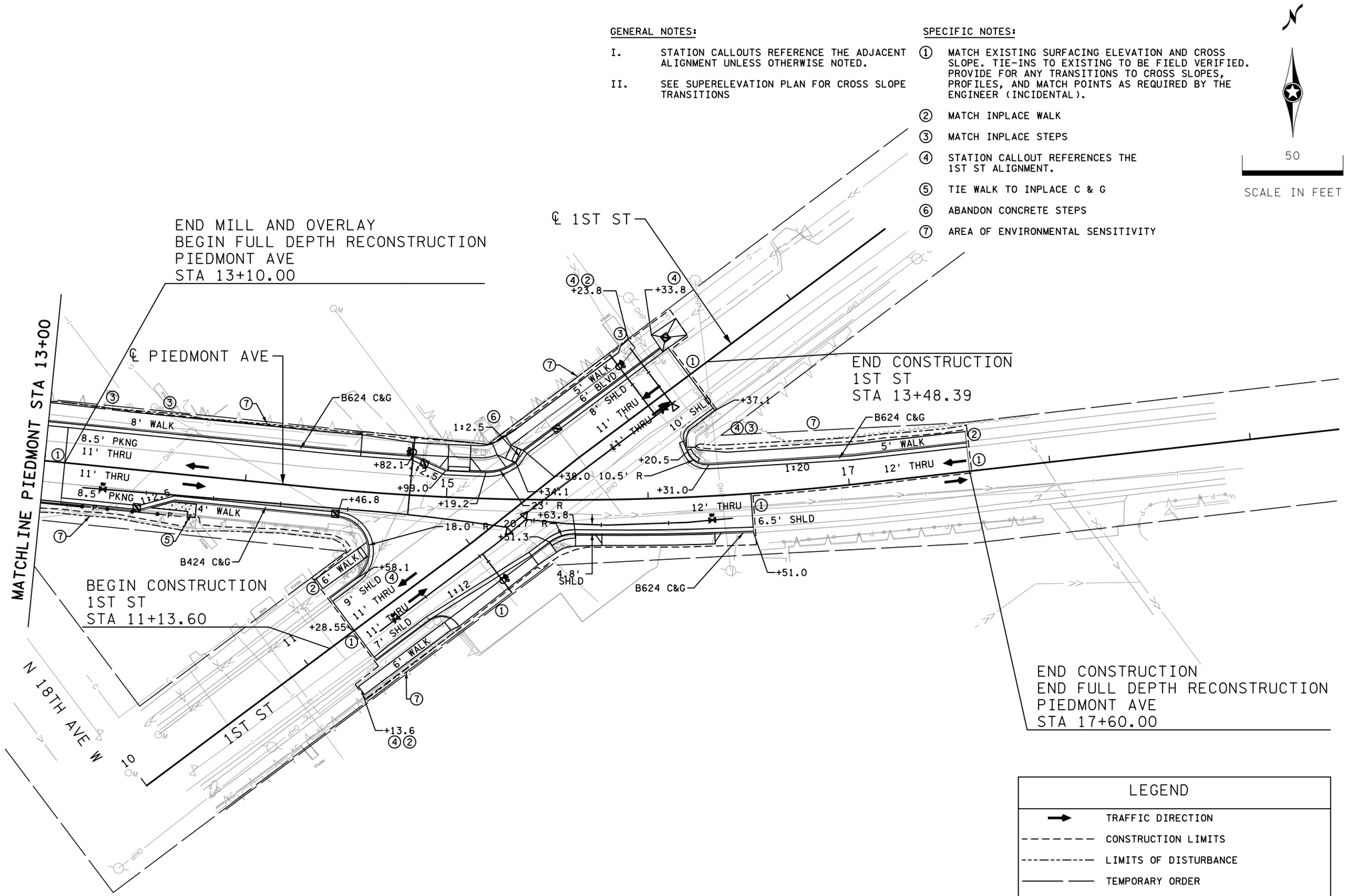
GENERAL NOTES:

I. STATION CALLOUTS REFERENCE THE ADJACENT ALIGNMENT UNLESS OTHERWISE NOTED.

II. SEE SUPERELEVATION PLAN FOR CROSS SLOPE TRANSITIONS

SPECIFIC NOTES:

1. MATCH EXISTING SURFACING ELEVATION AND CROSS SLOPE. TIE-INS TO EXISTING TO BE FIELD VERIFIED. PROVIDE FOR ANY TRANSITIONS TO CROSS SLOPES, PROFILES, AND MATCH POINTS AS REQUIRED BY THE ENGINEER (INCIDENTAL).
2. MATCH INPLACE WALK
3. MATCH INPLACE STEPS
4. STATION CALLOUT REFERENCES THE 1ST ST ALIGNMENT.
5. TIE WALK TO INPLACE C & G
6. ABANDON CONCRETE STEPS
7. AREA OF ENVIRONMENTAL SENSITIVITY



LEGEND

➡	TRAFFIC DIRECTION
- - - - - - -	CONSTRUCTION LIMITS
- - - - - - -	LIMITS OF DISTURBANCE
——— ———	TEMPORARY ORDER
•—P—•—•—	TRAFFIC BARRIER DESIGN TYPE 31
▨	PROPOSED DRAINAGE STRUCTURE

11:06:30 AM
10/30/2019
...\CD6982322WP1_cp402.dgn

NO	DATE	DWN	CKD	REVISIONS

Kimley»Horn

I HEREBY CERTIFY THAT THIS SHEET WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME: DRAFT COPY
SIGNATURE: DRAFT COPY
DATE _____ LICENSE #

CONSTRUCTION PLAN

PIEDMONT AVE STA 13+00 TO STA 17+60 / 1ST ST 11+13 TO 13+48

SP 6982-322WP1 (TH 35)

SHEET NO. 332 OF 862 SHEETS

Appendix B

2019 Work Package 1 Phase II ESA Soil Analytical Results

Table 2
Soil Analytical Results

Phase II Environmental Site Assessment
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

					Borings are ordered by Area:	27th Ave W Bridge Replacement																						
Boring ID	Units	*2014 Screening SLV*	20xTCLP level	Tier 1 Residential SRV	**Tier 2 Industrial SRV**	GP-119	GP-119	GP-119	GP-103	GP-103	GP-102	GP-102	GP-105	GP-105	GP-104	GP-340	GP-340	GP-340	GP-340	GP-340	GP-128	GP-128	GP-128	GP-127	GP-127	GP-127	GP-129	GP-129
Field Sample ID						GP-119-3	GP-119-7	GP-119-12	GP-103-4	GP-103-8	GP-102-4	GP-102-14	GP-105-3	GP-105-8	GP-104-3	GP-340-1	GP-340-8.5	GP-340-10.5	GP-340-8.5	GP-340-10.5	GP-128-2.5	GP-128-7	GP-128-15	GP-127-1.5	GP-127-7	GP-127-20	GP-129-3	GP-129-7
Laboratory ID						10448309001	10448309002	10448309003	10442788007	10442788008	10442788009	10442788010	10484853018	10484853019	10484853015	10475634001	10475634002	10475634003	10479612004	10479612005	10448151020	10448151021	10448151022	10448620001	10448620002	10448620003	10448620004	10448620005
Sample Date						9/19/2018	9/19/2018	9/19/2018	8/8/2018	8/8/2018	8/8/2018	8/8/2018	7/25/2019	7/25/2019	7/25/2019	5/20/2019	5/20/2019	5/20/2019	6/17/2019	6/17/2019	9/19/2018	9/19/2018	9/19/2018	9/21/2018	9/21/2018	9/21/2018	9/21/2018	9/21/2018
DRO and GRO																												
Diesel Range Organics	mg/kg	The MPCA Unregulated Fill Criteria for DRO and GRO is <100 mg/kg				<8.6	<9	<10.9	24.6 (T6)	23.4 (T6)	38.0 (T6)	<11.1	<9.1	<9.9	<9.4	NM	30.5 (T7,T6)	25.9 (T7,T6)	NM	NM	<8.6	<9.5	<11	<10.1	27.0 (T6)	<11	<10.1	47.0 (T6)
Gasoline Range Organics	mg/kg					<11.3	<11.8	<15.4	<13.8	<11.6	<12.9	<13.3	<6.3	<6.1	<5.9	<11.9	<13.1 (G+)	<12.4	NM	NM	<11.7	11.7 (C0,M1)	<15.3	<11.8	<14.9	<14.6	<12.3	<15.8
WDRO C10-C28 Silica Gel	mg/kg					NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	14.2 (T6)	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Metals																												
Antimony	mg/kg	5.4	NE	12	100	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Arsenic	mg/kg	5.8	100	9	20	1.3	1.4	2.8	*7.2*	3.4	*<5.9 (D3)*	3.5	<1.2	2.1	2.3	1.2	3.1	3.3	NM	NM	1.9	2.2	3.0	3.5 (M1)	3.1	*<7.2 (D3)*	1.5	3.9
Barium	mg/kg	1700	2000	1100	18000	7.2	7.0	115	199	102	167	117	6.1	17.8	25.4	10.0	113	99	NM	NM	34.7	58.8	146	105 (M1)	148	176	21.8	166
Beryllium	mg/kg	2.7	NE	55	230	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium	mg/kg	8.8	20	25	200	<0.15	<0.15	<0.2	0.3	<0.17	<0.88 (D3)	<0.19	<0.18	<0.17	<0.17	<0.17	<0.17	0.18	NM	NM	<0.15	<0.17	<0.2	0.21	0.21	<1.1 (D3)	<0.17	0.28
Chromium	mg/kg	36	100	87	650	4.2	4.0	33.9	*36.4*	29.2	*45.7*	32.7	4.4	9.6	14.5	6.6	30.8	24.8	NM	NM	11.5	22	*36.9*	24.6	31.5	*47.2*	7	35.1
Copper	mg/kg	700	NE	100	9000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Lead	mg/kg	2700	100	300	700	1.7	1.5	6.1	170	76.5	31.9	6.8	1.5	2.9	3.6	4.8	19.8	50.0	NM	NM	7.7	52.5	7.4	35.4 (M1)	49.8	13.4	2.4	66.7
Mercury	mg/kg	3.3	4	0.5	1.5	<0.018	<0.02	<0.024	0.11	0.14	0.064	<0.024	<0.022	<0.023	<0.022	NM	NM	NM	0.041	0.051	0.02	0.027	0.026	0.052	0.066	0.035	<0.024	0.069
Nickel	mg/kg	180	NE	560	2500	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Selenium	mg/kg	2.6	20	160	1300	<1	<1	<1.4	<1.2	<1.1	*<5.9 (D3)*	<1.3	<1.2	<1.1	<1.1	<1.1	<1.2	<1.2	NM	NM	<0.99	<1.1	<1.3	<1.1 (M1)	<1.2	*<7.2 (D3)*	<1.1	<1.2
Silver	mg/kg	7.9	100	160	1300	<0.52	<0.51	<0.68	<0.62	<0.57	<2.9 (D3)	<0.63	<0.6	<0.57	<0.57	<0.55	<0.58	<0.6	NM	NM	<0.49	<0.55	<0.66	<0.54	<0.6	<3.6 (D3)	<0.57	<0.59
Zinc	mg/kg	3000	NE	8700	75000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TCLP Metals																												
Lead TCLP	mg/L	5 mg/L TCLP Lead hazardous limit				NM	NM	NM	0.113	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Mercury TCLP	mg/L	0.2 mg/L TCLP Mercury hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium TCLP	mg/L	1.0 mg/L TCLP Cadmium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Chromium TCLP	mg/L	5.0 mg/L TCLP Chromium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
PCBs																												
PCBs (Polychlorinated Biphenyls)	mg/kg	NE	NE	1.2	8	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Herbicides and Pesticides																												
2,4-D	mg/kg	0.5	200	0.5	0.5	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Triclopyr	mg/kg	0.3	NE	0.3	0.3	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Semi-VOCs																												
1-Methylnaphthalene	mg/kg	NE	NE	NE	NE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<0.38	<0.42	<0.4	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2,4-Dinitrotoluene	mg/kg	0.013	2.6	50	355	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	*<0.38*	*<0.42*	*<0.4*	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2-Methylnaphthalene	mg/kg	NE	NE	100	369	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<0.38	<0.42	<0.4	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Acenaphthene	mg/kg	81	NE	1200	5260	<0.01	<0.011	<0.014	<0.063	0.097	<0.012	<0.014	<0.013	<0.012	<0.012	<0.38	<0.42	<0.4	NM	NM	<0.011	<0.059	<0.014	<0.012	<0.012	<0.015	<0.012	0.028
Acenaphthylene	mg/kg	NE	NE	NE	NE	<0.01	<0.011	<0.014	<0.063	0.016	<0.012	<0.014	<0.013	<0.012	<0.012	<0.38	<0.42	<0.4	NM	NM	<0.011	<0.059	<0.014	<0.012	0.031	<0.015	<0.012	0.045
Anthracene	mg/kg	1300	NE	7880	45400	<0.01	<0.011	<0.014	0.1	0.28	0.032	<0.014	<0.013	<0.012	<0.012	<0.38	<0.42	<0.4	NM	NM	0.016	<0.059	<0.014	<0.012	0.063	<0.015	<0.012	0.13
Benz(a)anthracene	mg/kg	NE	NE	NE	NE	<0.01	<0.011	<0.014	0.34	0.94	0.14	<0.014	<0.013	<0.012	<0.012	<0.38	<0.42	<0.4	NM	NM	0.057	0.14	<0.014	<0.012	0.22	<0.015	<0.012	0.32
Benzo(a)pyrene	mg/kg	1.4	NE	2	3	<0.01	<0.011	<0.014	0.34	0.81	0.13	<0.014	<0.013	<0.012	<0.012	<0.38	<0.42	<0.4	NM	NM	0.058	0.14	<0.014	<0.012	0.24	<0.015	<0.012	0.33
Benzo(b)fluoranthene	mg/kg	NE	NE	NE	NE	<0.01	<0.011	<0.014	0.42	0.95	0.14	<0.014	<0.013	<0.012	<0.012	<0.38	<0.42	<0.4	NM	NM	0.079	0.20	<0.014	<0.012	0.30	<0.015	<0.012	0.34
Benzo(g,h,i)perylene	mg/kg	NE	NE	NE	NE	<0.01	<0.011	<0.014	0.19	0.24	0.071	<0.014	<0.013	<0.012	<0.012	<0.38	<0.42	<0.4	NM	NM	0.042	0.094	<0.014	<0.012	0.16	<0.015	<0.012	0.19
Benzo(k)fluoranthene	mg/kg	NE	NE	NE	NE	<0.01	<0.011	<0.014	0.14	0.18	0.051	<0.014	<0.013	<0.012	<0.012	<0.38	<0.42	<0.4	NM	NM	0.032	0.067	<0.014	<0.012	0.14	<0.015	<0.012	0.17
Carbazole	mg/kg	NE	NE	700	1310	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<0.38	<0.42	<0.4	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Chrysene	mg/kg	NE	NE	NE	NE	<0.01	<0.011	<0.014	0.28	0.84	0.12	<0.014	<0.013	<0.012	<0.012	<0.38	<0.42	<0.4	NM	NM	0.043	0.13	<0.014	<0.012	0.23	<0.015	<0.012	0.31
Dibenz(a,h)anthracene	mg/kg	NE	NE	NE	NE	<0.01	<0.011	<0.014	<0.063	0.062	0.018	<0.014	<0.013	<0.012	<0.012	<0.38	<0.42	<0.4	NM	NM	0.013	<0.059	<0.014	<0.012	0.051	<0.015	<0.012	0.062
Dibenzofuran	mg/kg	NE	NE	104	810	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<0.38	<0.42	<0.4	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Fluoranthene	mg/kg	670	NE	1080	6800	<0.01	<0.011	<0.014	0.59	2.0	0.25	<0.014	<0.013	<0.012	<0.012	<0.38	<0.42	0.62	NM	NM	0.091	0.27	<0.014	<0.012	0.41	<0.015	<0.012	0.59
Fluorene	mg/kg	110	NE	850	4120	<0.01	<0.011	<0.014	<0.063	0.12	<0.012	<0.014	<0.013	<0.012	<0.012	<0.38	<0.42	<0.4	NM	NM	<0.011	<0.059	<0.014	<0.012	0.013	<0.015	<0.012	0.034
Indeno(1,2,3-cd)pyrene	mg/kg	NE	NE	NE	NE	<0.01	<0.011	<0.014	0.17	0.18	0.058	<0.014	<0.013	<0.012	<0.012	<0.38	<0.42	<0.4	NM	NM	0.034	0.074	<0.014	<0.012	0.14	<0.015	<0.012	0.16
Naphthalene	mg/kg	NE	NE	NE	NE	<0.01	<0.011	<0.014	<0.063	0.034	<0.012	<0.014	<0.013	<0.012	<0.012	<0.38	<0.42	<0.4	NM	NM	<0.011	<0.059	<0.014	<0.012	0.017	<0.015	<0.012	0.029
Phenanthrene	mg/kg	NE	NE	NE	NE	<0.01	<0.011	<0.014	0.31	1.9	0.13	<0.014	<0.013	<0.012	<0.012	<0.38	<0.42	<0.4	NM	NM	0.035	0.13	<0.014	<0.012	0.18	<0.015	<0.012	0.40
Pyrene	mg/kg	440	NE	890	5800	<0.01	<0.011	<0.014	0.55	2.0	0.28	<0.014	<0.013	<0.012	<0.012	<0.38	<0.42	0.53	NM	NM	0.084	0.23	<0.014	<0.012	0.36	<0.015	<0.012	0.52
BaP Equivalents																												
Benzo(a)pyrene Equivalents	mg/kg	1.4	NE	2	3	<0	<0	<0	0.45	1.08	0.18	<0	<0	<0	<0	<0	<0	<0	NM	NM	0.086	0.19	<0	<0	0.35	<0	<0	0.47
VOCs																												
1,2,4-Trimethylbenzene	mg/kg	2.7	NE	8	25	<0.056	<0.057	<0.07	<0.069	<0.058	<0.063	<0.069	<0.064	<0.068	<0.059	<0.056	0.072	<0.058	NM	NM	<0.054	<0.061	<0.072	<0.062	<0.066	<0.077	<0.06	<0.067
1,3,5-Trimethylbenzene	mg/kg	2.7	NE	3	10	<0.056	<0.057	<0.07	<0.069	<0.058	<0.063	<0.069	<0.064	<0.068	<0.059	<0.056	<0.064	<0.058	NM	NM	<0.054	<0.061	<0.072	<0.062	<0.066	<0.077	<0.06	<0.067
Benzene	mg/kg	0.017	10	6	10	*<0.022*	*<0.023*	*<0.028*	*<0.027*	*<0.023*	*<0.025*	*<0.028*	*<0.025*	*<0.027*	*<0.023*	*<0.022*	*<0.026*	*<0.023*	NM	NM	*<0.022*	*<0.024*	*<0.029*	*<0.025*	*<0.026*	*<0.031*	*<0.024*	*0.031*
Chlorobenzene	mg/kg	1.2	2000	11	32	<0.056	<0.057	<0.07	<0.069	<0.058	<0.063	<0.069	<0.064	<0.068	<0.059	<0.056	<0.064	<0.058	NM	NM	<0.054	<0.061	<0.072	<0.062	<0.066	<0.077	<0.06	<0.067
Diethyl Ether	mg/kg	0.51	NE	NE	NE	<0.22	<0.23	<0.28	<0.27	<0.23	<0.25	<0.28	<0.25	<0.27	<0.23	<0.22	<0.26	<0.23	NM	NM	<0.22	<0.24	<0.29	<0.25	<0.26	<0.31	<0.24	<0.27
Ethylbenzene	mg/kg	1.1	NE	200	200	<0.056	<0.057	<0.07	<0.069	<0.058	<0.063	<0.069	<0.064	<0.068	<0.059	<0.056	<0.064	<0.058	NM	NM	<0.054	<0.061	<0.072	<0.062	<0.066	<0.077	<0.06	<0.067
Isopropylbenzene	mg/kg	9.5	NE	30	87	<0.056	<0.057	<0.07	<0.069	<0.058	<0.063	<0.069	<0.064	<0.068	<0.059	<0.056	<0.064	<0.058	NM	NM	<0.054	<0.061	<0.072	<0.062	<0.066	<0.077	<0.06	<0.067
Naphthalene	mg/kg	4.5	NE	10	28	<0.22	<0.23	<0.28	<0.27	<0.23	<0.25	<0.28	<0.25	<0.27	<0.23	<0.22	<0.26	<0.23	NM	NM	<0.22	<0.24	<0.29	<0.25	<0.26	<0.31	<0.24	<0.27
n-Butylbenzene	mg/kg	NE	NE	30	92	<0.056	<0.057	<0.07	<0.069	<0.058	<0.063	<0.069	<0.064	<0.068	<0.059	<0.056	<0.064	<0.058	NM	NM	<0.054	<0.061	<0.072	<0.062	<0.066	<0.077	<0.06	<0.067
n-Propylbenzene	mg/kg	NE	NE	30	93	<0.056	<0.057	<0.07	<0.069	<0.058	<0.063	<0.069	<0.064	<0.068	<0.059	<0.056	<0.064	<0.058	NM	NM	<0.054	<0.061	<0.072	<0.062	<0.066	<0.077	<0.06	<0.067
p-Isopropyltoluene	mg/kg	NE	NE	NE	NE	<0.056	<0.057	<0.07	<0.069	<0.058	<0.063	<0.069	<0.064	<0.068	<0.059	<0.056	<0.064	0.11	NM	NM	<0.054	<0.061	<0.072	<0.062	<0.066	<0.077	<0.06	0.094
sec-Butylbenzene	mg/kg	NE	NE	25	70	<0.056	<0.057	<0.07	<0.069	<0.058	<0.063	<0.069	<0.064	<0.068	<0.059	<0.056	<0.064	<0.058	NM	NM	<0.054	<0.061	<0.072	<0.062	<0.066	<0.077	<0.06	<0.067
tert-Butylbenzene	mg/kg	NE	NE	30	90	<0.056	<0.057	<0.07	<0.069	<0.058	<0.063	<0.069	<0.064	<0.068	<0.059	<0.056	<0.064	<0.058	NM	NM	<0.054	<0.061	<0.072	<0.062	<0.066	<0.077	<0.06	<0.067
Tetrachloroethene	mg/kg	0.042	14	72	131	*<0.056*	*<0.057*	*<0.07*	*<0.069*	*<0.058*	*<0.063*	*<0.069*	*<0.064*	*<0.068*	*<0.059*	*<0.056*	*<0.064*	*<0.058*	NM	NM	*<0.054*	*<0.061*	*<0.072*	*<0.062*	*<0.066*	*<0.077*	*<0.06*	*<0.067*
Toluene	mg/kg	2.5	NE	107	305	<0.056	<0.057	<0.07	<0.069	<0.058	<0.063	<0.069	<0.064	<0.068	<0.059	<0.056	0.079	<0.058	NM	NM	<0.054	<0.061	<0.072	<0.062	<0.066	<0.077	<0.06	0.072
Trichloroethene	mg/kg	0.0023	10	29	46	*<0.056*	*<0.057*	*<0.07*	*<0.069*	*<0.058*	*<0.063*	*<0.069*	*<0.064*	*<0.068*	*<0.059*	*<0.056*	*<0.064*	*<0.058*	NM	NM	*<0.054*	*<0.061*	*<0.072*	*<0.062*	*<0.066*	*<0.077*	*<0.06*	*<0.067*
Xylene (Total)	mg/kg	5.4	NE	45	130	<0.17	<0.17	<0.21	<0.21	<0.17	<0.19	<0.21	<0.19	<0.2	<0.18	<0.17	<0.19	<0.17	NM	NM	<0.16	<0.18	<0.22	<0.19	<0.2	<0.23	<0.18	<0.2

Notes:

A full list of abbreviations is included in the table glossary

Table 2
Soil Analytical Results

Phase II Environmental Site Assessment
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

				Borings are ordered by Area:		27th Ave W Bridge Replacement						I-35 Profile Correction													
Boring ID	Units	2014 Screening SLV	20xTCLP level	Tier 1 Residential SRV	Tier 2 Industrial SRV	GP-130	GP-130	GP-130	GP-131	GP-131	GP-131	GP-133	GP-133	GP-134	GP-134	GP-137	GP-137	GP-140	GP-140	GP-141	GP-141	GP-143	GP-143	GP-145	GP-145
Field Sample ID						GP-130-2.5	GP-130-12	GP-130-20	GP-131-2	GP-131-11	GP-131-25	GP-133-3	GP-133-8	GP-134-3.5	GP-134-13	GP-137-3	GP-137-10	GP-140-4	GP-140-13	GP-141-3	GP-141-11	GP-143-1	GP-143-8	GP-145-2.5	GP-145-14
Laboratory ID						10448620006	10448620007	10448620012	10448620008	10448620009	10448620010	10452340007	10452340008	10452340004	10452340005	10452149006	10452149007	10452149008	10452149009	10452149010	10452149011	10452149012	10452149013	10448151018	10448151019
Sample Date						9/21/2018	9/21/2018	9/21/2018	9/21/2018	9/21/2018	9/21/2018	10/18/2018	10/18/2018	10/18/2018	10/18/2018	10/17/2018	10/17/2018	10/17/2018	10/17/2018	10/17/2018	10/17/2018	10/17/2018	10/17/2018	9/19/2018	9/19/2018
DRO and GRO																									
Diesel Range Organics	mg/kg	The MPCA Unregulated Fill Criteria for DRO and GRO is <100 mg/kg				<9.5	62.6 (T6)	<11.3	142 (T6)	54.3 (T6)	<10.8	<10.1	<8.9	<8.8	<9.3	<8.7	<8.9	<8.6	<9	<8.8	<9.8	17.3 (T7,T6)	<8.8	46.0 (T6)	<8.8
Gasoline Range Organics	mg/kg					<13.1	<13.1	<15.3	<11.3	<14.2	<14.2	<13.5	<12.2	<11.3	<12.5	<10.5	<12	<11.1	<11.5	<11.4	<12.4	<10.9	<12.2	<12	<11.5
WDRO C10-C28 Silica Gel	mg/kg					NM	NM	NM	87.4 (T6)	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Metals																									
Antimony	mg/kg	5.4	NE	12	100	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Arsenic	mg/kg	5.8	100	9	20	<1.1	<5.8 (D3)	<6.8 (D3)	2.6	4.1	3.3	4	2.6	2.0	2.0	1.6	2.5	2.5	2.8	2.5	2.3	2.8	2.4	2.4	2.4
Barium	mg/kg	1700	2000	1100	18000	10.4	154	211	80.7	156	168	137	93.8	34.7	29.9	26	46.6	47.6	43	40.5	31.3	46.9	28.7	82.2	68.4
Beryllium	mg/kg	2.7	NE	55	230	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium	mg/kg	8.8	20	25	200	0.24	<0.87 (D3)	<1 (D3)	<0.17	0.51	<0.21	0.19	<0.16	<0.17	<0.18	<0.15	<0.16	<0.15	<0.16	<0.16	<0.16	<0.15	<0.15	<0.16	0.17
Chromium	mg/kg	36	100	87	650	7.4	42.8	41.6	19.9	29.2	36.3	23.5	20.3	10.3	11.8	11.9	15.5	18.5	14.9	13.6	14.4	16.3	16.1	18.8	18.6
Copper	mg/kg	700	NE	100	9000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Lead	mg/kg	2700	100	300	700	7.5	114	10.7	18.2	102	8.1	80.7	6.1	4.3	3.2	2.6	6.1	4.0	8.2	19.8	3.8	8.8	3.1	15.4	26.3
Mercury	mg/kg	3.3	4	0.5	1.5	<0.022	0.038	<0.025	0.050	0.28	<0.026	0.10	<0.023	<0.023	<0.023	<0.02	<0.021	<0.02	<0.02	<0.02	<0.024	<0.021	<0.022	0.018	0.031
Nickel	mg/kg	180	NE	560	2500	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Selenium	mg/kg	2.6	20	160	1300	<1.1	<5.8 (D3)	<6.8 (D3)	<1.1	<1.4	<1.4	<1.1	<1.1	<1.1	<1.2	<1	<1.1	<1	<1	<1	<1.1	<1	<1	<1	<1.1
Silver	mg/kg	7.9	100	160	1300	<0.55	<2.9 (D3)	<3.4 (D3)	<0.57	<0.68	<0.69	<0.56	<0.54	<0.57	<0.58	<0.5	<0.55	<0.5	<0.52	<0.52	<0.55	<0.51	<0.51	<0.52	<0.53
Zinc	mg/kg	3000	NE	8700	75000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TCLP Metals																									
Lead TCLP	mg/L	5 mg/L TCLP Lead hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Mercury TCLP	mg/L	0.2 mg/L TCLP Mercury hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium TCLP	mg/L	1.0 mg/L TCLP Cadmium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Chromium TCLP	mg/L	5.0 mg/L TCLP Chromium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
PCBs																									
PCBs (Polychlorinated Biphenyls)	mg/kg	NE	NE	1.2	8	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	BRL	NM	NM	NM	NM	NM	NM
Herbicides and Pesticides																									
2,4-D	mg/kg	0.5	200	0.5	0.5	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Triclopyr	mg/kg	0.3	NE	0.3	0.3	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Semi-VOCs																									
1-Methylnaphthalene	mg/kg	NE	NE	NE	NE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<0.36	NM	NM	NM	NM	NM	NM
2,4-Dinitrotoluene	mg/kg	0.013	2.6	50	355	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<0.36	NM	NM	NM	NM	NM	NM
2-Methylnaphthalene	mg/kg	NE	NE	100	369	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<0.36	NM	NM	NM	NM	NM	NM
Acenaphthene	mg/kg	81	NE	1200	5260	<0.012	<0.012	<0.014	0.037	<0.069	<0.014	<0.012	<0.012	<0.011	<0.012	<0.01	<0.011	<0.011	<0.36	<0.011	<0.012	<0.011	<0.011	<0.011	<0.011
Acenaphthylene	mg/kg	NE	NE	NE	NE	<0.012	<0.012	<0.014	<0.011	<0.069	<0.014	0.032	<0.012	<0.011	<0.012	<0.01	<0.011	<0.011	<0.36	<0.011	<0.012	<0.011	<0.011	<0.011	<0.011
Anthracene	mg/kg	1300	NE	7880	45400	<0.012	<0.012	<0.014	0.097	0.087	<0.014	0.052	<0.012	<0.011	<0.012	<0.01	<0.011	<0.011	<0.36	<0.011	<0.012	<0.011	<0.011	<0.011	<0.011
Benz(a)anthracene	mg/kg	NE	NE	NE	NE	<0.012	0.028	<0.014	0.27	0.34	<0.014	0.20	<0.012	<0.011	<0.012	<0.01	0.014	<0.011	<0.36	0.033	0.023	0.019	<0.011	0.011	0.026
Benzo(a)pyrene	mg/kg	1.4	NE	2	3	<0.012	0.033	<0.014	0.29	0.35	<0.014	0.19	<0.012	<0.011	<0.012	<0.01	0.014	<0.011	<0.36	0.032	0.024	0.021	<0.011	<0.011	0.032
Benzo(b)fluoranthene	mg/kg	NE	NE	NE	NE	<0.012	0.035	<0.014	0.36	0.39	<0.014	0.25	<0.012	<0.011	<0.012	<0.01	0.017	<0.011	<0.36	0.038	0.029	0.031	<0.011	0.014	0.041
Benzo(g,h,i)perylene	mg/kg	NE	NE	NE	NE	<0.012	0.022	<0.014	0.19	0.20	<0.014	0.15	<0.012	<0.011	<0.012	<0.01	<0.011	<0.011	<0.36	0.021	0.017	0.019	<0.011	<0.011	0.022
Benzo(k)fluoranthene	mg/kg	NE	NE	NE	NE	<0.012	0.017	<0.014	0.14	0.19	<0.014	0.091	<0.012	<0.011	<0.012	<0.01	<0.011	<0.011	<0.36	0.018	<0.012	0.011	<0.011	<0.011	0.016
Carbazole	mg/kg	NE	NE	700	1310	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<0.36	NM	NM	NM	NM	NM	NM
Chrysene	mg/kg	NE	NE	NE	NE	<0.012	0.027	<0.014	0.26	0.32	<0.014	0.20	<0.012	<0.011	<0.012	<0.01	0.014	<0.011	<0.36	0.033	0.023	0.022	<0.011	<0.011	0.023
Dibenz(a,h)anthracene	mg/kg	NE	NE	NE	NE	<0.012	<0.012	<0.014	0.051	<0.069	<0.014	0.041	<0.012	<0.011	<0.012	<0.01	<0.011	<0.011	<0.36	<0.011	<0.012	<0.011	<0.011	<0.011	<0.011
Dibenzofuran	mg/kg	NE	NE	104	810	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<0.36	NM	NM	NM	NM	NM	NM
Fluoranthene	mg/kg	670	NE	1080	6800	0.013	0.054	<0.014	0.69	0.70	<0.014	0.34	0.020	0.022	<0.012	0.011	0.032	<0.011	<0.36	0.062	0.050	0.039	<0.011	0.028	0.045
Fluorene	mg/kg	110	NE	850	4120	<0.012	<0.012	<0.014	0.027	<0.069	<0.014	<0.012	<0.012	<0.011	<0.012	<0.01	<0.011	<0.011	<0.36	<0.011	<0.012	<0.011	<0.011	<0.011	<0.011
Indeno(1,2,3-cd)pyrene	mg/kg	NE	NE	NE	NE	<0.012	0.019	<0.014	0.17	0.19	<0.014	0.12	<0.012	<0.011	<0.012	<0.01	<0.011	<0.011	<0.36	0.019	0.015	0.016	<0.011	<0.011	0.020
Naphthalene	mg/kg	NE	NE	NE	NE	<0.012	<0.012	<0.014	<0.011	<0.069	<0.014	<0.012	<0.012	<0.011	<0.012	<0.01	<0.011	<0.011	<0.36	<0.011	<0.012	<0.011	<0.011	<0.011	<0.011
Phenanthrene	mg/kg	NE	NE	NE	NE	<0.012	0.017	<0.014	0.43	0.23	<0.014	0.14	<0.012	<0.011	<0.012	<0.01	0.017	<0.011	<0.36	0.023	0.018	0.023	<0.011	0.027	0.017
Pyrene	mg/kg	440	NE	890	5800	<0.012	0.058	<0.014	0.51	0.57	<0.014	0.30	0.014	0.014	<0.012	<0.01	0.022 (L2)	<0.011 (L2)	<0.36	0.044 (L2)	0.033 (L2)	0.026 (L2)	<0.011 (L2)	0.021	0.04
BaP Equivalents																									
Benzo(a)pyrene Equivalents	mg/kg	1.4	NE	2	3	<0	0.043	<0	0.42	0.46	<0	0.28	<0	<0	<0	<0	0.017	<0	<0	0.043	0.031	0.029	<0	0.003	0.043
VOCs																									
1,2,4-Trimethylbenzene	mg/kg	2.7	NE	8	25	<0.064	<0.062	<0.072	<0.06	<0.07	<0.07	<0.067	<0.064	<0.058	<0.062	<0.053	<0.059	<0.053	<0.058	<0.054	<0.06	0.52	<0.053	<0.059	<0.056
1,3,5-Trimethylbenzene	mg/kg	2.7	NE	3	10	<0.064	<0.062	<0.072	<0.06	<0.07	<0.07	<0.067	<0.064	<0.058	<0.062	<0.053	<0.059	<0.053	<0.058	<0.054	<0.06	0.075	<0.053	<0.059	<0.056
Benzene	mg/kg	0.017	10	6	10	<0.026	<0.025	<0.029	<0.024	<0.028	<0.028	<0.027	<0.025	<0.023	<0.025	<0.021	<0.024	<0.021	<0.023	<0.022	<0.024	0.12	<0.021	<0.024	<0.023
Chlorobenzene	mg/kg	1.2	2000	11	32	<0.064	<0.062	<0.072	<0.06	<0.07	<0.07	<0.067	<0.064	<0.058	<0.062	<0.053	<0.059	<0.053	<0.058	<0.054	<0.06	<0.057	<0.053	<0.059	<0.056
Diethyl Ether	mg/kg	0.51	NE	NE	NE	<0.26	<0.25	<0.29	<0.24	<0.28	<0.28	<0.27	<0.25	<0.23	<0.25	<0.21	<0.24	<0.21	<0.23	<0.22	<0.24	<0.23	<0.21	<0.24	<0.23
Ethylbenzene	mg/kg	1.1	NE	200	200	<0.064	<0.062	<0.072	<0.06	<0.07	<0.07	<0.067	<0.064	<0.058	<0.062	<0.053	<0.059	<0.053	<0.058	<0.054	<0.06	0.60	<0.053	<0.059	<0.056
Isopropylbenzene	mg/kg	9.5	NE	30	87	<0.064	<0.062	<0.072	<0.06	<0.07	<0.07	<0.067	<0.064	<0.058	<0.062	<0.053	<0.059	<0.053	<0.058	<0.054	<0.06	0.38	<0.053	<0.059	<0.056
Naphthalene	mg/kg	4.5	NE	10	28	<0.26	<0.25	<0.29	<0.24	<0.28	<0.28	<0.27	<0.25	<0.23	<0.25	<0.21	<0.24	<0.21	<0.23	<0.22	<0.24	1.0	<0.21	<0.24	<0.23
n-Butylbenzene	mg/kg	NE	NE	30	92	<0.064	<0.062	<0.072	<0.06	<0.07	<0.07	<0.067	<0.064	<0.058	<0.062	<0.053	<0.059	<0.053	<0.058	<0.054	<0.06	0.13	<0.053	<0.059	<0.056
n-Propylbenzene	mg/kg	NE	NE	30	93	<0.064	<0.062	<0.072	<0.06	<0.07	<0.07	<0.067	<0.064	<0.058	<0.062	<0.053	<0.059	<0.053	<0.058	<0.054	<0.06	0.63	<0.053	<0.059	<0.056
p-Isopropyltoluene	mg/kg	NE	NE	NE	NE	<0.064	<0.062	<0.072	<0.06	<0.07	<0.07	<0.067	<0.064	<0.058	<0.062	<0.053	<0.059	<0.053	<0.058	<0.054	<0.06	<0.057	<0.053	<0.059	<0.056
sec-Butylbenzene	mg/kg	NE	NE	25	70	<0.064	<0.062	<0.072	<0.06	<0.07	<0.07	<0.067	<0.064	<0.058	<0.062	<0.053	<0.059	<0.053	<0.058	<0.054	<0.06	0.089	<0.053	<0.059	<0.056
tert-Butylbenzene	mg/kg	NE	NE	30	90	<0.064	<0.062	<0.072	<0.06	<0.07	<0.07	<0.067	<0.064	<0.058	<0.062	<0.053	<0.059	<0.053	<0.058	<0.054	<0.06	<0.057	<0.053	<0.059	<0.056
Tetrachloroethene	mg/kg	0.042	14	72	131	<0.064	<0.062	<0.072	<0.06	<0.07	<0.07	<0.067	<0.064	<0.058	<0.062	<0.053	<0.059	<0.053	<0.058	<0.054	<0.06	<0.057	<0.053	<0.059	<0.056
Toluene	mg/kg	2.5	NE	107	305	<0.064	<0.062	<0.072	<0.06	<0.07	<0.07	<0.067	<0.064	<0.058	<0.062	<0.053	<0.059	<0.053	<0.058	<0.054	<0.06	1.6	<0.053	<0.059	<0.056
Trichloroethene	mg/kg	0.0023	10	29	46	<0.064	<0.062	<0.072	<0.06	<0.07	<0.07	<0.067	<0.064	<0.058	<0.062	<0.053 (L2)	<0.059 (L2)	<0.053 (L2)	<0.058 (L2)	<0.054 (L2)	<0.06 (L2)	<0.057 (L2)	<0.053 (L2)	<0.059	<0.056
Xylene (Total)	mg/kg	5.4	NE	45	130	<0.19	<0.19	<0.22	<0.18	<0.21	<0.21	<0.2	<0.19	<0.17	<0.19	<0.16	<0.18	<0.16	<0.17	<0.16	<0.18	2.7	<0.16	<0.18	<0.17

Notes:

A full list of abbreviations is included in the table glossery

Table 2
Soil Analytical Results

Phase II Environmental Site Assessment
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

				Borings are ordered by Area:		WLSSD (Parcel 215)								Miller Creek Replacement														
Boring ID	Units	*2014 Screening SLV*	20xTCLP level	Tier 1 Residential SRV	**Tier 2 Industrial SRV**	GP-408	GP-408	GP-409	GP-409	GP-410	GP-410	GP-411	GP-411	GP-144	GP-144	GP-144	SS-395	GP-146	GP-146	GP-146	GP-146	SS-396	GP-147	GP-147	GP-147	GP-263	GP-263	GP-263
Field Sample ID						GP-408-3	GP-408-8	GP-409-3	GP-409-8	GP-410-3	GP-410-8	GP-411-2	GP-411-8	GP-144-4.5	GP-144-9	GP-144-14	SS-395-1	GP-146-2	GP-146-7	GP-146-12	GP-146-18	SS-396-1	GP-147-1.5	GP-147-7	GP-147-10	GP-263-1.5	GP-263-7.5	GP-263-16
Laboratory ID						10484109001	10484109002	10484109004	10484109005	10484109007	10484109008	10484109009	10484109010	10452149002	10452149003	10452149004	10482958007	10451966007	10451966008	10451966009	10451966010	10482958006	10451966001	10451966002	10451966003	10451966011	10451966012	10451966013
Sample Date						7/22/2019	7/22/2019	7/22/2019	7/22/2019	7/22/2019	7/22/2019	7/22/2019	7/22/2019	10/17/2018	10/17/2018	10/17/2018	7/12/2019	10/16/2018	10/16/2018	10/16/2018	10/16/2018	7/12/2019	10/16/2018	10/16/2018	10/16/2018	10/16/2018	10/16/2018	10/16/2018
DRO and GRO																												
Diesel Range Organics	mg/kg	The MPCA Unregulated Fill Criteria for DRO and GRO is <100 mg/kg				10.7 (T6)	<9.8	<8.4	NM	NM	NM	28.1 (T7,T6)	NM	<10.4	<10.2	NM	NM	NM	<8.6	<10.6	<9	NM	NM	NM	NM	23.0 (T6)	66.4 (T6)	79.8 (T6)
Gasoline Range Organics	mg/kg					<11.3 (M1)	<12.6	<10.5	<11.9	<10.6	<12.1	<10.1	<12.7	<12.5	<13.2	<11.7	<13 (G-)	<12.5	<11.5	<13	<11.2 (M1)	NM	<14.7	<12.3	<11.6	<15.8	<11	<11.8
WDRO C10-C28 Silica Gel	mg/kg					NM	NM	NM	<9.3	<8.8	22.6 (T7,T6)	NM	42.7 (T7,T6)	NM	NM	<9.8	56.8 (T6)	22.1 (T6)	NM	NM	NM	NM	208 (T6)	<9.6	<9.3	NM	NM	NM
Metals																												
Antimony	mg/kg	5.4	NE	12	100	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Arsenic	mg/kg	5.8	100	9	20	<5.2 (D3)	3.1	1.1	2.1	2.3	3.0	2.3	2.2	3.2	*7.0*	2.8	3.5	3.1	1.5	3.5	3.0	2.9	3.5	4.2	1.6	2.6	2.6	2.7
Barium	mg/kg	1700	2000	1100	18000	50.5	138	14.4	31.4	42	114	35	95.4	108	113	98.7	98.5	93.6	14.5	120	43.1	50.8	85.6	138	16.5	261	45.3	58.7
Beryllium	mg/kg	2.7	NE	55	230	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium	mg/kg	8.8	20	25	200	<0.78 (D3)	<0.17	<0.14	<0.17	<0.15	<0.17	<0.15	<0.18	<0.18	<0.19	<0.17	0.42	<0.17	<0.15	<0.19	<0.16	0.19	0.22	<0.18	<0.17	<0.22	<0.15	<0.17
Chromium	mg/kg	36	100	87	650	21.4	34.5	7.2	10.2	16.2	29.8	15.7	25.7	24.8	29.1	11.4	22.3	21.7	6.9	30.5	17.5	24.3	17	30.8	8.5	3.6	19	21.1
Copper	mg/kg	700	NE	100	9000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Lead	mg/kg	2700	100	300	700	6.1	9.4	1.4	4.7	4.6	19.7	8.2	13.2	6.5	6.4	2.5	62.1	27.3	4.8	6.4	3.2	25.2	65.4 (M1)	6.8	2.1	9.6	10.9	12.8
Mercury	mg/kg	3.3	4	0.5	1.5	<0.02	<0.024	<0.018	<0.023	<0.021	0.38	<0.021	0.031	<0.024	<0.022	<0.022	0.055	0.047	0.026	0.027	<0.019	0.024	0.047	<0.022	<0.023	0.08	0.039	0.034
Nickel	mg/kg	180	NE	560	2500	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Selenium	mg/kg	2.6	20	160	1300	*<5.2 (D3)*	<1.1	<0.96	<1.1	<0.99	<1.1	<1	<1.2	<1.2	<1.3	<1.2	<1.2	<1.2	<1	<1.2	<1.1	<1.2	<1.4	<1.2	<1.1	*4.5*	<1	<1.2
Silver	mg/kg	7.9	100	160	1300	<2.6 (D3)	<0.56	<0.48	<0.56	<0.5	<0.57	<0.5	<0.6	<0.61	<0.63	<0.58	<0.6	<0.58	<0.51	<0.62	<0.54	<0.59	<0.68	<0.6	<0.57	<0.74	<0.51	<0.58
Zinc	mg/kg	3000	NE	8700	75000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TCLP Metals																												
Lead TCLP	mg/L	5 mg/L TCLP Lead hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Mercury TCLP	mg/L	0.2 mg/L TCLP Mercury hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium TCLP	mg/L	1.0 mg/L TCLP Cadmium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Chromium TCLP	mg/L	5.0 mg/L TCLP Chromium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
PCBs																												
PCBs (Polychlorinated Biphenyls)	mg/kg	NE	NE	1.2	8	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	BRL	NM	NM	NM	NM	NM
Herbicides and Pesticides																												
2,4-D	mg/kg	0.5	200	0.5	0.5	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Triclopyr	mg/kg	0.3	NE	0.3	0.3	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Semi-VOCs																												
1-Methylnaphthalene	mg/kg	NE	NE	NE	NE	NM	NM	NM	NM	NM	<0.39	NM	<0.4	<0.41	<0.42	<0.39	NM	<0.4	NM	NM	NM	NM	<0.47	NM	NM	NM	NM	NM
2,4-Dinitrotoluene	mg/kg	0.013	2.6	50	355	NM	NM	NM	NM	NM	*<0.39*	NM	*<0.4*	*<0.41*	*<0.42*	*<0.39*	NM	*<0.4*	NM	NM	NM	NM	*<0.47*	NM	NM	NM	NM	NM
2-Methylnaphthalene	mg/kg	NE	NE	100	369	NM	NM	NM	NM	NM	<0.39	NM	<0.4	<0.41	<0.42	<0.39	NM	<0.4	NM	NM	NM	NM	<0.47	NM	NM	NM	NM	NM
Acenaphthene	mg/kg	81	NE	1200	5260	<0.011	<0.012	<0.01	<0.012	<0.011	<0.39	<0.011	<0.4	<0.41	<0.42	<0.39	0.016 (M1)	<0.4	<0.011	<0.013	<0.011	<0.012	<0.47 (R1)	<0.012	<0.012	0.08	4.8	3.1
Acenaphthylene	mg/kg	NE	NE	NE	NE	<0.011	<0.012	<0.01	<0.012	<0.011	<0.39	<0.011	<0.4	<0.41	<0.42	<0.39	0.015	<0.4	<0.011	<0.013	<0.011	<0.012	<0.47	<0.012	<0.012	0.22	0.11	<0.12
Anthracene	mg/kg	1300	NE	7880	45400	<0.011	<0.012	<0.01	<0.012	<0.011	<0.39	<0.011	<0.4	<0.41	<0.42	<0.39	0.059 (M1,R1	<0.4	<0.011	<0.013	<0.011	<0.012	<0.47 (M1,R1)	<0.012	<0.012	1.1	10.5	6.6
Benz(a)anthracene	mg/kg	NE	NE	NE	NE	<0.011	<0.012	<0.01	<0.012	<0.011	0.56	<0.011	0.55	<0.41	<0.42	<0.39	0.24 (M1)	0.44	0.018	<0.013	<0.011	0.037	<0.47 (M1,R1)	<0.012	<0.012	1.3	14.1	7.7
Benzo(a)pyrene	mg/kg	1.4	NE	2	3	<0.011	<0.012	<0.01	<0.012	<0.011	0.49	<0.011	0.47	<0.41	<0.42	<0.39	0.22 (M1)	0.4	0.015	<0.013	<0.011	0.038	<0.47 (M1,R1)	<0.012	<0.012	0.98	***12***	***5.8***
Benzo(b)fluoranthene	mg/kg	NE	NE	NE	NE	<0.011	<0.012	<0.01	0.012	<0.011	0.71	<0.011	0.55	<0.41	<0.42	<0.39	0.26 (M1)	0.49	0.020	<0.013	<0.011	0.058	<0.47 (M1,R1)	<0.012	<0.012	1.2	14.5	7.1
Benzo(g,h,i)perylene	mg/kg	NE	NE	NE	NE	<0.011	<0.012	<0.01	<0.012	<0.011	<0.39	<0.011	<0.4	<0.41	<0.42	<0.39	0.13 (M1)	<0.4	<0.011	<0.013	<0.011	0.029	<0.47	<0.012	<0.012	0.43	6.0	2.7
Benzo(k)fluoranthene	mg/kg	NE	NE	NE	NE	<0.011	<0.012	<0.01	<0.012	<0.011	<0.39	<0.011	<0.4	<0.41	<0.42	<0.39	0.13 (M1)	<0.4	<0.011	<0.013	<0.011	0.021	<0.47 (R1)	<0.012	<0.012	0.42	5.3	3.4
Carbazole	mg/kg	NE	NE	700	1310	NM	NM	NM	NM	NM	<0.39	NM	<0.4	<0.41	<0.42	<0.39	NM	<0.4	NM	NM	NM	NM	<0.47	NM	NM	NM	NM	NM
Chrysene	mg/kg	NE	NE	NE	NE	<0.011	<0.012	<0.01	<0.012	<0.011	0.56	<0.011	0.55	<0.41	<0.42	<0.39	0.19 (M1)	0.42	0.014	<0.013	<0.011	0.040	<0.47 (M1,R1)	<0.012	<0.012	0.92	11	5.5
Dibenz(a,h)anthracene	mg/kg	NE	NE	NE	NE	<0.011	<0.012	<0.01	<0.012	<0.011	<0.39	<0.011	<0.4	<0.41	<0.42	<0.39	0.041	<0.4	<0.011	<0.013	<0.011	<0.012	<0.47	<0.012	<0.012	0.12	1.6	0.92
Dibenzofuran	mg/kg	NE	NE	104	810	NM	NM	NM	NM	NM	<0.39	NM	<0.4	<0.41	<0.42	<0.39	NM	<0.4	NM	NM	NM	NM	<0.47	NM	NM	NM	NM	NM
Fluoranthene	mg/kg	670	NE	1080	6800	<0.011	<0.012	<0.01	0.021	<0.011	0.91	<0.011	1.2	<0.41	<0.42	<0.39	0.43 (M1)	0.99	0.033	<0.013	<0.011	0.083	0.72 (M1,R1)	<0.012	<0.012	2.7	34.4	18.5
Fluorene	mg/kg	110	NE	850	4120	<0.011	<0.012	<0.01	<0.012	<0.011	<0.39	<0.011	<0.4	<0.41	<0.42	<0.39	0.017 (M1)	<0.4	<0.011	<0.013	<0.011	<0.012	<0.47 (R1)	<0.012	<0.012	0.31	5.2	3.5
Indeno(1,2,3-cd)pyrene	mg/kg	NE	NE	NE	NE	<0.011	<0.012	<0.01	<0.012	<0.011	<0.39	<0.011	<0.4	<0.41	<0.42	<0.39	0.11 (M1)	<0.4	<0.011	<0.013	<0.011	0.023	<0.47	<0.012	<0.012	0.39	5.3	2.7
Naphthalene	mg/kg	NE	NE	NE	NE	<0.011	<0.012	<0.01	<0.012	<0.011	<0.39	<0.011	<0.4	<0.41	<0.42	<0.39	<0.012 (M1	<0.4	<0.011	<0.013	<0.011	<0.012	<0.47	<0.012	<0.012	0.31	1.8	1.6
Phenanthrene	mg/kg	NE	NE	NE	NE	<0.011	<0.012	<0.01	0.021	<0.011	0.48	<0.011	1.5	<0.41	<0.42	<0.39	0.2 (M1)	0.73	0.017	<0.013	<0.011	0.051	0.7	<0.012	<0.012	2.4	34.1	21
Pyrene	mg/kg	440	NE	890	5800	<0.011	<0.012	<0.01	0.018	<0.011	0.86	<0.011	1.2	<0.41	<0.42	<0.39	0.36 (M1)	0.82	0.026	<0.013	<0.011	0.073	0.63 (M1,R1)	<0.012	<0.012	2.0	27.5	14.1
BaP Equivalents																												
Benzo(a)pyrene Equivalents	mg/kg	1.4	NE	2	3	<0	<0	<0	0.0012	<0	0.62	<0	0.59	<0	<0	<0	0.32 (M1)	0.50	0.019	<0	<0	0.052	<0	<0	<0	1.39	***16.9***	***8.46***
VOCs																												
1,2,4-Trimethylbenzene	mg/kg	2.7	NE	8	25	<0.056	<0.067	<0.053	<0.059	<0.052	<0.06	<0.055	<0.06	<0.074	<0.066	<0.06	<0.064	<0.058	<0.06	<0.069	<0.057	NM	<0.075 (M1,R1)	<0.062	<0.058	<0.078	<0.055	<0.062
1,3,5-Trimethylbenzene	mg/kg	2.7	NE	3	10	<0.056	<0.067	<0.053	<0.059	<0.052	<0.06	<0.055	<0.06	<0.074	<0.066	<0.06	<0.064	<0.058	<0.06	<0.069	<0.057	NM	<0.075 (M1,R1)	<0.062	<0.058	<0.078	<0.055	<0.062
Benzene	mg/kg	0.017	10	6	10	*<0.022*	*<0.027*	*<0.021*	*<0.024*	*<0.021*	*<0.024*	*<0.022*	*<0.024*	*<0.029*	*<0.027*	*<0.024*	*<0.026*	*<0.023*	*<0.024*	*<0.027*	*<0.023*	NM	*<0.03 (M1,R1)*	*<0.025*	*<0.023*	*<0.031*	*<0.022*	*<0.025*
Chlorobenzene	mg/kg	1.2	2000	11	32	<0.056	<0.067	<0.053	<0.059	<0.052	<0.06	<0.055	<0.06	<0.074	<0.066	<0.06	<0.064	<0.058	<0.06	<0.069	<0.057	NM	<0.075 (M1,R1)	<0.062	<0.058	<0.078	<0.055	<0.062
Diethyl Ether	mg/kg	0.51	NE	NE	NE	<0.22	<0.27	<0.21	<0.24	<0.21	<0.24	<0.22	<0.24	<0.29	<0.27	<0.24	<0.26	<0.23	<0.24	<0.27	<0.23	NM	<0.3 (M1,R1)	<0.25	<0.23	<0.31	<0.22	<0.25
Ethylbenzene	mg/kg	1.1	NE	200	200	<0.056	<0.067	<0.053	<0.059	<0.052	<0.06	<0.055	<0.06	<0.074	<0.066	<0.06	<0.064	<0.058	<0.06	<0.069	<0.057	NM	<0.075 (M1,R1)	<0.062	<0.058	<0.078	<0.055	<0.062
Isopropylbenzene	mg/kg	9.5	NE	30	87	<0.056	<0.067	<0.053	<0.059	<0.052	<0.06	<0.055	<0.06	<0.074	<0.066	<0.06	<0.064	<0.058	<0.06	<0.069	<0.057	NM	<0.075 (M1,R1)	<0.062	<0.058	<0.078	<0.055	<0.062
Naphthalene	mg/kg	4.5	NE	10	28	<0.22	<0.27	<0.21	<0.24	<0.21	<0.24	<0.22	<0.24	<0.29	<0.27	<0.24	<0.26	<0.23	<0.24	<0.27	<0.23	NM	<0.3 (M1,R1)	<0.25	<0.23	<0.31	<0.22	<0.25
n-Butylbenzene	mg/kg	NE	NE	30	92	<0.056	<0.067	<0.053	<0.059	<0.052	<0.06	<0.055	<0.06	<0.074	<0.066	<0.06	<0.064	<0.058	<0.06	<0.069	<0.057	NM	<0.075 (M1,R1)	<0.062	<0.058	<0.078	<0.055	<0.062
n-Propylbenzene	mg/kg	NE	NE	30	93	<0.056	<0.067	<0.053	<0.059	<0.052	<0.06	<0.055	<0.06	<0.074	<0.066	<0.06	<0.064	<0.058	<0.06	<0.069	<0.057	NM	<0.075 (M1,R1)	<0.062	<0.058	<0.078	<0.055	<0.062
p-Isopropyltoluene	mg/kg	NE	NE	NE	NE	<0.056	<0.067	<0.053	<0.059	<0.052	<0.06	<0.055	<0.06	<0.074	<0.066	<0.06	<0.064	<0.058	<0.06	<0.069	<0.057	NM	0.085 (M1,R1)	<0.062	<0.058	<0.078	<0.055	<0.062
sec-Butylbenzene	mg/kg	NE	NE	25	70	<0.056	<0.067	<0.053	<0.059	<0.052	<0.06	<0.055	<0.06	<0.074	<0.066	<0.06	<0.064	<0.058	<0.06	<0.069	<0.057	NM	<0.075 (M1,R1)	<0.062	<0.058	<0.078	<0.055	<0.062
tert-Butylbenzene	mg/kg	NE	NE	30	90	<0.056	<0.067	<0.053	<0.059	<0.052	<0.06	<0.055	<0.06	<0.074	<0.066	<0.06	<0.064	<0.058	<0.06	<0.069	<0.057	NM	<0.075 (M1,R1)	<0.062	<0.058	<0.078	<0.055	<0.062
Tetrachloroethene	mg/kg	0.042	14	72	131	*<0.056*	*<0.067*	*<0.053*	*<0.059*	*<0.052*	*<0.06*	*<0.055*	*<0.06*	*<0.074*	*<0.066*	*<0.06*	*<0.064*	*<0.058*	*<0.06*	*<0.069*	*<0.057*	NM	*<0.075 (M1,R1)*	*<0.062*	*<0.058*	*<0.078*	*<0.055*	*<0.062*
Toluene	mg/kg	2.5	NE	107	305	<0.056	<0.067	<0.053	<0.059	<0.052	<0.06	<0.055	<0.06	<0.074	<0.066	<0.06	<0.064	<0.058	<0.06	<0.069	<0.057	NM	<0.075 (M1,R1)	<0.062	<0.058	<0.078	<0.055	<0.062
Trichloroethene	mg/kg	0.0023	10	29	46	*<0.056*	*<0.067*	*<0.053*	*<0.059*	*<0.052*	*<0.06*	*<0.055*	*<0.06*	*<0.074 (L2)*	*<0.066 (L2)*	*<0.06 (L2)*	*<0.064*	*<0.058*	*<0.06*	*<0.069*	*<0.057*	NM	*<0.075 (M1,R1)*	*<0.062*	*<0.058*	*<0.078*	*<0.055*	*<0.062*
Xylene (Total)	mg/kg	5.4	NE	45	130	<0.17	<0.2	<0.16	<0.18	<0.16	<0.18	<0.17	<0.18	<0.22	<0.2	<0.18	<0.19	<0.17	<0.18	<0.21	<0.17	NM	<0.23 (RS,MS)	<0.19	<0.18	<0.23	<0.17	<0.18

Notes:

A full list of abbreviations is included in the table glossery

Table 2
Soil Analytical Results

Phase II Environmental Site Assessment
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

				Borings are ordered by Area:		Miller Creek Replacement															22nd Ave and Coffee Creek Replacement							
Boring ID	Units	2014 Screening SLV	20xTCLP level	Tier 1 Residential SRV	Tier 2 Industrial SRV	SS-397	GP-148	GP-148	GP-040	GP-040	GP-040	GP-279	GP-279	GP-039	GP-039	GP-039	GP-280	GP-280	SS-400	SS-401	GP-037	GP-037	GP-037	GP-036	GP-036	GP-036	SS-398	GP-281
Field Sample ID						SS-397-1	GP-148-2	GP-148-7	GP-040-1	GP-040-8	GP-040-20	GP-279-1.5	GP-279-10	GP-039-3.5	GP-039-8	GP-039-15	GP-280-2.5	GP-280-8	SS-400-1	SS-401-1	GP-037-2.5	GP-037-8	GP-037-12	GP-036-2.5	GP-036-7	GP-036-16.5	SS-398-1	GP-281-3
Laboratory ID						10482958005	10451966005	10451966006	10452519006	10452519007	10452519008	10472856010	10472856011	10452519009	10452519010	10452519011	10472856013	10472856014	10482561002	10482561001	10451751001	10451751002	10451751003	10451751005	10451751006	10451751007	10482958008	10473051001
Sample Date						7/12/2019	10/16/2018	10/16/2018	10/19/2018	10/19/2018	10/19/2018	4/30/2019	4/30/2019	10/19/2018	10/19/2018	10/19/2018	4/30/2019	4/30/2019	7/9/2019	7/9/2019	10/15/2018	10/15/2018	10/15/2018	10/15/2018	10/15/2018	10/15/2018	7/12/2019	4/30/2019
DRO and GRO																												
Diesel Range Organics	mg/kg	The MPCA Unregulated Fill Criteria for DRO and GRO is <100 mg/kg				NM	36.3 (T6)	NM	45.9	<8.5	<9.1	63.4 (T6)	<8.9	<8.8	<8.6	<8.1	<8.9	<8.9	NM	NM	14.9 (T6)	<9.2	<9.9	84.1 (T6)	<10.1	<9.6	NM	<9
Gasoline Range Organics	mg/kg					<11.6 (G-)	<12	<15.4	<12.5	<10.6	<11.6	<11.5 (G+)	<11	<11.7	<10.8	<11.3	<10.7	<11.2	<12	<12.2	<11.8	<12	<12.4	<11	<12.6	<12.3	<12 (G-,G+)	<11.5
WDRO C10-C28 Silica Gel	mg/kg					91.6 (T6)	NM	36.3 (T6)	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<9	17.1 (T6)	NM	NM	NM	NM	NM	NM	12.2 (T6)	NM
Metals																												
Antimony	mg/kg	5.4	NE	12	100	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Arsenic	mg/kg	5.8	100	9	20	3.4	3.6	4.3	3.6	5.5	5.6	<5.4 (D3)	<5.3 (D3)	6.1	5.8	5.8	<5.1 (D3)	<5.2 (D3)	2.8	4.5	4.5	2.8	2.2	2.7	3.2	2.7	2.9	<5.5 (D3)
Barium	mg/kg	1700	2000	1100	18000	93.5	58.4	117	157	37.2	48.4	74.8	44.2	38.9	44.9	41.3	42.2	59.4	64.2	82.6	132 (M1,R1)	123	32.3	49.3	131	21.7	46.2	55.5 (M1,R1)
Beryllium	mg/kg	2.7	NE	55	230	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium	mg/kg	8.8	20	25	200	0.19	<0.16	0.22	0.20	<0.77 (D3)	<0.79 (D3)	<0.81 (D3)	<0.79 (D3)	<0.78 (D3)	<0.76 (D3)	<0.78 (D3)	<0.76 (D3)	<0.79 (D3)	<0.17	0.23	0.24	<0.17	<0.17	<0.16	<0.18	<0.18	<0.17	<0.82 (D3)
Chromium	mg/kg	36	100	87	650	22.6	21.5	24.2	17.8	17.5	16.8	19.5	18.5	18.6	18.6	16.7	18.9	23.3	21.3	17.8	34.6	32.2	10.1	22.1	34.5	7.7	21	19.4
Copper	mg/kg	700	NE	100	9000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Lead	mg/kg	2700	100	300	700	83.8	27.4	25.2	126	5.2	15.5	22.6	4.5	6.9	5.1	5.0	7.2	6.0	18.8	59.2	356 (M1,R1)	6.1	3.0	4.9	8.5	2.3	31.2	7.0
Mercury	mg/kg	3.3	4	0.5	1.5	0.054	0.054	0.026	0.13	<0.02	<0.019	<0.02	<0.02	0.043	<0.018	<0.018	<0.02	<0.021	0.029	0.056	0.17	<0.022	<0.02	<0.021	<0.023	<0.022	0.024	<0.02
Nickel	mg/kg	180	NE	560	2500	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Selenium	mg/kg	2.6	20	160	1300	<1.1	<1.1	<1.4	<1.1	<5.1 (D3)	<5.3 (D3)	<5.4 (D3)	<5.3 (D3)	<5.2 (D3)	<5.1 (D3)	<5.2 (D3)	<5.1 (D3)	<5.2 (D3)	<1.2	<1.1	<1.1	<1.1	<1.1	<1.1	<1.2	<1.2	<1.1	<5.5 (D3)
Silver	mg/kg	7.9	100	160	1300	<0.55	<0.54	<0.68	<0.54	<2.6 (D3)	<2.6 (D3)	<2.7 (D3)	<2.6 (D3)	<2.6 (D3)	<2.5 (D3)	<2.6 (D3)	<2.5 (D3)	<2.6 (D3)	<0.58	<0.55	<0.55	<0.57	<0.56	<0.53	<0.6	<0.58	<0.56	<2.7 (D3)
Zinc	mg/kg	3000	NE	8700	75000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TCLP Metals																												
Lead TCLP	mg/L	5 mg/L TCLP Lead hazardous limit				NM	NM	NM	<0.5	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	1.4	NM	NM	NM	NM	NM	NM	NM
Mercury TCLP	mg/L	0.2 mg/L TCLP Mercury hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium TCLP	mg/L	1.0 mg/L TCLP Cadmium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Chromium TCLP	mg/L	5.0 mg/L TCLP Chromium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
PCBs																												
PCBs (Polychlorinated Biphenyls)	mg/kg	NE	NE	1.2	8	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Herbicides and Pesticides																												
2,4-D	mg/kg	0.5	200	0.5	0.5	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Triclopyr	mg/kg	0.3	NE	0.3	0.3	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Semi-VOCs																												
1-Methylnaphthalene	mg/kg	NE	NE	NE	NE	NM	NM	<0.48	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2,4-Dinitrotoluene	mg/kg	0.013	2.6	50	355	NM	NM	<0.48	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2-Methylnaphthalene	mg/kg	NE	NE	100	369	NM	NM	<0.48	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Acenaphthene	mg/kg	81	NE	1200	5260	0.25	0.10	<0.48	0.067	<0.011	<0.011	<0.011	<0.011	<0.011	0.014	<0.011	<0.011	<0.011	0.021	0.06	0.064	<0.012	<0.012	0.065	<0.013	<0.012	<0.012	<0.011
Acenaphthylene	mg/kg	NE	NE	NE	NE	<0.23	<0.011	<0.48	0.11	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011	<0.012	0.027	0.018	<0.012	<0.012	0.015	<0.013	<0.012	<0.012	<0.011
Anthracene	mg/kg	1300	NE	7880	45400	0.65	0.28	<0.48	0.33	<0.011	<0.011	0.025	<0.011	<0.011	0.031	<0.011	<0.011	<0.011	0.054	0.17	0.15	<0.012	<0.012	0.18	<0.013	<0.012	0.020	<0.011
Benz(a)anthracene	mg/kg	NE	NE	NE	NE	1.4	0.51	<0.48	1.1	<0.011	0.013	0.10	<0.011	<0.011	0.077	<0.011	0.021	<0.011	0.17	0.46	0.29	<0.012	<0.012	0.68	<0.013	<0.012	0.075	<0.011
Benzo(a)pyrene	mg/kg	1.4	NE	2	3	1.2	0.37	<0.48	0.93	<0.011	<0.011	0.10	<0.011	<0.011	0.078	<0.011	0.019	<0.011	0.15	0.46	0.27	<0.012	<0.012	0.77	<0.013	<0.012	0.064	<0.011
Benzo(b)fluoranthene	mg/kg	NE	NE	NE	NE	1.6	0.51	<0.48	1.2	<0.011	0.014	0.15	<0.011	<0.011	0.093	<0.011	0.029	<0.011	0.19	0.64	0.34	<0.012	<0.012	1.1	<0.013	<0.012	0.089	<0.011
Benzo(g,h,i)perylene	mg/kg	NE	NE	NE	NE	0.61	0.20	<0.48	0.55	<0.011	<0.011	0.079	<0.011	<0.011	0.053	<0.011	0.016	<0.011	0.092	0.32	0.15	<0.012	<0.012	0.48	<0.013	<0.012	0.043	<0.011
Benzo(k)fluoranthene	mg/kg	NE	NE	NE	NE	0.62	0.17	<0.48	0.38	<0.011	<0.011	0.051	<0.011	<0.011	0.034	<0.011	0.013	<0.011	0.076	0.26	0.17	<0.012	<0.012	0.37	<0.013	<0.012	0.041	<0.011
Carbazole	mg/kg	NE	NE	700	1310	NM	NM	<0.48	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Chrysene	mg/kg	NE	NE	NE	NE	1.2	0.38	<0.48	0.87	<0.011	0.012	0.11	<0.011	<0.011	0.071	<0.011	0.024	<0.011	0.15	0.49	0.26	<0.012	<0.012	0.73	<0.013	<0.012	0.071	<0.011
Dibenz(a,h)anthracene	mg/kg	NE	NE	NE	NE	<0.23	0.057	<0.48	0.18	<0.011	<0.011	0.027	<0.011	<0.011	0.013	<0.011	<0.011	<0.011	0.028	0.096	0.04	<0.012	<0.012	0.085	<0.013	<0.012	0.019	<0.011
Dibenzofuran	mg/kg	NE	NE	104	810	NM	NM	<0.48	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Fluoranthene	mg/kg	670	NE	1080	6800	3.0	1.1	<0.48	1.9	<0.011	0.024	0.16	<0.011	<0.011	0.18	<0.011	0.042	<0.011	0.35	1.0	0.68	<0.012	<0.012	1.8	<0.013	<0.012	0.16	<0.011
Fluorene	mg/kg	110	NE	850	4120	<0.23	0.11	<0.48	0.095	<0.011	<0.011	<0.011	<0.011	<0.011	0.014	<0.011	<0.011	<0.011	0.019	0.058	0.067	<0.012	<0.012	0.067	<0.013	<0.012	<0.012	<0.011
Indeno(1,2,3-cd)pyrene	mg/kg	NE	NE	NE	NE	0.57	0.21	<0.48	0.49	<0.011	<0.011	0.071	<0.011	<0.011	0.046	<0.011	0.014	<0.011	0.082	0.29	0.15	<0.012	<0.012	0.36	<0.013	<0.012	0.037	<0.011
Naphthalene	mg/kg	NE	NE	NE	NE	<0.23	0.015	<0.48	0.035	<0.011	<0.011	0.018	<0.011	<0.011	0.018	<0.011	<0.011	<0.011	<0.012	0.019	0.017	<0.012	<0.012	0.011	<0.013	<0.012	<0.012	<0.011
Phenanthrene	mg/kg	NE	NE	NE	NE	2.2	0.86	<0.48	1.2	<0.011	0.018	0.071	<0.011	<0.011	0.15	<0.011	0.023	<0.011	0.21	0.66	0.55	<0.012	<0.012	1.0	<0.013	<0.012	0.093	<0.011
Pyrene	mg/kg	440	NE	890	5800	2.6	0.89	<0.48	1.7	<0.011	0.023	0.14	<0.011	<0.011	0.18	<0.011	0.033	<0.011	0.30	0.92	0.57	<0.012	<0.012	1.4	<0.013	<0.012	0.13	<0.011
BaP Equivalents																												
Benzo(a)pyrene Equivalents	mg/kg	1.4	NE	2	3	1.6	0.55	<0	1.4	<0	0.0028	0.15	<0	<0	0.11	<0	0.027	<0	0.22	0.68	0.39	<0	<0	1.08	<0	<0	0.10	<0
VOCs																												
1,2,4-Trimethylbenzene	mg/kg	2.7	NE	8	25	<0.062	<0.058	<0.072	0.22	<0.056	<0.057	0.059	<0.056	<0.055	<0.055	<0.056	<0.055	<0.056	<0.057	<0.057	<0.06	<0.064	<0.06	<0.054	<0.07	<0.062	<0.057	<0.056
1,3,5-Trimethylbenzene	mg/kg	2.7	NE	3	10	<0.062	<0.058	<0.072	<0.066	<0.056	<0.057	<0.053	<0.056	<0.055	<0.055	<0.056	<0.055	<0.056	<0.057	<0.057	<0.06	<0.064	<0.06	<0.054	<0.07	<0.062	<0.057	<0.056
Benzene	mg/kg	0.017	10	6	10	<0.025	<0.023	<0.029	0.10	<0.022	<0.023	0.030	<0.022	<0.022	<0.022	<0.022	<0.022	<0.023	<0.023	<0.023	<0.024	<0.026	<0.024	<0.021	<0.028	<0.025	<0.023	<0.022
Chlorobenzene	mg/kg	1.2	2000	11	32	<0.062	<0.058	<0.072	<0.066	<0.056	<0.057	<0.053	<0.056	<0.055	<0.055	<0.056	<0.055	<0.056	<0.057	<0.057	<0.06	<0.064	<0.06	<0.054	<0.07	<0.062	<0.057	<0.056
Diethyl Ether	mg/kg	0.51	NE	NE	NE	<0.25	<0.23	<0.29	<0.26	<0.22	<0.23	<0.21	<0.22	<0.22	<0.22	<0.22	<0.22	<0.23	<0.23	<0.23	<0.24	<0.26	<0.24	<0.21	<0.28	<0.25	<0.23	<0.22
Ethylbenzene	mg/kg	1.1	NE	200	200	<0.062	<0.058	<0.072	0.10	<0.056	<0.057	<0.053	<0.056	<0.055	<0.055	<0.056	<0.055	<0.056	<0.057	<0.057	<0.06	<0.064	<0.06	<0.054	<0.07	<0.062	<0.057	<0.056
Isopropylbenzene	mg/kg	9.5	NE	30	87	<0.062	<0.058	<0.072	0.08	<0.056	<0.057	<0.053	<0.056	<0.055	<0.055	<0.056	<0.055	<0.056	<0.057	<0.057	<0.06	<0.064	<0.06	<0.054	<0.07	<0.062	<0.057	<0.056
Naphthalene	mg/kg	4.5	NE	10	28	<0.25	<0.23	<0.29	0.36	<0.22	<0.23	<0.21	<0.22	<0.22	<0.22	<0.22	<0.22	<0.23	<0.23	<0.23	<0.24	<0.26	<0.24	<0.21	<0.28	<0.25	<0.23	<0.22
n-Butylbenzene	mg/kg	NE	NE	30	92	<0.062	<0.058	<0.072	<0.066	<0.056	<0.057	<0.053	<0.056	<0.055	<0.055	<0.056	<0.055	<0.056	<0.057	<0.057	<0.06	<0.064	<0.06	<0.054	<0.07	<0.062	<0.057	<0.056
n-Propylbenzene	mg/kg	NE	NE	30	93	<0.062	<0.058	<0.072	0.083	<0.056	<0.057	<0.053	<0.056	<0.055	<0.055	<0.056	<0.055	<0.056	<0.057	<0.057	<0.06	<0.064	<0.06	<0.054	<0.07	<0.062	<0.057	<0.056
p-Isopropyltoluene	mg/kg	NE	NE	NE	NE	<0.062	<0.058	<0.072	<0.066	<0.056	<0.057	<0.053	<0.056	<0.055	<0.055	<0.056	<0.055	<0.056	<0.057	<0.057	<0.06	<0.064	<0.06	<0.054	<0.07	<0.062	0.075	<0.056
sec-Butylbenzene	mg/kg	NE	NE	25	70	<0.062	<0.058	<0.072	<0.066	<0.056	<0.057	<0.053	<0.056	<0.055	<0.055	<0.056	<0.055	<0.056	<0.057	<0.057	<0.06	<0.064	<0.06	<0.054	<0.07	<0.062	<0.057	<0.056
tert-Butylbenzene	mg/kg	NE	NE	30	90	<0.062	<0.058	<0.072	<0.066	<0.056	<0.057	<0.053	<0.056	<0.055	<0.055	<0.056	<0.055	<0.056	<0.057	<0.057	<0.06	<0.064	<0.06	<0.054	<0.07	<0.062	<0.057	<0.056
Tetrachloroethene	mg/kg	0.042	14	72	131	<0.062	<0.058	<0.072	<0.066	<0.056	<0.057	<0.053	<0.056	<0.055	<0.055	<0.056	<0.055	<0.056	<0.057	<0.057	<0.06	<0.064	<0.06	<0.054	<0.07	<0.062	<0.057	<0.056
Toluene	mg/kg	2.5	NE	107	305	<0.062	<0.058	<0.072	0.46	<0.056	<0.057	0.12	<0.056	<0.055	<0.055	<0.056	<0.055	<0.056	<0.057	<0.057	<0.06	<0.064	<0.06	<0.054	<0.07	<0.062	<0.057	<0.056
Trichloroethene	mg/kg	0.0023	10	29	46	<0.062	<0.058	<0.072	<0.066	<0.056	<0.057	<0.053	<0.056	<0.055	<0.055	<0.056	<0.055	<0.056	<0.057	<0.057	<0.06	<0.064	<0.06	<0.054	<0.07	<0.062	<0.057	<0.056
Xylene (Total)	mg/kg	5.4	NE	45	130	<0.18	<0.18	<0.22	0.71	<0.17	<0.17	0.24	<0.17	<0.17	<0.16	<0.17	<0.16	<0.17	<0.17	<0.17	<0.18	<0.19	<0.18	<0.16	<0.21	<0.19	<0.17	<0.17

Notes:

A full list of abbreviations is included in the table glossery

Table 2
Soil Analytical Results

Phase II Environmental Site Assessment
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

				Borings are ordered by Area:		22nd Ave and Coffee Creek Replacement																							
Boring ID	Units	2014 Screening SLV	20xTCLP level	Tier 1 Residential SRV	Tier 2 Industrial SRV	GP-281	GP-281	SS-399	GP-152	GP-152	GP-035	GP-035	GP-414	GP-414	GP-439	GP-415	GP-415	GP-032	GP-032	GP-339	GP-339	GP-339	GP-031	GP-031	GP-338	GP-338	GP-030	GP-030
Field Sample ID						GP-281-7.5	GP-281-15	SS-399-1	GP-152-5	GP-152-8	GP-035-3	GP-035-8	GP-414-3	GP-414-7.5	GP-439-14	GP-415-3	GP-415-8	GP-032-1	GP-032-11	GP-339-2.5	GP-339-8	GP-339-13	GP-031-3.5	GP-031-12	GP-338-2.5	GP-338-12	GP-030-2	GP-030-10
Laboratory ID						10473051002	10473051003	10482958009	10451751012	10451751013	10451751009	10451751010	10484109011	10484109012	10484853005	10484109013	10484109017	10447922014	10447922015	10474744007	10474744008	10474744009	10447922011	10447922012	10474744011	10474744012	10447922004	10447922005
Sample Date						4/30/2019	4/30/2019	7/12/2019	10/15/2018	10/15/2018	10/15/2018	10/15/2018	7/22/2019	7/22/2019	7/24/2019	7/22/2019	7/22/2019	9/18/2018	9/18/2018	5/13/2019	5/13/2019	5/13/2019	9/18/2018	9/18/2018	5/13/2019	5/13/2019	9/17/2018	9/17/2018
DRO and GRO																													
Diesel Range Organics	mg/kg	The MPCA Unregulated Fill Criteria for DRO and GRO is <100 mg/kg				<8.9	<7	NM	102 (T6)	NM	<9.9	NM	NM	NM	NM	23.1 (T7,T6)	NM	19.5 (T7,T6)	14.5 (T7,T6)	NM	NM	NM	137 (T6)	145 (T7,T6)	203 (T7,T6)	NM	1750 (T6)	219 (T6)
Gasoline Range Organics	mg/kg					<11.8	<10.6	NM	<12.6	<11.7	<12.9	<11.5	<12.5	<13.3	<6.7	<13.2	<12.8	<11	<16.3	<11.6 (TP)	<13.7	<72.7 (3M)	<15	<17.9	<10.8 (G+)	<26.7	<11 (1M)	<15.2
WDRO C10-C28 Silica Gel	mg/kg					NM	NM	NM	NM	63.1 (T6)	NM	<9.1	<9.6	37.4 (T7,T6)	49.3 (T7,T6)	NM	20.2 (T7,T6)	NM	NM	<9.4	176 (T6)	63.8 (T6)	NM	NM	NM	114 (T6)	NM	NM
Metals																													
Antimony	mg/kg	5.4	NE	12	100	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<0.96	NM	<1.1	<1.3	<4.7	1.3	NM	<1	3	22.8	NM
Arsenic	mg/kg	5.8	100	9	20	2.3	<4.9 (D3)	3.0	2.5	4.1	<5.9 (D3)	5.2	3.2	2.7	2.9	2.6	4.2	2.6	4.3	3.4	3.8	<4.7	18.9	2.0	6.3	10.9	11.9	2.9
Barium	mg/kg	1700	2000	1100	18000	32.7	56.5	64.1	47.9	148	267	90.5	87.8	60.9	106	51.6	106	NM	55.2	81.5	95	44	NM	46.9	90.2	564	NM	69.2
Beryllium	mg/kg	2.7	NE	55	230	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<0.24	NM	0.70	0.5	<1.2	0.41	NM	0.51	0.72	<0.27	NM
Cadmium	mg/kg	8.8	20	25	200	<0.16	<0.74 (D3)	<0.16	<0.16	0.64	<0.89 (D3)	0.86	<0.17	<0.18	<0.19	0.21	0.19	<0.14	<0.23	0.51	0.40	<0.71	5.2	0.40	2.1	1.9	5.4	0.73
Chromium	mg/kg	36	100	87	650	19.5	22	21	21.5	17.2	11.7	22.8	25.1	20.5	29.6	13.4	25.5	10.5	19.3	27.2	16.3	5.4	25.9	10.5	21.4	36.9	24.6	16.8
Copper	mg/kg	700	NE	100	9000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	26.5	NM	36.8	50.3	12.6	120	NM	172	90.2	180	NM
Lead	mg/kg	2700	100	300	700	4.9	6.6	28.3	19.4	721	67.8	90.4	37	30.8	11.2	30.8	206	16.4	45.4	36.1	213	19.2	525	37.1	184	1360	1510	63.7
Mercury	mg/kg	3.3	4	0.5	1.5	<0.019	<0.02	0.025	0.092	0.53	0.052	<0.02	0.058	0.13	0.063	0.053	0.06.0	0.02	0.53	0.073	0.47	<0.093	0.2	0.19	0.028	0.28	0.67	0.19
Nickel	mg/kg	180	NE	560	2500	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	11.9	NM	22	19.3	<4.7	25	NM	24.7	19.2	31	NM
Selenium	mg/kg	2.6	20	160	1300	<1.1	<4.9 (D3)	<1.1	<1.1	<1.1	<5.9 (D3)	<1.1	<1.1	<1.2	<1.2	<1.1	<1.2	<0.96	<1.6	<1.1	<1.3	<4.7	<1.3	<1.7	<1	<2.6	<1.1	<1.3
Silver	mg/kg	7.9	100	160	1300	<0.53	<2.5 (D3)	<0.55	<0.54	<0.56	<3 (D3)	<0.55	<0.57	<0.59	<0.62	<0.55	<0.58	<0.48	<0.78	<0.57	<0.64	<2.4	<0.63	<0.87	<0.52	<1.3	<0.54	<0.66
Zinc	mg/kg	3000	NE	8700	75000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	50.2	NM	77.2	167	86.7	726	NM	247	533	1380	NM
TCLP Metals																													
Lead TCLP	mg/L	5 mg/L TCLP Lead hazardous limit				NM	NM	NM	NM	3.4	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<0.5	NM	0.15	NM	NM	<0.5	1.9	NM
Mercury TCLP	mg/L	0.2 mg/L TCLP Mercury hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium TCLP	mg/L	1.0 mg/L TCLP Cadmium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Chromium TCLP	mg/L	5.0 mg/L TCLP Chromium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
PCBs																													
PCBs (Polychlorinated Biphenyls)	mg/kg	NE	NE	1.2	8	NM	NM	NM	BRL	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	BRL	NM	NM	NM	BRL	NM
Herbicides and Pesticides																													
2,4-D	mg/kg	0.5	200	0.5	0.5	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Triclopyr	mg/kg	0.3	NE	0.3	0.3	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Semi-VOCs																													
1-Methylnaphthalene	mg/kg	NE	NE	NE	NE	NM	NM	NM	NM	NM	NM	<0.38	<0.39	<0.4	<0.44	NM	<0.4	<0.35	<0.52	<0.4	<0.45	<1.6	<0.45	<0.57	<7	<0.9	<0.37	<0.45
2,4-Dinitrotoluene	mg/kg	0.013	2.6	50	355	NM	NM	NM	NM	NM	NM	<0.38	<0.39	<0.4	<0.44	NM	<0.4	<0.35	<0.52	<0.4	<0.45	<1.6	<0.45	<0.57	<7	<0.9	<0.37	<0.45
2-Methylnaphthalene	mg/kg	NE	NE	100	369	NM	NM	NM	NM	NM	NM	<0.38	<0.39	<0.4	<0.44	NM	<0.4	<0.35	<0.52	<0.4	<0.45	<1.6	<0.45	<0.57	<7	<0.9	<0.37	<0.45
Acenaphthene	mg/kg	81	NE	1200	5260	<0.011	<0.011	<0.012	0.24	0.13	<0.013	<0.38	<0.39	<0.4	<0.44	0.012	<0.4	<0.35	<0.52	<0.4	0.71	<1.6	<0.45	<0.57	<7	<0.9	<0.37	<0.45
Acenaphthylene	mg/kg	NE	NE	NE	NE	<0.011	<0.011	<0.012	0.018	0.083	<0.013	<0.38	<0.39	<0.4	<0.44	0.037	<0.4	<0.35	<0.52	<0.4	<0.45	<1.6	<0.45	<0.57	<7	<0.9	<0.37	<0.45
Anthracene	mg/kg	1300	NE	7880	45400	<0.011	<0.011	0.025	0.25	0.43	0.023	<0.38	0.57	<0.4	<0.44	0.043	<0.4	<0.35	<0.52	<0.4	2.7	<1.6	0.74	<0.57	<7	<0.9	<0.37	1.3
Benz(a)anthracene	mg/kg	NE	NE	NE	NE	<0.011	<0.011	0.086	1.1	1.1	0.073	<0.38	1.00	<0.4	<0.44	0.13	<0.4	<0.35	<0.52	<0.4	9.0	<1.6	1.8	0.61	<7	<0.9	0.86	2.3
Benzo(a)pyrene	mg/kg	1.4	NE	2	3	<0.011	<0.011	0.077	1.3	0.85	0.071	<0.38	0.82	<0.4	<0.44	0.12	<0.4	<0.35	<0.52	<0.4	6.6	<1.6	1.7	0.59	<7	<0.9	0.71	2.1
Benzo(b)fluoranthene	mg/kg	NE	NE	NE	NE	0.014	<0.011	0.10	2.1	1.2	0.10	<0.38	1.1	<0.4	<0.44	0.16	<0.4	<0.35	<0.52	<0.4	10.5	<1.6	2.3	0.71	<7	1.2	0.92	2.6
Benzo(g,h,i)perylene	mg/kg	NE	NE	NE	NE	<0.011	<0.011	0.05	0.97	0.45	0.045	<0.38	0.44	<0.4	<0.44	0.081	<0.4	<0.35	<0.52	<0.4	3.8	<1.6	1.1	<0.57	<7	<0.9	<0.37	1.1
Benzo(k)fluoranthene	mg/kg	NE	NE	NE	NE	<0.011	<0.011	0.049	0.63	0.43	0.037	<0.38	0.42	<0.4	<0.44	0.076	<0.4	<0.35	<0.52	<0.4	4.1	<1.6	0.92	<0.57	<7	<0.9	0.39	1.1
Carbazole	mg/kg	NE	NE	700	1310	NM	NM	NM	NM	NM	NM	<0.38	<0.39	<0.4	<0.44	NM	<0.4	<0.35	<0.52	<0.4	0.5	<1.6	<0.45	<0.57	<7	<0.9	<0.37	<0.45
Chrysene	mg/kg	NE	NE	NE	NE	0.012	<0.011	0.083	1.3	0.98	0.068	<0.38	0.94	<0.4	<0.44	0.13	<0.4	<0.35	<0.52	<0.4	7.2	<1.6	1.9	0.61	<7	<0.9	0.77	2.1
Dibenz(a,h)anthracene	mg/kg	NE	NE	NE	NE	<0.011	<0.011	0.021	0.22	0.13	0.014	<0.38	<0.39	<0.4	<0.44	0.025	<0.4	<0.35	<0.52	<0.4	1.1	<1.6	<0.45	<0.57	<7	<0.9	<0.37	<0.45
Dibenzofuran	mg/kg	NE	NE	104	810	NM	NM	NM	NM	NM	NM	<0.38	<0.39	<0.4	<0.44	NM	<0.4	<0.35	<0.52	<0.4	<0.45	<1.6	<0.45	<0.57	<7	<0.9	<0.37	<0.45
Fluoranthene	mg/kg	670	NE	1080	6800	0.023	<0.011	0.18	2.7	2.3	0.15	<0.38	2.2	0.49	<0.44	0.22	<0.4	<0.35	<0.52	<0.4	17.7	<1.6	3.7	1.3	<7	1.7	1.8	5.0
Fluorene	mg/kg	110	NE	850	4120	<0.011	<0.011	<0.012	0.18	0.15	<0.013	<0.38	<0.39	<0.4	<0.44	0.013	<0.4	<0.35	<0.52	<0.4	0.93	<1.6	<0.45	<0.57	<7	<0.9	<0.37	<0.45
Indeno(1,2,3-cd)pyrene	mg/kg	NE	NE	NE	NE	<0.011	<0.011	0.045	0.91	0.46	0.042	<0.38	0.43	<0.4	<0.44	0.065	<0.4	<0.35	<0.52	<0.4	3.6	<1.6	0.95	<0.57	<7	<0.9	<0.37	1.1
Naphthalene	mg/kg	NE	NE	NE	NE	<0.011	<0.011	<0.012	<0.012	0.057	<0.013	<0.38	<0.39	<0.4	<0.44	0.14	<0.4	<0.35	<0.52	<0.4	<0.45	<1.6	<0.45	<0.57	<7	<0.9	<0.37	<0.45
Phenanthrene	mg/kg	NE	NE	NE	NE	0.012	<0.011	0.11	1.3	1.6	0.074	<0.38	1.9	<0.4	<0.44	0.19	<0.4	<0.35	<0.52	<0.4	6.7	<1.6	2.8	0.73	<7	0.97	1.2	3.7
Pyrene	mg/kg	440	NE	890	5800	0.020	<0.011	0.15	2.2	1.9	0.12	<0.38	1.8	0.42	<0.44	0.23	<0.4	<0.35	<0.52	<0.4	15.1	<1.6	3.2	1.1	<7	1.3	1.5	4.2
BaP Equivalents																													
Benzo(a)pyrene Equivalents	mg/kg	1.4	NE	2	3	0.0015	<0	0.12	1.9	1.3	0.10	<0	1.1	<0	<0	0.18	<0	<0	<0	<0	10.0	<0	2.3	0.73	<0	0.12	0.93	2.8
VOCs																													
1,2,4-Trimethylbenzene	mg/kg	2.7	NE	8	25	<0.054	<0.054	NM	<0.06	<0.06	<0.064	<0.058	<0.061	<0.062	<0.068	0.082	<0.064	<0.054	<0.079	<0.062	<0.067	<0.24	<0.066	<0.09	<0.056	<0.13	0.091	<0.072
1,3,5-Trimethylbenzene	mg/kg	2.7	NE	3	10	<0.054	<0.054	NM	<0.06	<0.06	<0.064	<0.058	<0.061	<0.062	<0.068	<0.064	<0.064	<0.054	<0.079	<0.062	<0.067	<0.24	<0.066	<0.09	<0.056	<0.13	<0.062	<0.072
Benzene	mg/kg	0.017	10	6	10	<0.022	<0.022	NM	<0.024	0.033	<0.026	<0.023	<0.024	<0.025	<0.027	<0.026	<0.025	<0.022	<0.032	<0.025	<0.027	<0.098	<0.026	<0.036	<0.022	<0.054	0.058	<0.029
Chlorobenzene	mg/kg	1.2	2000	11	32	<0.054	<0.054	NM	<0.06	<0.06	<0.064	<0.058	<0.061	<0.062	<0.068	<0.064	<0.064	<0.054	<0.079	<0.062	<0.067	<0.24	<0.066	<0.09	<0.056	<0.13	<0.062	<0.072
Diethyl Ether	mg/kg	0.51	NE	NE	NE	<0.22	<0.22	NM	<0.24	<0.24	<0.26	<0.23	<0.24	<0.25	<0.27	<0.26	<0.25	<0.22	<0.32	<0.25	<0.27	<0.98	<0.26	<0.36	<0.22	<0.54	<0.25	<0.29
Ethylbenzene	mg/kg	1.1	NE	200	200	<0.054	<0.054	NM	<0.06	<0.06	<0.064	<0.058	<0.061	<0.062	<0.068	0.066	<0.064	<0.054	<0.079	<0.062	<0.067	<0.24	<0.066	<0.09	<0.056	<0.13	0.10	<0.072
Isopropylbenzene	mg/kg	9.5	NE	30	87	<0.054	<0.054	NM	<0.06	<0.06	<0.064	<0.058	<0.061	<0.062	<0.068	<0.064	<0.064	<0.054	<0.079	<0.062	<0.067	<0.24	<0.066	<0.09	<0.056	<0.13	<0.062	<0.072
Naphthalene	mg/kg	4.5	NE	10	28	<0.22	<0.22	NM	<0.24	<0.24	<0.26	<0.23	<0.24	<0.25	<0.27	<0.26	<0.25	<0.22	<0.32	<0.25	<0.27	<0.98	<0.26	<0.36	<0.22	<0.54	0.27	<0.29
n-Butylbenzene	mg/kg	NE	NE	30	92	<0.054	<0.054	NM	<0.06	<0.06	<0.064	<0.058	<0.061	<0.062	<0.068	<0.064	<0.064	<0.054	<0.079	<0.062	<0.067	<0.24	<0.066	<0.09	<0.056	<0.13	<0.062	<0.072
n-Propylbenzene	mg/kg	NE	NE	30	93	<0.054	<0.054	NM	<0.06	<0.06	<0.064	<0.058	<0.061	<0.062	<0.068	<0.064	<0.064	<0.054	<0.079	<0.062	<0.067	<0.24	<0.066	<0.09	<0.056	<0.13	<0.062	<0.072
p-Isopropyltoluene	mg/kg	NE	NE	NE	NE	<0.054	<0.054	NM	<0.06	<0.06	<0.064	<0.058	<0.061	<0.062	<0.068	<0.064	<0.064	<0.054	<0.079	<0.062	<0.067	<0.24	<0.066	<0.09	<0.056	<0.13	<0.062	1.3
sec-Butylbenzene	mg/kg	NE	NE	25	70	<0.054	<0.054	NM	<0.06	<0.06	<0.064	<0.058	<0.061	<0.062	<0.068	<0.064	<0.064	<0.054	<0.079	<0.062	<0.067	<0.24	<0.066	<0.09	<0.056	<0.13	<0.062	<0.072
tert-Butylbenzene	mg/kg	NE	NE	30	90	<0.054	<0.054	NM	<0.06	<0.06	<0.064	<0.058	<0.061	<0.062	<0.068	<0.064	<0.064	<0.054	<0.079	<0.062	<0.067	<0.24	<0.066	<0.09	<0.056	<0.13	<0.062	<0.072
Tetrachloroethene	mg/kg	0.042	14	72	131	<0.054	<0.054	NM	<0.06	<0.06	<0.064	<0.058	<0.061	<0.062	<0.068	<0.064	<0.064	<0.054	<0.079	<0.062	<0.067	<0.24	<0.066	<0.09	<0.056	<0.13	<0.062	<0.072
Toluene	mg/kg	2.5	NE	107	305	<0.054	<0.054	NM	0.068	0.11	<0.064	<0.058	<0.061	0.074	<0.068	0.17	<0.064	<0.054	<0.079	<0.062	<0.067	<0.24	0.093	<0.09	<0.056	<0.13	0.37	<0.072
Trichloroethene	mg/kg	0.0023	10	29	46	<0.054	<0.054	NM	<0.06	<0.06	<0.064	<0.058	<0.061	<0.062	<0.068	<0.064	<0.064	<0.054	<0.079	<0.062	<0.067	<0.24	<0.066	<0.09	<0.056	<0.13	<0.062	<0.072
Xylene (Total)	mg/kg	5.4	NE	45	130	<0.16	<0.16	NM	<0.18	<0.18	<0.19	<0.17	<0.18	<0.19	<0.41	0.37	<0.38	<0.16	<0.24	<0.19	<0.2	<0.73	<0.2	<0.27	<0.17	<0.4	0.37	<0.22

Notes:

A full list of abbreviations is included in the table glossery

Table 2
Soil Analytical Results

Phase II Environmental Site Assessment
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

				Borings are ordered by Area:		22nd Ave and Coffee Creek Replacement																						
Boring ID	Units	*2014 Screening SLV*	20xTCLP level	Tier 1 Residential SRV	**Tier 2 Industrial SRV**	GP-284	GP-284	GP-285	GP-285	GP-029	GP-029	GP-286	GP-286	GP-118	GP-118	GP-009	GP-009	GP-276	GP-276	GP-278	GP-278	GP-277	GP-117	GP-117	GP-117	GP-008	GP-008	GP-007
Field Sample ID						GP-284-2	GP-284-10.5	GP-285-2	GP-285-8	GP-029-2	GP-029-7.5	GP-286-3	GP-286-12	GP-118-2	GP-118-12.5	GP-009-5.5	GP-009-16.5	GP-276-1.5	GP-276-11.5	GP-278-3.5	GP-278-9	GP-277-2.5	GP-117-9.5	GP-117-11	GP-117-17	GP-008-2.5	GP-008-7	GP-007-2.5
Laboratory ID						10474744004	10474744005	10474487013	10474487014	10447922001	10447922002	10474744001	10474744002	10445057004	10445057005	10445057001	10445057002	10472647005	10472647006	10472856004	10472856006	10472856002	10445057006	10445057007	10445057008	10443754007	10443754008	10443754004
Sample Date						5/13/2019	5/13/2019	5/10/2019	5/10/2019	9/17/2018	9/17/2018	5/13/2019	5/13/2019	8/27/2018	8/27/2018	8/27/2018	8/27/2018	4/29/2019	4/29/2019	4/29/2019	4/29/2019	4/29/2019	8/27/2018	8/27/2018	8/27/2018	8/15/2018	8/15/2018	8/15/2018
DRO and GRO																												
Diesel Range Organics	mg/kg	The MPCA Unregulated Fill Criteria for DRO and GRO is <100 mg/kg				NM	**401 (T6)**	**1050 (T6)**	**806 (T6)**	26.1 (T6)	10.6 (T6)	**959 (T7,T6)**	NM	75 (T6)	**227 (T6)**	36.8 (T6)	51.6 (T6)	52.5 (T6)	39.0 (T7,T6)	182 (T6)	126 (T7,T6)	64.3 (T7,T6)	<10.4	29.1 (T6)	87.3	**245 (T6)**	68.3 (T6)	107 (T6)
Gasoline Range Organics	mg/kg					<12.2	<13.4	<12 (G+)	<11.2	<11.8	<12.2	14.5 (G+)	<26.6	<15.2	<11.5	<12.9	<16.8	<12.1	<13.3	<12.7	<16.4	<18.3 (G+)	<14	<12.3	<12.8	<12.5	<14.9	<13.3
WDRO C10-C28 Silica Gel	mg/kg					136 (T6)	NM	NM	NM	NM	NM	NM	147 (T6)	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Metals																												
Antimony	mg/kg	5.4	NE	12	100	<1.1	<1.3	<1.2	<0.99	<1.2 (M1)	NM	<2.4 (D3)	<2.7	NM	NM	<1.2 (M1)	<1.6	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Arsenic	mg/kg	5.8	100	9	20	3.8	2.2	1.2	4.3	2.9 (M1)	2.7	3.6	*6.6*	3.9	*5.8*	3.3 (M1)	3.1	<5.4 (D3)	2.0	3.9	*<5.9 (D3)*	*<5.8 (D3)*	3.4	2.9	1.8	2.0	4.0	1.8
Barium	mg/kg	1700	2000	1100	18000	96.5	30.7	8.2	161	NM	75.2	48.2	105	114	170	NM	NM	157	55.4	98.7	177	138	131	111	31.4	35	109	25.3
Beryllium	mg/kg	2.7	NE	55	230	0.79	<0.33	<0.29	0.69	<0.29	NM	0.68	<0.67	NM	NM	<0.3 (M1)	<0.4	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium	mg/kg	8.8	20	25	200	<0.17	<0.2	<0.18	3.3	0.32	<0.16	<0.36 (D3)	0.75	<0.19	0.94	<0.18	<0.24	<0.81 (D3)	<0.17	<0.36 (D3)	<0.89 (D3)	<0.86 (D3)	0.28	<0.18	<0.18	<0.15	1.2	<0.17
Chromium	mg/kg	36	100	87	650	*37.2*	6.4	4.7	22.5	24.4	10.9	14.8	18.7	31.2	32.5	32.3 (M1)	27.6	*36.1*	17.8	24.4	*42.9*	*36.4*	29.6	25.7	12.3	13.2	28.3	15.9
Copper	mg/kg	700	NE	100	9000	33.4	22.4	2.7	122	45.9	NM	45.8	71.5	NM	NM	37.6	36.2	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Lead	mg/kg	2700	100	300	700	17	217	1.1	303	66 (M1,R1)	14	40.9	223	14	**1290**	10.8 (M1)	5.5	10.4	7.2	40.4	18.2	37.4	6.8	5.6	3.2	15	103	21.2
Mercury	mg/kg	3.3	4	0.5	1.5	0.028	0.16	0.058	0.080	0.036	0.064	<0.024	0.60 (M1,R1)	0.046	0.26	0.045	0.061	0.025	0.023	<0.024	0.057	0.24	<0.026	<0.022	<0.023	0.059	***13.2***	0.033
Nickel	mg/kg	180	NE	560	2500	24.3	6.3	4.1	23.8	34.3 (M1)	NM	18.2	15.5	NM	NM	27.8 (M1)	21.5	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Selenium	mg/kg	2.6	20	160	1300	<1.1	<1.3	<1.2	<0.99	<1.2 (M1)	<1	<2.4 (D3)	*<2.7*	<1.2	<1.2	<1.2 (M1)	<1.6	*<5.4 (D3)*	<1.1	<2.4 (D3)	*<5.9 (D3)*	*<5.8 (D3)*	<1.2	<1.2	<1.2	<1	<1.5	<1.1
Silver	mg/kg	7.9	100	160	1300	<0.56	<0.65	<0.58	<0.5	<0.59	<0.52	<1.2 (D3)	<1.3	<0.62	<0.59	<0.6	<0.8	<2.7 (D3)	<0.57	<1.2 (D3)	<3 (D3)	<2.9 (D3)	<0.62	<0.61	<0.59	<0.51	0.92	<0.57
Zinc	mg/kg	3000	NE	8700	75000	49.6	45.4	5.7	464	800 (P6)	NM	75	209	NM	NM	45.1 (M1)	56.9	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TCLP Metals																												
Lead TCLP	mg/L	5 mg/L TCLP Lead hazardous limit				NM	<0.5	NM	<0.5	NM	NM	NM	<0.5	NM	<0.5	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	0.92	NM
Mercury TCLP	mg/L	0.2 mg/L TCLP Mercury hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<0.0006	NM
Cadmium TCLP	mg/L	1.0 mg/L TCLP Cadmium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Chromium TCLP	mg/L	5.0 mg/L TCLP Chromium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
PCBs																												
PCBs (Polychlorinated Biphenyls)	mg/kg	NE	NE	1.2	8	BRL	NM	4.4	NM	NM	NM	BRL	NM	BRL	NM	BRL	NM	BRL	NM	NM	NM	NM	BRL	BRL	NM	NM	NM	BRL
Herbicides and Pesticides																												
2,4-D	mg/kg	0.5	200	0.5	0.5	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Triclopyr	mg/kg	0.3	NE	0.3	0.3	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Semi-VOCs																												
1-Methylnaphthalene	mg/kg	NE	NE	NE	NE	<0.4	<0.44	<0.39	0.75	<0.39	<0.37	0.77	<0.88	NM	NM	NM	NM	NM	NM	NM	<0.42	NM	NM	NM	NM	NM	NM	NM
2,4-Dinitrotoluene	mg/kg	0.013	2.6	50	355	*<0.4*	*<0.44*	*<0.39*	*<0.36*	*<0.39*	*<0.37*	*<0.4*	*<0.88*	NM	NM	NM	NM	NM	NM	NM	*<0.42*	NM	NM	NM	NM	NM	NM	NM
2-Methylnaphthalene	mg/kg	NE	NE	100	369	0.59	<0.44	<0.39	0.95	<0.39	<0.37	0.68	<0.88	NM	NM	NM	NM	NM	NM	NM	<0.42	NM	NM	NM	NM	NM	NM	NM
Acenaphthene	mg/kg	81	NE	1200	5260	3.2	0.55	<0.39	3.6	<0.39	<0.37	3.9	<0.88	0.055	<0.012	0.11	<0.016	<0.012	<0.012	<0.012	<0.42	<0.025 (M1,R1)	<0.013	<0.012	0.27	<0.056	<0.015	<0.057
Acenaphthylene	mg/kg	NE	NE	NE	NE	<0.4	<0.44	<0.39	<0.36	<0.39	<0.37	<0.4	<0.88	0.026	<0.012	0.032	<0.016	<0.012	<0.012	<0.012	<0.42	<0.025	<0.013	<0.012	0.057	<0.056	<0.015	<0.057
Anthracene	mg/kg	1300	NE	7880	45400	4.3	1.6	<0.39	11.7	<0.39	<0.37	13.1	<0.88	0.17	<0.012	0.26	<0.016	0.048	<0.012	0.034	<0.42	0.10 (M1,R1)	<0.013	<0.012	0.098	0.070	0.033	<0.057
Benz(a)anthracene	mg/kg	NE	NE	NE	NE	10.8	4.2	<0.39	17.5	<0.39	0.47	22.8	0.96	0.39	<0.012	0.98	<0.016	0.22	0.020	0.075	1.1	0.34 (M1,R1)	<0.013	<0.012	<0.012	0.17	0.11	0.19
Benzo(a)pyrene	mg/kg	1.4	NE	2	3	***9.4***	***3.5***	<0.39	***13.7***	<0.39	0.43	***18.6***	0.91	0.33	<0.012	0.94	<0.016	0.19	0.029	0.074	0.88	0.28 (M1,R1)	<0.013	<0.012	<0.012	0.18	0.11	0.19
Benzo(b)fluoranthene	mg/kg	NE	NE	NE	NE	12.4	4.9	0.5	17.8	<0.39	0.47	23.4	1.2	0.58	0.015	1.1	<0.016	0.25	0.023	0.091	1.3	0.38 (M1,R1)	<0.013	<0.012	<0.012	0.15	0.15	0.18
Benzo(g,h,i)perylene	mg/kg	NE	NE	NE	NE	5.3	1.9	<0.39	7.6	<0.39	<0.37	12	<0.88	0.17	<0.012	0.39	<0.016	0.099	0.025	0.058	0.49	0.18 (M1,R1)	<0.013	<0.012	<0.012	0.15	0.061	0.13
Benzo(k)fluoranthene	mg/kg	NE	NE	NE	NE	4.4	1.9	<0.39	5.7	<0.39	<0.37	6.4	<0.88	0.18	<0.012	0.40	<0.016	0.091	<0.012	0.037	0.46	0.13 (M1,R1)	<0.013	<0.012	<0.012	<0.056	0.049	0.06
Carbazole	mg/kg	NE	NE	700	1310	3.0	<0.44	<0.39	1.8	<0.39	<0.37	1.1	<0.88	NM	NM	NM	NM	NM	NM	NM	<0.42	NM	NM	NM	NM	NM	NM	NM
Chrysene	mg/kg	NE	NE	NE	NE	11	3.9	<0.39	15.9	<0.39	0.47	22.2	0.93	0.35	<0.012	0.83	<0.016	0.16	0.032	0.078	1.0	0.32 (M1,R1)	<0.013	<0.012	<0.012	0.21	0.088	0.18
Dibenz(a,h)anthracene	mg/kg	NE	NE	NE	NE	1.4	0.62	<0.39	2.1	<0.39	<0.37	3.1	<0.88	0.052	<0.012	0.12	<0.016	0.032	<0.012	0.017	<0.42	0.063 (M1,R1)	<0.013	<0.012	<0.012	<0.056	<0.015	<0.057
Dibenzofuran	mg/kg	NE	NE	104	810	1.7	0.48	<0.39	3.5	<0.39	<0.37	2.6	<0.88	NM	NM	NM	NM	NM	NM	NM	<0.42	NM	NM	NM	NM	NM	NM	NM
Fluoranthene	mg/kg	670	NE	1080	6800	26.3	6.9	0.57	37.5	<0.39	0.96	46.6	1.6	1.2	0.024	2.0	<0.016	0.40	0.025	0.13	1.8	0.57 (M1,R1)	<0.013	<0.012	0.039	0.24	0.19	0.26
Fluorene	mg/kg	110	NE	850	4120	2.9	0.66	<0.39	4.7	<0.39	<0.37	4.2	<0.88	0.06	<0.012	0.1	<0.016	<0.012	<0.012	<0.012	<0.42	<0.025 (M1,R1)	<0.013	<0.012	0.30	<0.056	<0.015	<0.057
Indeno(1,2,3-cd)pyrene	mg/kg	NE	NE	NE	NE	4.5	2.0	<0.39	7.4	<0.39	<0.37	11.1	<0.88	0.15	<0.012	0.37	<0.016	0.10	<0.012	0.046	0.49	0.18 (M1,R1)	<0.013	<0.012	<0.012	0.060	0.056	0.076
Naphthalene	mg/kg	NE	NE	NE	NE	1.7	<0.44	<0.39	0.64	<0.39	<0.37	<0.4	<0.88	0.045	<0.012	0.043	<0.016	<0.012	<0.012	<0.012	<0.42	<0.025	<0.013	<0.012	0.044	<0.056	<0.015	<0.057
Phenanthrene	mg/kg	NE	NE	NE	NE	24.1	5.1	<0.39	34.8	<0.39	0.68	38.4	<0.88	0.85	0.017	1.4	<0.016	0.16	0.031	0.077	0.57	0.28 (M1,R1)	<0.013	<0.012	2.1	<0.056	0.081	<0.057
Pyrene	mg/kg	440	NE	890	5800	21.3	6.3	0.56	30.2	<0.39	0.87	37.5	1.5	0.93	0.02	1.7	<0.016	0.32	0.043	0.13	1.6	0.51 (M1,R1)	<0.013	<0.012	0.058	0.62	0.18	0.51
BaP Equivalents																												
Benzo(a)pyrene Equivalents	mg/kg	1.4	NE	2	3	***13.5***	***5.2***	0.05	***19.9***	<0	0.53	***26.9***	1.1	0.49	0.0015	1.3	<0	0.28	0.034	0.11	1.2	0.42 (M1,R1)	<0	<0	<0	0.22	0.15	0.24
VOCs																												
1,2,4-Trimethylbenzene	mg/kg	2.7	NE	8	25	<0.061	<0.065	<0.058	<0.055	<0.06	<0.058	<0.063 (M1)	<0.14	<0.076	<0.06	0.067	<0.083	<0.061	<0.065	<0.066	<0.08	0.15	<0.068	<0.06	<0.059	<0.057	<0.08	<0.064
1,3,5-Trimethylbenzene	mg/kg	2.7	NE	3	10	<0.061	<0.065	<0.058	<0.055	<0.06	<0.058	<0.063	<0.14	<0.076	<0.06	<0.064	<0.083	<0.061	<0.065	<0.066	<0.08	<0.079	<0.068	<0.06	<0.059	<0.057	<0.08	<0.064
Benzene	mg/kg	0.017	10	6	10	*<0.025*	*<0.026*	*<0.023*	*<0.022*	*<0.024*	*<0.023*	*<0.025*	*<0.055*	*<0.031*	*<0.024*	*<0.026*	*<0.033*	*<0.024*	*<0.026*	*<0.026*	*<0.032*	*<0.032*	*<0.027*	*<0.024*	*<0.024*	*<0.023*	*<0.032*	*<0.025*
Chlorobenzene	mg/kg	1.2	2000	11	32	<0.061	<0.065	<0.058	<0.055	<0.06	<0.058	<0.063	<0.14	<0.31	<0.24	<0.26	<0.33	<0.061	<0.065	<0.066	<0.08	<0.079	<0.27	<0.24	<0.24	<0.057	<0.08	<0.064
Diethyl Ether	mg/kg	0.51	NE	NE	NE	<0.25	<0.26	<0.23	<0.22	<0.24	<0.23	<0.25	<0.55	<0.31	<0.24	<0.26	<0.33	<0.24	<0.26	<0.26	<0.32	<0.32	<0.27	<0.24	<0.24	<0.23	<0.32	<0.25
Ethylbenzene	mg/kg	1.1	NE	200	200	<0.061	<0.065	<0.058	<0.055	<0.06	<0.058	<0.063	<0.14	<0.076	<0.06	<0.064	<0.083	<0.061	<0.065	<0.066	<0.08	<0.079	<0.068	<0.06	<0.059	<0.057	<0.08	<0.064
Isopropylbenzene	mg/kg	9.5	NE	30	87	<0.061	<0.065	<0.058	<0.055	<0.06	<0.058	<0.063	<0.14	<0.31	<0.24	<0.26	<0.33	<0.061	<0.065	<0.066	<0.08	<0.079	<0.27	<0.24	<0.24	<0.057	<0.08	<0.064
Naphthalene	mg/kg	4.5	NE	10	28	<0.25	<0.26	<0.23	<0.22	<0.24	<0.23	<0.25	<0.55	<0.31	<0.24	<0.26	<0.33	<0.24	<0.26	<0.26	<0.32	0.43	<0.27	<0.24	<0.24	<0.23	<0.32	<0.25
n-Butylbenzene	mg/kg	NE	NE	30	92	<0.061	<0.065	<0.058	<0.055	<0.06	<0.058	<0.063	<0.14	<0.076	<0.06	<0.064	<0.083	<0.061	<0.065	<0.066	<0.08	<0.079	<0.068	<0.06	<0.059	<0.057	<0.08	<0.064
n-Propylbenzene	mg/kg	NE	NE	30	93	<0.061	<0.065	<0.058	<0.055	<0.06	<0.058	<0.063	<0.14	<0.076	<0.06	<0.064	<0.083	<0.061	<0.065	<0.066	<0.08	<0.079	<0.068	<0.06	<0.059	<0.057	<0.08	<0.064
p-Isopropyltoluene	mg/kg	NE	NE	NE	NE	<0.061	<0.065	<0.058	<0.055	<0.06	<0.058	<0.063	<0.14	<0.076	<0.06	<0.064	<0.083	<0.061	<0.065	<0.066	<0.08	<0.079	<0.068	<0.06	<0.059	<0.057	<0.08	<0.064
sec-Butylbenzene	mg/kg	NE	NE	25	70	<0.061	<0.065	<0.058	<0.055	<0.06	<0.058	<0.063	<0.14	<0.076	<0.06	<0.064	<0.083	<0.061	<0.065	<0.066	<0.08	<0.079	0.084	<0.06	<0.059	<0.057	<0.08	<0.064
tert-Butylbenzene	mg/kg	NE	NE	30	90	<0.061	<0.065	<0.058	<0.055	<0.06	<0.058	<0.063	<0.14	<0.076	<0.06	<0.064	<0.083	<0.061	<0.065	<0.066	<0.08	<0.079	<0.068	<0.06	<0.059	<0.057	<0.08	<0.064
Tetrachloroethene	mg/kg	0.042	14	72	131	*<0.061*	*<0.065*	*<0.058*	*<0.055*	*<0.06*	*<0.058*	*<0.063*	*<0.14*	*<0.076*	*<0.06*	*<0.064*	*<0.083*	*<0.061*	*<0.065*	*<0.066*	*<0.08*	*<0.079*	*<0.068*	*<0.06*	*<0.059*	*<0.057*	*<0.08*	*<0.064*
Toluene	mg/kg	2.5	NE	107	305	<0.061	<0.065	0.095	<0.055	<0.06	<0.058	<0.063	<0.14	<0.076	<0.06	0.17	<0.083	<0.061	<0.065	0.072	<0.08	0.19	<0.068	<0.06	<0.059	<0.057	0.17	<0.064
Trichloroethene	mg/kg	0.0023	10	29	46	*<0.061*	*<0.065*	*<0.058*	*<0.055*	*<0.06*	*<0.058*	*<0.063*	*<0.14*	*<0.076*	*<0.06*	*8.1*	*<0.083*	*<0.061*	*<0.065*	*<0.066*	*<0.08*	*<0.079*	*<0.068*	*<0.06*	*<0.059*	*<0.057*	*<0.08*	*<0.064*
Xylene (Total)	mg/kg	5.4	NE	45	130	<0.18	<0.2	<0.18	<0.16	<0.18	<0.17	<0.19	<0.41	<0.69	<0.54	<0.58	<0.75	<0.18	<0.2	<0.2	<0.24	0.46	<0.61	<0.54	<0.53	<0.17	<0.24	<0.19

Notes:

A full list of abbreviations is included in the table glossary

Table 2
Soil Analytical Results

Phase II Environmental Site Assessment
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

Borings are ordered by Area:						22nd Ave and Coffee Creek Replacement																				
Boring ID	Units	2014 Screening SLV	20xTCLP level	Tier 1 Residential SRV	Tier 2 Industrial SRV	GP-007	GP-116	GP-116	GP-274	GP-274	GP-275	GP-006	GP-006	GP-115	GP-115	GP-005	GP-005	GP-005	GP-004	GP-004	GP-003	GP-003	GP-002	GP-002	GP-371	GP-371
Field Sample ID						GP-007-18	GP-116-2.5	GP-116-15	GP-274-3	GP-274-8	GP-275-3	GP-006-5.5	GP-006-11	GP-115-1	GP-115-7.5	GP-005-8	GP-005-11.5	GP-005-14	GP-004-8	GP-004-12	GP-003-5.5	GP-003-10	GP-002-2	GP-002-11	GP-371-2	GP-371-7
Laboratory ID						10443754005	10445270001	10445270002	10472647001	10472647002	10472647003	10443754001	10443754002	10446142006	10446142007	10443754009	10443754011	10443754010	10445270003	10445270004	10443754015	10443754014	10445270006	10445270007	10480119012	10480119013
Sample Date						8/15/2018	8/28/2018	8/28/2018	4/29/2019	4/29/2019	4/29/2019	8/15/2018	8/15/2018	9/4/2018	9/4/2018	8/15/2018	8/15/2018	8/15/2018	8/28/2018	8/28/2018	8/15/2018	8/15/2018	8/28/2018	8/28/2018	6/19/2019	6/19/2019
DRO and GRO																										
Diesel Range Organics	mg/kg	The MPCA Unregulated Fill Criteria for DRO and GRO is <100 mg/kg				<9.6	<10.1	<10.7	<10.2	<10.2	143 (T7,T6)	<8.3	<10.8	<10.1	<10.5	46 (T7,T6)	139 (T7)	228 (T6)	108 (T7,T6)	<9.2	<9	13.8 (T7)	811 (T6)	63.4 (T7,T6)	NM	<10
Gasoline Range Organics	mg/kg					12.7 (M1,R1)	<13.1	<13.3	41.2	<12.7	434 (G+)	<12.8	<12.6	<12.7	<12.7	961	763	<16.4	<13	<11.3	<11.9	89.8	<14.4	<14.6	<10.8	<12.5
WDRO C10-C28 Silica Gel	mg/kg					NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<8.4	NM
Metals																										
Antimony	mg/kg	5.4	NE	12	100	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Arsenic	mg/kg	5.8	100	9	20	2.8	3.6	3.2	<6.1 (D3)	2.4	<5.4 (D3)	2.6	3.2	2.8	3.1	3.0	3.2	5.2	4.6	1.8	2.1	2.8	10.8	3.4	<5.1 (D3)	<6.1 (D3)
Barium	mg/kg	1700	2000	1100	18000	66.5	130	81.8	172 (M1,R1)	101	39.9	134	112	113	115	142	128	170	112	25.1	41.1	116	147	110	25.3	142
Beryllium	mg/kg	2.7	NE	55	230	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium	mg/kg	8.8	20	25	200	<0.18	<0.18	<0.19	<0.92 (D3)	<0.18	<0.81 (D3)	<0.18	<0.2	<0.18	<0.38 (D3)	<0.18	<0.19	<0.24	<0.19	<0.16	<0.16	<0.18	0.36	<0.19	<0.76 (D3)	<0.91 (D3)
Chromium	mg/kg	36	100	87	650	18	44.2	27.9	35	23.8	17.7	24.3	27.4	29.2	35.4	30.7	28.9	22.7	25.7	17.7	16.7	23.3	21.9	31.3	18.6	42.2
Copper	mg/kg	700	NE	100	9000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Lead	mg/kg	2700	100	300	700	4.6	11.1	6.9	10.2	6.0	8.0	5.3	6.2	6.2	9.1	7.0	8.0	193	138	3.2	3.2	6.0	209	11.7	4.6	10.1
Mercury	mg/kg	3.3	4	0.5	1.5	<0.023	0.024	<0.024	<0.024	<0.025	<0.02	<0.024	<0.026	<0.024	0.041	<0.023	<0.023	0.24	0.063	<0.023	<0.022	<0.023	0.12	0.026	<0.019	0.036
Nickel	mg/kg	180	NE	560	2500	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Selenium	mg/kg	2.6	20	160	1300	<1.2	<1.2	<1.3	<6.1 (D3)	<1.2	<5.4 (D3)	<1.2	<1.3	<1.2	<2.6 (D3)	<1.2	<1.2	<1.6	<1.2	<1.1	<1.1	<1.2	<1.2	<1.3	<5.1 (D3)	<6.1 (D3)
Silver	mg/kg	7.9	100	160	1300	<0.6	<0.59	<0.64	<3.1 (D3)	<0.61	<2.7 (D3)	<0.59	<0.65	<0.58	<1.3 (D3)	<0.6	<0.62	<0.81	<0.62	<0.55	<0.55	<0.61	<0.62	<0.65	<2.5 (D3)	<3 (D3)
Zinc	mg/kg	3000	NE	8700	75000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TCLP Metals																										
Lead TCLP	mg/L	5 mg/L TCLP Lead hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	2.4	<0.5	NM	NM	NM	<0.5	NM	NM	NM
Mercury TCLP	mg/L	0.2 mg/L TCLP Mercury hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium TCLP	mg/L	1.0 mg/L TCLP Cadmium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Chromium TCLP	mg/L	5.0 mg/L TCLP Chromium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
PCBs																										
PCBs (Polychlorinated Biphenyls)	mg/kg	NE	NE	1.2	8	NM	NM	NM	NM	NM	BRL	NM	NM	NM	NM	BRL	NM	NM	NM	NM	NM	BRL	NM	NM	NM	NM
Herbicides and Pesticides																										
2,4-D	mg/kg	0.5	200	0.5	0.5	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	0.13	<0.1	NM	NM
Triclopyr	mg/kg	0.3	NE	0.3	0.3	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<0.1	<0.1	NM	NM
Semi-VOCs																										
1-Methylnaphthalene	mg/kg	NE	NE	NE	NE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<0.42	<0.44	<0.35	NM
2,4-Dinitrotoluene	mg/kg	0.013	2.6	50	355	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<0.42	<0.44	<0.35	NM
2-Methylnaphthalene	mg/kg	NE	NE	100	369	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<0.42	<0.44	<0.35	NM
Acenaphthene	mg/kg	81	NE	1200	5260	<0.012	0.018	<0.013	<0.013	<0.013	<0.011	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	0.17	0.55	<0.011	<0.012	<0.013	<0.42	<0.44	<0.35	<0.012
Acenaphthylene	mg/kg	NE	NE	NE	NE	<0.012	<0.012	<0.013	<0.013	<0.013	<0.011	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	<0.017	0.026	<0.011	<0.012	<0.013	<0.42	<0.44	<0.35	<0.012
Anthracene	mg/kg	1300	NE	7880	45400	<0.012	0.067	<0.013	<0.013	<0.013	<0.011	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	0.47	2.4	<0.011	<0.012	0.057	<0.42	<0.44	<0.35	<0.012
Benz(a)anthracene	mg/kg	NE	NE	NE	NE	<0.012	0.38	<0.013	<0.013	<0.013	<0.011	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	1.1	3.7	0.016	<0.012	0.28	0.54	<0.44	<0.35	0.018
Benzo(a)pyrene	mg/kg	1.4	NE	2	3	<0.012	0.39	<0.013	<0.013	<0.013	<0.011	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	1.0	4.0	0.017	<0.012	0.25	0.48	<0.44	<0.35	0.018
Benzo(b)fluoranthene	mg/kg	NE	NE	NE	NE	<0.012	0.53	<0.013	<0.013	<0.013	<0.011	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	1.2	4.6	0.02	<0.012	0.33	0.62	0.46	<0.35	0.023
Benzo(g,h,i)perylene	mg/kg	NE	NE	NE	NE	<0.012	0.24	<0.013	<0.013	<0.013	<0.011	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	0.42	2.2	0.012	<0.012	0.13	<0.42	<0.44	<0.35	<0.012
Benzo(k)fluoranthene	mg/kg	NE	NE	NE	NE	<0.012	0.22	<0.013	<0.013	<0.013	<0.011	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	0.35	2.0	<0.011	<0.012	0.097	<0.42	<0.44	<0.35	<0.012
Carbazole	mg/kg	NE	NE	700	1310	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<0.42	<0.44	<0.35	NM
Chrysene	mg/kg	NE	NE	NE	NE	<0.012	0.33	<0.013	<0.013	<0.013	<0.011	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	0.99	3.7	0.015	<0.012	0.22	0.53	<0.44	<0.35	0.019
Dibenz(a,h)anthracene	mg/kg	NE	NE	NE	NE	<0.012	<0.012	<0.013	<0.013	<0.013	<0.011	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	0.13	<0.013	<0.011	<0.012	0.037	<0.42	<0.44	<0.35	<0.012
Dibenzofuran	mg/kg	NE	NE	104	810	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<0.42	<0.44	<0.35	NM
Fluoranthene	mg/kg	670	NE	1080	6800	<0.012	0.71	<0.013	<0.013	<0.013	<0.011	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	2.5	8.7	0.030	<0.012	0.28	1.0	0.82	<0.35	0.039
Fluorene	mg/kg	110	NE	850	4120	<0.012	0.015	<0.013	<0.013	<0.013	<0.011	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	0.19	0.61	<0.011	<0.012	<0.013	<0.42	<0.44	<0.35	<0.012
Indeno(1,2,3-cd)pyrene	mg/kg	NE	NE	NE	NE	<0.012	0.21	<0.013	<0.013	<0.013	<0.011	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	0.40	2.0	<0.011	<0.012	0.12	<0.42	<0.44	<0.35	<0.012
Naphthalene	mg/kg	NE	NE	NE	NE	<0.012	<0.012	<0.013	<0.013	<0.013	0.035	<0.013	<0.013	<0.013	<0.013	0.017	0.015	0.022	0.13	<0.011	<0.012	0.031	<0.42	<0.44	<0.35	<0.012
Phenanthrene	mg/kg	NE	NE	NE	NE	<0.012	0.22	<0.013	<0.013	<0.013	<0.011	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	1.8	6.2	0.014	<0.012	0.11	0.45	<0.44	<0.35	0.030
Pyrene	mg/kg	440	NE	890	5800	<0.012	0.60	<0.013	<0.013	<0.013	<0.011	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	1.9	6.9	0.027	<0.012	0.32	0.82	0.94	<0.35	0.038
BaP Equivalents																										
Benzo(a)pyrene Equivalents	mg/kg	1.4	NE	2	3	<0	0.53	<0	<0	<0	<0	<0	<0	<0	<0	<0	<0	1.4	5.3	0.021	<0	0.36	0.60	0.046	<0	0.022
VOCs																										
1,2,4-Trimethylbenzene	mg/kg	2.7	NE	8	25	<0.06	<0.059	<0.066	<0.064	<0.064	0.47	<0.064	<0.068	<0.062	<0.068	<0.064	0.085	0.10	<0.071	<0.064	<0.059	1.3	<0.077	<0.082	<0.054	<0.062
1,3,5-Trimethylbenzene	mg/kg	2.7	NE	3	10	<0.06	<0.059	<0.066	<0.064	<0.064	0.14	<0.064	<0.068	<0.062	<0.068	0.43	0.44	<0.082	<0.071	<0.064	<0.059	0.37	<0.077	<0.082	<0.054	<0.062
Benzene	mg/kg	0.017	10	6	10	<0.024	<0.024	<0.026	<0.025	<0.025	<0.022	<0.026	<0.027	<0.025	<0.027	<0.026	<0.026	<0.033	<0.029	<0.026	<0.024	0.045	<0.031	<0.033	<0.022	<0.025
Chlorobenzene	mg/kg	1.2	2000	11	32	<0.06	<0.24	<0.26	<0.064	<0.064	<0.056	<0.064	<0.068	<0.062	<0.068	<0.064	<0.066	<0.082	<0.29	<0.26	<0.059	<0.068	<0.31	<0.33	<0.054	<0.062
Diethyl Ether	mg/kg	0.51	NE	NE	NE	<0.24	<0.24	<0.26	<0.25	<0.25	<0.22	<0.26	<0.27	<0.25	<0.27	<0.26	<0.26	<0.33	<0.29	<0.26	<0.24	<0.27	<0.31	<0.33	<0.22	<0.25
Ethylbenzene	mg/kg	1.1	NE	200	200	<0.06	<0.059	<0.066	<0.064	<0.064	<0.056	<0.064	<0.068	<0.062	<0.068	1.1	0.64	<0.082	<0.071	<0.064	<0.059	0.30	<0.077	<0.082	<0.054	<0.062
Isopropylbenzene	mg/kg	9.5	NE	30	87	<0.06	<0.24	<0.26	<0.064	<0.064	<0.056	<0.064	<0.068	<0.062	<0.068	1.3	0.58	<0.082	<0.29	<0.26	<0.059	0.15	<0.31	<0.33	<0.054	<0.062
Naphthalene	mg/kg	4.5	NE	10	28	<0.24	<0.24	<0.26	<0.25	<0.25	<0.22	<0.26	<0.27	<0.25	<0.27	<0.26	<0.26	<0.33	<0.29	<0.26	<0.24	<0.27	<0.31	<0.33	<0.22	<0.25
n-Butylbenzene	mg/kg	NE	NE	30	92	<0.06	<0.059	<0.066	<0.064	<0.064	0.40	<0.064	<0.068	<0.062	<0.068	1.5	0.84	<0.082	<0.071	<0.064	<0.059	0.15	<0.077	<0.082	<0.054	<0.062
n-Propylbenzene	mg/kg	NE	NE	30	93	<0.06	<0.059	<0.066	<0.064	<0.064	0.077	<0.064	<0.068	<0.062	<0.068	2.3	1.1	<0.082	<0.071	<0.064	<0.059	0.24	<0.077	<0.082	<0.054	<0.062
p-Isopropyltoluene	mg/kg	NE	NE	NE	NE	<0.06	<0.059	<0.066	<0.064	<0.064	0.093	<0.064	<0.068	<0.062	<0.068	1.6	0.92	0.26	<0.071	<0.064	<0.059	0.26	<0.077	<0.082	<0.054	<0.062
sec-Butylbenzene	mg/kg	NE	NE	25	70	<0.06	<0.059	<0.066	<0.064	<0.064	0.08	<0.064	<0.068	<0.062	<0.068	1.1	0.45	<0.082	<0.071	<0.064	<0.059	0.10	<0.077	<0.082	<0.054	<0.062
tert-Butylbenzene	mg/kg	NE	NE	30	90	<0.06	<0.059	<0.066	<0.064	<0.064	<0.056	<0.064	<0.068	<0.062	<0.068	<0.064	<0.066	<0.082	<0.071	<0.064	<0.059	<0.068	<0.077	<0.082	<0.054	<0.062
Tetrachloroethene	mg/kg	0.042	14	72	131	<0.06	<0.059	<0.066	<0.064	<0.064	<0.056	<0.064	<0.068	<0.25	<0.27	<0.064	<0.066	<0.082	<0.071	<0.064	<0.059	<0.068	<0.077	<0.082	<0.054	<0.062
Toluene	mg/kg	2.5	NE	107	305	<0.06	<0.059	<0.066	<0.064	<0.064	<0.056	<0.064	<0.068	<0.062	<0.068	<0.064	<0.066	<0.082	<0.071	<0.064	<0.059	<0.068	0.10	<0.082	<0.054	<0.062
Trichloroethene	mg/kg	0.0023	10	29	46	<0.06	<0.059	<0.066	<0.064	<0.064	<0.056	<0.064 (R1)	<0.068	<0.062	<0.068	<0.064	<0.066	<0.082	<0.071	<0.064	<0.059	<0.068	<0.077	<0.082	<0.054	<0.062
Xylene (Total)	mg/kg	5.4	NE	45	130	<0.18	<0.53	<0.59	<0.19	<0.19	<0.17	<0.19	<0.2	<0.18	<0.2	<0.19	<0.2	<0.25	<0.64	<0.58	<0.18	0.83	<0.7	<0.74	<0.16	<0.19

Notes:

A full list of abbreviations is included in the table glossery

Table 2
Soil Analytical Results

Phase II Environmental Site Assessment
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

					Borings are ordered by Area:	22nd Ave and Coffee Creek Replacement				Reconnect Michigan St to Lower Michigan St						Parcel 226												
Boring ID	Units	2014 Screening SLV	20xTCLP level	Tier 1 Residential SRV	Tier 2 Industrial SRV	GP-381	GP-381	GP-001	GP-001	GP-298	GP-298	GP-299	GP-299	GP-302	GP-302	GP-043	GP-043	GP-044	GP-044	GP-045	GP-045	GP-046	GP-046	GP-046	GP-049b	GP-049a	GP-047	GP-048
Field Sample ID						GP-381-3	GP-381-8.5	GP-001-1.5	GP-001-21	GP-298-2	GP-298-8	GP-299-2	GP-299-10	GP-302-2.5	GP-302-8	GP-043-2.5	GP-043-13	GP-044-4.5	GP-044-11	GP-045-2	GP-045-12.5	GP-046-1.5	GP-046-7	GP-046-12	GP-049b-10	GP-049a-2	GP-047-5	GP-048-4.25
Laboratory ID						10480119014	10480119015	10445270008	10445270009	10474936001	10474936002	10474936003	10474936004	10474936006	10474936007	10448309015	10448309016	10448309011	10448309012	10448309008	10448309009	10448309004	10448309005	10448309006	10446354004	10446354001	10446354020	10446354018
Sample Date						6/19/2019	6/19/2019	8/28/2018	8/28/2018	5/14/2019	5/14/2019	5/14/2019	5/14/2019	5/14/2019	5/14/2019	9/20/2018	9/20/2018	9/20/2018	9/20/2018	9/20/2018	9/20/2018	9/20/2018	9/20/2018	9/20/2018	9/4/2018	9/4/2018	9/5/2018	9/5/2018
DRO and GRO																												
Diesel Range Organics	mg/kg	The MPCA Unregulated Fill Criteria for DRO and GRO is <100 mg/kg				27.2 (T7,T6)	NM	<12.2	<9.3	NM	NM	NM	<10.4	9.90 (T6)	<10.5	<8.6	<11.5	16400 (T6)	34.5 (T6)	9930 (T6)	15.6 (T6)	59.7 (T7,T6)	18000 (T6)	255 (T6)	21300 (T6)	51.4	616 (T6)	43.3 (T7,T6)
Gasoline Range Organics	mg/kg					<12.6	<12.8	<18.4	<12.3	<13	<13.6	<15.1	<12.9	<10.3	<13	<10.9	<12.5	24.2 (G+)	<14.6	<13.2 (G+)	<15.1	<10.6	31.5 (G+)	<16.1	<13.1 (G+)	<14	<12.5	<12.2
WDRO C10-C28 Silica Gel	mg/kg					NM	<10.5	NM	NM	<10.6	<10.7	<11.9	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Metals																												
Antimony	mg/kg	5.4	NE	12	100	NM	NM	<1.4	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Arsenic	mg/kg	5.8	100	9	20	<5.9 (D3)	<6.4 (D3)	19.3	2.3	<6.3 (D3)	3.0	3.2	3.2	3.3	3.7	NM	2.6	7.9	4.7	26.1	2.9	3.1	3.5	7.9	3.2	3.8	4.9	5.2
Barium	mg/kg	1700	2000	1100	18000	149	174	NM	41.8	156 (M1)	113	114	114	18.6	93	NM	82.4	148	93.1	652	117	112	83.8	604	130	96.7	106	82.1
Beryllium	mg/kg	2.7	NE	55	230	NM	NM	1.4	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium	mg/kg	8.8	20	25	200	<0.88 (D3)	<0.95 (D3)	0.24	<0.17	<0.95 (D3)	<0.19	<0.21	<0.18	<0.15	<0.19	NM	<0.19	1.1	0.71	94.9	<0.2	0.22	0.23	8.9	<0.19	0.40	0.25	<0.17
Chromium	mg/kg	36	100	87	650	37.9	45.6	21	22.9	40.3	27.6	27.4	29.1	13.5	30.3	NM	21.3	14.5	16.8	40	34	23.5	10.8	34.7	30.7	288	22.2	21.8
Copper	mg/kg	700	NE	100	9000	NM	NM	155	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Lead	mg/kg	2700	100	300	700	22.4	10.1	53.6	4.0	7.9	6.4	9.4	7.5	4.2	7.0	NM	5.1	232	312	442	9.9	48.7	48.1	424	9.0	130	58.8	23.2
Mercury	mg/kg	3.3	4	0.5	1.5	0.051	0.03	<0.028	<0.02	0.031	<0.023	<0.027	<0.024	<0.021	<0.024	NM	<0.024	0.20	1.1	<0.024	0.035	0.14	0.06	0.16	0.049	0.14	0.15	0.033
Nickel	mg/kg	180	NE	560	2500	NM	NM	33.3	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Selenium	mg/kg	2.6	20	160	1300	<5.9 (D3)	<6.4 (D3)	<1.4	<1.1	<6.3 (D3)	<1.2	<1.4	<1.2	<1	<1.3	NM	<1.2	1.2	<1.4	<1.2	<1.4	<1.1	<1.2	<1.3	<1.3	<2.2 (D3)	<1.2	<1.1
Silver	mg/kg	7.9	100	160	1300	<2.9 (D3)	<3.2 (D3)	<0.7	<0.57	<3.2 (D3)	<0.62	<0.68	<0.6	<0.5	<0.63	NM	<0.62	<0.51	<0.68	<0.58	<0.68	<0.53	<0.6	<0.64	<0.63	<1.1 (D3)	<0.59	<0.57
Zinc	mg/kg	3000	NE	8700	75000	NM	NM	63.8	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TCLP Metals																												
Lead TCLP	mg/L	5 mg/L TCLP Lead hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<0.5	<0.5	0.085	NM	NM	NM	<0.5	NM	<0.05	NM	NM
Mercury TCLP	mg/L	0.2 mg/L TCLP Mercury hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium TCLP	mg/L	1.0 mg/L TCLP Cadmium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<0.015	NM	NM	NM	NM	NM	NM	NM	NM
Chromium TCLP	mg/L	5.0 mg/L TCLP Chromium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<0.05	NM	NM
PCBs																												
PCBs (Polychlorinated Biphenyls)	mg/kg	NE	NE	1.2	8	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Herbicides and Pesticides																												
2,4-D	mg/kg	0.5	200	0.5	0.5	NM	NM	<0.1	<0.1	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Triclopyr	mg/kg	0.3	NE	0.3	0.3	NM	NM	<0.1	<0.1	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Semi-VOCs																												
1-Methylnaphthalene	mg/kg	NE	NE	NE	NE	NM	<0.43	<0.5	<0.38	NM	<0.43	<0.49	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2,4-Dinitrotoluene	mg/kg	0.013	2.6	50	355	NM	<0.43	<0.5	<0.38	NM	<0.43	<0.49	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2-Methylnaphthalene	mg/kg	NE	NE	100	369	NM	<0.43	<0.5	<0.38	NM	<0.43	<0.49	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Acenaphthene	mg/kg	81	NE	1200	5260	0.025	<0.43	<0.5	<0.38	<0.013	<0.43	<0.49	<0.013	<0.011	<0.013	NM	<0.013	59.5	0.48	1.1	0.13	<0.11	24.1	2.4	2.1	0.59 (M6,R1)	2.3	<0.061
Acenaphthylene	mg/kg	NE	NE	NE	NE	0.014	<0.43	<0.5	<0.38	<0.013	<0.43	<0.49	<0.013	0.029	<0.013	NM	<0.013	<7.5	<0.14	<0.24	<0.014	<0.11	3.4	0.15	0.079	<0.12 (M6)	<1.2	<0.061
Anthracene	mg/kg	1300	NE	7880	45400	0.049	<0.43	<0.5	<0.38	<0.013	<0.43	<0.49	<0.013	0.068	<0.013	NM	<0.013	184	1.3	2.7	0.37	0.17	68.2	5.7	5.4	2.1 (M6,R1)	5.5	<0.061
Benz(a)anthracene	mg/kg	NE	NE	NE	NE	0.19	<0.43	<0.5	<0.38	0.035 (M1)	<0.43	<0.49	<0.013	0.15	<0.013	NM	0.015	216	2.7	3.7	0.39	0.19	92.3	6.2	7.8	4.5 (M6,R1)	8.5	0.42
Benzo(a)pyrene	mg/kg	1.4	NE	2	3	0.18	<0.43	<0.5	<0.38	0.042 (M1)	<0.43	<0.49	<0.013	0.15	<0.013	NM	0.013	147	2.5	3.5	0.32	0.17	80.4	5.3	6.0	4.6 (M6,R1)	7.6	0.46
Benzo(b)fluoranthene	mg/kg	NE	NE	NE	NE	0.25	<0.43	<0.5	<0.38	0.050 (M1)	<0.43	<0.49	<0.013	0.17	<0.013	NM	0.016	174	3.0	4.0	0.42	0.20	94	5.8	7.8	5.6 (M6,R1)	9.6	0.24
Benzo(g,h,i)perylene	mg/kg	NE	NE	NE	NE	0.12	<0.43	<0.5	<0.38	0.064 (M1)	<0.43	<0.49	<0.013	0.096	<0.013	NM	<0.013	65.9	1.6	2.2	0.19	0.13	47.7	2.7	2.2	2.5 (M6,R1)	3.6	0.31
Benzo(k)fluoranthene	mg/kg	NE	NE	NE	NE	0.11	<0.43	<0.5	<0.38	0.025 (M1)	<0.43	<0.49	<0.013	0.083	<0.013	NM	<0.013	66.9	1.3	1.5	0.15	<0.11	38.4	2.0	3.0	2.0 (M6,R1)	3.8	0.063
Carbazole	mg/kg	NE	NE	700	1310	NM	<0.43	<0.5	<0.38	NM	<0.43	<0.49	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Chrysene	mg/kg	NE	NE	NE	NE	0.19	<0.43	<0.5	<0.38	0.038 (M1)	<0.43	<0.49	<0.013	0.15	<0.013	NM	0.015	183	2.2	3.4	0.34	0.17	79.6	5.5	6.0	3.2 (M6,R1)	7.3	0.52
Dibenz(a,h)anthracene	mg/kg	NE	NE	NE	NE	0.037	<0.43	<0.5	<0.38	<0.013	<0.43	<0.49	<0.013	0.032	<0.013	NM	<0.013	28.3	0.48	0.64	0.057	<0.11	11.3	0.93	0.9	0.73 (M6,R1)	<1.2	0.10
Dibenzofuran	mg/kg	NE	NE	104	810	NM	<0.43	<0.5	<0.38	NM	<0.43	<0.49	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Fluoranthene	mg/kg	670	NE	1080	6800	0.40	<0.43	<0.5	<0.38	0.064 (M1)	<0.43	<0.49	<0.013	0.19	<0.013	NM	0.036	455	6.0	10.2	1.1	0.46	235	15.9	20.1	10.1 (M6,R1)	24.8	0.22
Fluorene	mg/kg	110	NE	850	4120	0.022	<0.43	<0.5	<0.38	<0.013	<0.43	<0.49	<0.013	<0.011	<0.013	NM	<0.013	95	0.52	1.4	0.22	<0.11	33.9	3	2.8	0.83 (M6,R1)	3.1	<0.061
Indeno(1,2,3-cd)pyrene	mg/kg	NE	NE	NE	NE	0.11	<0.43	<0.5	<0.38	0.030 (M1)	<0.43	<0.49	<0.013	0.071	<0.013	NM	<0.013	58.8	1.4	1.7	0.15	<0.11	38.6	2.4	2.4	2.0 (M6,R1)	3.4	0.094
Naphthalene	mg/kg	NE	NE	NE	NE	<0.012	<0.43	<0.5	<0.38	<0.013	<0.43	<0.49	<0.013	<0.011	<0.013	NM	<0.013	24.7	0.27	0.87	0.13	<0.11	26.6	2.4	1.6	0.14 (M6)	3.0	<0.061
Phenanthrene	mg/kg	NE	NE	NE	NE	0.24	<0.43	<0.5	<0.38	0.028 (M1)	<0.43	<0.49	<0.013	0.12	<0.013	NM	0.031	538	4.4	9.9	1.2	0.47	229	17.2	20.7	7.3 (M6,R1)	25.6	<0.061
Pyrene	mg/kg	440	NE	890	5800	0.35	<0.43	<0.5	<0.38	0.061 (M1)	<0.43	<0.49	<0.013	0.20	<0.013	NM	0.026	337	4.2	6.9	0.74	0.33	160	11.3	14.3	7.6 (M6,R1)	18.4	0.49
BaP Equivalents																												
Benzo(a)pyrene Equivalents	mg/kg	1.4	NE	2	3	0.27	<0	<0	<0	0.056 (M1)	<0	<0	<0	0.22	<0	NM	0.016	216	3.6	5.0	0.47	0.21	114	7.52	8.66	6.5 (M6,R1)	10.2	0.60
VOCs																												
1,2,4-Trimethylbenzene	mg/kg	2.7	NE	8	25	<0.06	<0.064	<0.092	<0.062	<0.065	<0.065	<0.071	<0.067	<0.054	<0.063	<0.053	<0.064	0.26	<0.073	0.11	<0.073	<0.055	0.24	<0.068	0.12	0.11	<0.068	<0.061
1,3,5-Trimethylbenzene	mg/kg	2.7	NE	3	10	<0.06	<0.064	<0.092	<0.062	<0.065	<0.065	<0.071	<0.067	<0.054	<0.063	<0.053	<0.064	<0.12	<0.073	<0.065	<0.073	<0.055	<0.13	<0.068	<0.064	<0.061	<0.068	<0.061
Benzene	mg/kg	0.017	10	6	10	<0.024	0.13	<0.037	<0.025	<0.026	<0.026	<0.029	0.035	<0.021	<0.025	<0.021	<0.026	<0.047	<0.029	<0.026	<0.029	<0.022	<0.054	<0.027	0.030	0.05	<0.027	<0.025
Chlorobenzene	mg/kg	1.2	2000	11	32	<0.06	<0.064	<0.37	<0.25	<0.065	<0.065	<0.071	<0.067	<0.054	<0.063	<0.053	<0.064	<0.12	<0.073	<0.065	<0.073	<0.055	<0.13	<0.068	<0.064	<0.061	<0.068	<0.061
Diethyl Ether	mg/kg	0.51	NE	NE	NE	<0.24	<0.26	<0.37	<0.25	<0.26	<0.26	<0.29	<0.27	<0.21	<0.25	<0.21	<0.26	0.56	<0.29	<0.26	<0.29	<0.22	<0.54	<0.27	<0.25	<0.24	<0.27	<0.25
Ethylbenzene	mg/kg	1.1	NE	200	200	<0.06	<0.064	<0.092	<0.062	<0.065	<0.065	<0.071	<0.067	<0.054	<0.063	<0.053	<0.064	<0.12	<0.073	0.072	<0.073	<0.055	<0.13	<0.068	<0.064	0.068	<0.068	<0.061
Isopropylbenzene	mg/kg	9.5	NE	30	87	<0.06	<0.064	<0.37	<0.25	<0.065	<0.065	<0.071	<0.067	<0.054	<0.063	<0.053	<0.064	<0.12	<0.073	<0.065	<0.073	<0.055	<0.13	<0.068	<0.064	<0.061	<0.068	<0.061
Naphthalene	mg/kg	4.5	NE	10	28	<0.24	<0.26	<0.37	<0.25	<0.26	<0.26	<0.29	<0.27	<0.21	<0.25	<0.21	<0.26	27.8	<0.29	0.93	<0.29	0.31	26.1	<0.27	14.4	<0.24	<0.27	<0.25
n-Butylbenzene	mg/kg	NE	NE	30	92	<0.06	<0.064	<0.092	<0.062	<0.065	<0.065	<0.071	<0.067	<0.054	<0.063	<0.053	<0.064	<0.12	<0.073	<0.065	<0.073	<0.055	<0.13	<0.068	<0.064	<0.061	<0.068	<0.061
n-Propylbenzene	mg/kg	NE	NE	30	93	<0.06	<0.064	<0.092	<0.062	<0.065	<0.065	<0.071	<0.067	<0.054	<0.063	<0.053	<0.064	<0.12	<0.073	<0.065	<0.073	<0.055	<0.13	<0.068	<0.064	<0.061	<0.068	<0.061
p-Isopropyltoluene	mg/kg	NE	NE	NE	NE	<0.06	<0.064	<0.092	<0.062	<0.065	<0.065	<0.071	<0.067	<0.054	<0.063	<0.053	<0.064	<0.12	<0.073	<0.065	<0.073	<0.055	<0.13	<0.068	<0.064	<0.061	<0.068	<0.061
sec-Butylbenzene	mg/kg	NE	NE	25	70	<0.06	<0.064	<0.092	<0.062	<0.065	<0.065	<0.071	<0.067	<0.054	<0.063	<0.053	<0.064	<0.12	<0.073	<0.065	<0.073	<0.055	<0.13	<0.068	<0.064	<0.061	<0.068	<0.061
tert-Butylbenzene	mg/kg	NE	NE	30	90	<0.06	<0.064	<0.092	<0.062	<0.065	<0.065	<0.071	<0.067	<0.054	<0.063	<0.053	<0.064	<0.12	<0.073	<0.065	<0.073	<0.055	<0.13	<0.068	<0.064	<0.061	<0.068	<0.061
Tetrachloroethene	mg/kg	0.042	14	72	131	<0.06	<0.064	<0.092	<0.062	<0.065	<0.065	<0.071	<0.067	<0.054	<0.063	<0.053	<0.064	<0.12	<0.073	<0.065	<0.073	<0.055	<0.13	<0.068	<0.064	<0.24	<0.068	<0.061
Toluene	mg/kg	2.5	NE	107	305	<0.06	<0.064	<0.092	<0.062	<0.065	<0.065	<0.071	<0.067	<0.054	<0.063	<0.053	<0.064	0.17	<0.073	<0.065	<0.073	<0.055	<0.13	<0.068	0.094	0.17	<0.068	0.066
Trichloroethene	mg/kg	0.0023	10	29	46	<0.06	<0.064	<0.092	<0.062	<0.065	<0.065	<0.071	<0.067	<0.054	<0.063	<0.053	<0.064	<0.12	<0.073	<0.065	<0.073	<0.055	<0.13	<0.068	<0.064	<0.061	<0.068	<0.061
Xylene (Total)	mg/kg	5.4	NE	45	130	<0.18	<0.19	<0.83	<0.55	<0.2	<0.19	<0.21	<0.2	<0.16	<0.19	<0.16	<0.19	0.42	<0.22	0.31	<0.22	<0.17	<0.4	<0.2	<0.19	0.35	<0.2	<0.18

Notes:

A full list of abbreviations is included in the table glossery

Table 2
Soil Analytical Results

Phase II Environmental Site Assessment
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

				Borings are ordered by Area:		Parcel 226B												Temporary Pavement for Staging Option 3											
Boring ID	Units	2014 Screening SLV	20xTCLP level	Tier 1 Residential SRV	Tier 2 Industrial SRV	GP-048	GP-270	GP-270	GP-050	GP-051	GP-051	GP-052	GP-052	GP-053	GP-053	GP-054	GP-054	GP-155	GP-155	GP-155	GP-155	GP-156	GP-156	GP-341	GP-341	GP-341	GP-341	GP-341	GP-341
Field Sample ID						GP-048-8.5	GP-270-6.5	GP-270-11	GP-050-2.5	GP-051-3	GP-051-6.5	GP-052-3	GP-052-10	GP-053-2.5	GP-053-10	GP-054-4	GP-054-11	GP-155-0.5	GP-155-1.5	GP-155-3	GP-155-10	GP-156-3	GP-156-11	GP-341-0.5	GP-341-1.5	GP-341-3	GP-341-8	GP-341-0.5	GP-341-1.5
Laboratory ID						10446354019	10446354013	10446354014	10446354012	10446354011	10446354010	10446354002	10446354003	10446354008	10446354009	10446354005	10446354006	10447922007	10447922008	10447922009	10447922010	10446354021	10446354022	10475634004	10475634005	10475634006	10475634007	10479612006	10479612007
Sample Date						9/5/2018	9/5/2018	9/5/2018	9/5/2018	9/5/2018	9/5/2018	9/4/2018	9/4/2018	9/5/2018	9/5/2018	9/5/2018	9/5/2018	9/18/2018	9/18/2018	9/18/2018	9/18/2018	9/5/2018	9/5/2018	5/20/2019	5/20/2019	5/20/2019	5/20/2019	6/17/2019	6/17/2019
DRO and GRO																													
Diesel Range Organics	mg/kg	The MPCA Unregulated Fill Criteria for DRO and GRO is <100 mg/kg				3610 (T6)	61.5 (T7,T6)	84.9 (T7,T6)	40.8 (T7,T6)	18.6 (T7,T6)	384 (T6)	<8.7	16.3 (T6)	36 (T7,T6)	207 (T6)	812 (T6)	<10.5	NM	NM	<8.3	<8.5	48.3 (T7,T6)	<9.3	NM	NM	NM	NM	NM	NM
Gasoline Range Organics	mg/kg					15.5	<13	<15	<12.2	<11.3	<11.5	<10.9	<12.8	<12.5	<13.8	<12.9	<14.5	NM	NM	<10.2 (M1)	<11.3	<12	<11.3	NM	NM	<16.8	<17.4	NM	NM
WDRO C10-C28 Silica Gel	mg/kg					NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	28.5 (T6)	<13.8	NM	NM
Metals																													
Antimony	mg/kg	5.4	NE	12	100	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Arsenic	mg/kg	5.8	100	9	20	4.0	5.7	5.0	4.2	4.2	5.9	2.4	3.5	10.8	3.3	7.6	3.2	NM	NM	2.1	2.4	3.6	1.2	3.5	4.3	9.9	6.3	NM	NM
Barium	mg/kg	1700	2000	1100	18000	131	167	94.7	132	58.3	413	64.1	54.7	124	128	180	90.3	NM	NM	31.5	36.3	97.7	7.8	89.2	94	311	147	NM	NM
Beryllium	mg/kg	2.7	NE	55	230	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium	mg/kg	8.8	20	25	200	0.40	0.21	<0.21	0.31	<0.16	0.93	<0.15	<0.18	<0.18	<0.19	2.8	<0.2	NM	NM	<0.16	<0.16	<0.17	<0.16	0.4	0.45	2.2	0.80	NM	NM
Chromium	mg/kg	36	100	87	650	19.8	17.4	25.1	21.9	46.8	20	18.3	19	5.9	32.8	24.1	27.9	NM	NM	14	18.3	22.9	5.5	18.7	21.8	30.7	27.8	NM	NM
Copper	mg/kg	700	NE	100	9000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Lead	mg/kg	2700	100	300	700	173	95.8	71.5	95.9	65.6	473	5.2	8.0	24.5	13.8	501	8.6	75.6	30.2	4.4	3.5	31.6	1.4	175	205	371	186	NM	NM
Mercury	mg/kg	3.3	4	0.5	1.5	0.17	0.15	0.093	0.13	0.064	0.14	<0.019	0.036	0.033	0.031	0.27	0.043	NM	NM	0.12	0.052	0.045	<0.022	NM	NM	NM	0.3 (2M)	0.086	0.18
Nickel	mg/kg	180	NE	560	2500	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Selenium	mg/kg	2.6	20	160	1300	<1.1	<1.2	<1.4	<1.1	<1.1	1.1	<1	<1.2	<1.2	<1.3	<1.2	<1.3	NM	NM	<1.1	<1.1	<1.1	<1.1	<1.1	<1.2	<1.6	<1.7	NM	NM
Silver	mg/kg	7.9	100	160	1300	<0.54	<0.61	<0.71	<0.57	<0.54	<0.55	<0.51	<0.59	<0.59	<0.63	<0.6	<0.67	NM	NM	<0.53	<0.53	<0.56	<0.54	<0.54	<0.6	<0.82	<0.83	NM	NM
Zinc	mg/kg	3000	NE	8700	75000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TCLP Metals																													
Lead TCLP	mg/L	5 mg/L TCLP Lead hazardous limit				NM	NM	NM	NM	NM	0.32 (B)	NM	NM	NM	NM	6.3	NM	NM	NM	NM	NM	NM	NM	0.57	<0.5	<0.5	<0.5	NM	NM
Mercury TCLP	mg/L	0.2 mg/L TCLP Mercury hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium TCLP	mg/L	1.0 mg/L TCLP Cadmium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Chromium TCLP	mg/L	5.0 mg/L TCLP Chromium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
PCBs																													
PCBs (Polychlorinated Biphenyls)	mg/kg	NE	NE	1.2	8	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Herbicides and Pesticides																													
2,4-D	mg/kg	0.5	200	0.5	0.5	NM	NM	NM	NM	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Triclopyr	mg/kg	0.3	NE	0.3	0.3	NM	NM	NM	NM	<0.1	<0.1	<0.1	0.2 (P)	<0.1	<0.1	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Semi-VOCs																													
1-Methylnaphthalene	mg/kg	NE	NE	NE	NE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<0.56	<0.56	NM	NM
2,4-Dinitrotoluene	mg/kg	0.013	2.6	50	355	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<0.56	<0.56	NM	NM
2-Methylnaphthalene	mg/kg	NE	NE	100	369	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<0.56	<0.56	NM	NM
Acenaphthene	mg/kg	81	NE	1200	5260	2.6	0.058	0.064	0.061	0.11	10.5	<0.011	<0.013	<0.12	<0.014	0.37	<0.014	NM	NM	<0.053	<0.011	<0.12	<0.011	NM	NM	<0.56	<0.56	NM	NM
Acenaphthylene	mg/kg	NE	NE	NE	NE	<1.2	0.036	0.062	0.038	0.044	2.0	<0.011	<0.013	<0.12	<0.014	0.051	<0.014	NM	NM	<0.053	<0.011	0.59	<0.011	NM	NM	<0.56	<0.56	NM	NM
Anthracene	mg/kg	1300	NE	7880	45400	7.6	0.26	0.31	0.23	0.44	29.9	<0.011	<0.013	<0.12	0.062	1.2	<0.014	NM	NM	<0.053	<0.011	0.30	<0.011	NM	NM	0.58	<0.56	NM	NM
Benz(a)anthracene	mg/kg	NE	NE	NE	NE	13.1	0.60	0.57	0.58	1.3	41.7	<0.011	0.023	0.45	0.18	1.9	<0.014	NM	NM	<0.053	<0.011	0.65	<0.011	NM	NM	1.8	0.95	NM	NM
Benzo(a)pyrene	mg/kg	1.4	NE	2	3	13.1	0.58	0.52	0.55	1.2	39	<0.011	0.027	0.47	0.17	1.7	<0.014	NM	NM	<0.053	<0.011	3.0	<0.011	NM	NM	1.9	0.84	NM	NM
Benzo(b)fluoranthene	mg/kg	NE	NE	NE	NE	16.4	0.73	0.67	0.69	1.7	49.4	<0.011	0.035	0.69	0.22	2.2	<0.014	NM	NM	<0.053	<0.011	2.2	<0.011	NM	NM	2.6	1.2	NM	NM
Benzo(g,h,i)perylene	mg/kg	NE	NE	NE	NE	7.0	0.28	0.24	0.25	0.62	18.6	<0.011	0.027	0.27	0.077	0.79	<0.014	NM	NM	<0.053	<0.011	2.3	<0.011	NM	NM	1.3	<0.56	NM	NM
Benzo(k)fluoranthene	mg/kg	NE	NE	NE	NE	6.0	0.28	0.25	0.25	0.61	19.8	<0.011	0.016	0.25	0.093	0.78	<0.014	NM	NM	<0.053	<0.011	0.62	<0.011	NM	NM	1.0	<0.56	NM	NM
Carbazole	mg/kg	NE	NE	700	1310	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<0.56	<0.56	NM	NM
Chrysene	mg/kg	NE	NE	NE	NE	12.2	0.52	0.43	0.51	1.1	35.9	<0.011	0.023	0.41	0.15	1.5	<0.014	NM	NM	<0.053	<0.011	0.52	<0.011	NM	NM	2.0	0.97	NM	NM
Dibenz(a,h)anthracene	mg/kg	NE	NE	NE	NE	1.8	0.091	0.086	0.087	0.21	5.8	<0.011	<0.013	<0.12	0.026	0.26	<0.014	NM	NM	<0.053	<0.011	0.83	<0.011	NM	NM	<0.56	<0.56	NM	NM
Dibenzofuran	mg/kg	NE	NE	104	810	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<0.56	<0.56	NM	NM
Fluoranthene	mg/kg	670	NE	1080	6800	35.9	1.3	1.3	1.3	2.6	120	<0.011	0.046	0.80	0.4	4.5	0.018	NM	NM	<0.053	<0.011	0.98	<0.011	NM	NM	4.3	2.2	NM	NM
Fluorene	mg/kg	110	NE	850	4120	3.4	0.073	0.16	0.08	0.15	16.1	<0.011	<0.013	<0.12	0.019	0.53	<0.014	NM	NM	<0.053	<0.011	<0.12	<0.011	NM	NM	<0.56	<0.56	NM	NM
Indeno(1,2,3-cd)pyrene	mg/kg	NE	NE	NE	NE	6	0.28	0.24	0.24	0.57	18.7	<0.011	0.017	0.25	0.074	0.76	<0.014	NM	NM	<0.053	<0.011	2.0	<0.011	NM	NM	1.2	<0.56	NM	NM
Naphthalene	mg/kg	NE	NE	NE	NE	1.3	0.029	0.042	0.033	0.047	9.6	<0.011	<0.013	<0.12	<0.014	0.35	<0.014	NM	NM	<0.053	<0.011	0.16	<0.011	NM	NM	<0.56	<0.56	NM	NM
Phenanthrene	mg/kg	NE	NE	NE	NE	27.5	0.84	1.0	0.84	1.5	118	<0.011	0.026	0.43	0.19	4.2	<0.014	NM	NM	<0.053	<0.011	0.65	<0.011	NM	NM	2.5	1.5	NM	NM
Pyrene	mg/kg	440	NE	890	5800	27.6	1.1	0.99	1.0	2.1	88.6	<0.011	0.037	0.65	0.29	3.4	<0.014	NM	NM	<0.053	<0.011	0.79	<0.011	NM	NM	3.4	1.8	NM	NM
BaP Equivalents																													
Benzo(a)pyrene Equivalents	mg/kg	1.4	NE	2	3	18.4	0.83	0.75	0.78	1.7	55.6	<0	0.036	0.64	0.24	2.4	<0	NM	NM	<0	<0	4.0	<0	NM	NM	2.6	1.1	NM	NM
VOCs																													
1,2,4-Trimethylbenzene	mg/kg	2.7	NE	8	25	0.37	0.077	<0.077	<0.06	<0.057	<0.06	<0.055	<0.064	0.23	<0.066	<0.064	<0.068	NM	NM	<0.054	<0.056	<0.062	<0.055	NM	NM	<0.084	<0.082	NM	NM
1,3,5-Trimethylbenzene	mg/kg	2.7	NE	3	10	<0.056	<0.062	<0.077	<0.06	<0.057	<0.06	<0.055	<0.064	<0.063	<0.066	<0.064	<0.068	NM	NM	<0.054	<0.056	<0.062	<0.055	NM	NM	<0.084	<0.082	NM	NM
Benzene	mg/kg	0.017	10	6	10	0.16	<0.025	<0.031	<0.024	<0.023	<0.024	<0.022	<0.026	0.071	<0.027	<0.026	<0.027	NM	NM	<0.021	<0.022	<0.025	<0.022	NM	NM	<0.034	<0.033	NM	NM
Chlorobenzene	mg/kg	1.2	2000	11	32	<0.056	<0.062	<0.077	<0.06	<0.057	<0.06	<0.055	<0.064	<0.063	<0.066	<0.064	<0.068	NM	NM	<0.054	<0.056	<0.062	<0.055	NM	NM	<0.084	<0.082	NM	NM
Diethyl Ether	mg/kg	0.51	NE	NE	NE	<0.23	<0.25	<0.31	<0.24	<0.23	<0.24	<0.22	<0.26	<0.25	<0.27	<0.26	<0.27	NM	NM	<0.21	<0.22	<0.25	<0.22	NM	NM	<0.34	<0.33	NM	NM
Ethylbenzene	mg/kg	1.1	NE	200	200	1.8	<0.062	<0.077	<0.06	<0.057	<0.06	<0.055	<0.064	0.10	<0.066	<0.064	<0.068	NM	NM	<0.054	<0.056	<0.062	<0.055	NM	NM	<0.084	<0.082	NM	NM
Isopropylbenzene	mg/kg	9.5	NE	30	87	0.41	<0.062	<0.077	<0.06	<0.057	<0.06	<0.055	<0.064	0.073	<0.066	<0.064	<0.068	NM	NM	<0.054	<0.056	<0.062	<0.055	NM	NM	<0.084	<0.082	NM	NM
Naphthalene	mg/kg	4.5	NE	10	28	2.7	<0.25	<0.31	<0.24	<0.23	0.46	<0.22	<0.26	0.33	<0.27	0.83	<0.27	NM	NM	<0.21	<0.22	<0.25	<0.22	NM	NM	<0.34	<0.33	NM	NM
n-Butylbenzene	mg/kg	NE	NE	30	92	<0.056	<0.062	<0.077	<0.06	<0.057	<0.06	<0.055	<0.064	<0.063	<0.066	<0.064	<0.068	NM	NM	<0.054	<0.056	<0.062	<0.055	NM	NM	<0.084	<0.082	NM	NM
n-Propylbenzene	mg/kg	NE	NE	30	93	0.20	<0.062	<0.077	<0.06	<0.057	<0.06	<0.055	<0.064	0.079	<0.066	<0.064	<0.068	NM	NM	<0.054	<0.056	<0.062	<0.055	NM	NM	<0.084	<0.082	NM	NM
p-Isopropyltoluene	mg/kg	NE	NE	NE	NE	0.065	<0.062	<0.077	<0.06	<0.057	<0.06	<0.055	<0.064	<0.063	0.26	<0.064	<0.068	NM	NM	<0.054	<0.056	<0.062	<0.055	NM	NM	<0.084	<0.082	NM	NM
sec-Butylbenzene	mg/kg	NE	NE	25	70	<0.056	<0.062	<0.077	<0.06	<0.057	<0.06	<0.055	<0.064	<0.063	<0.066	<0.064	<0.068	NM	NM	<0.054	<0.056	<0.062	<0.055	NM	NM	<0.084	<0.082	NM	NM
tert-Butylbenzene	mg/kg	NE	NE	30	90	<0.056	<0.062	<0.077	<0.06	<0.057	<0.06	<0.055	<0.064	<0.063	<0.066	<0.064	<0.068	NM	NM	<0.054	<0.056	<0.062	<0.055	NM	NM	<0.084	<0.082	NM	NM
Tetrachloroethene	mg/kg	0.042	14	72	131	<0.056	<0.062	<0.077	<0.06	<0.057	<0.06	<0.055	<0.064	0.12	<0.066	<0.064	<0.068	NM	NM	<0.054	<0.056	<0.062	<0.055	NM	NM	<0.084	<0.082	NM	NM
Toluene	mg/kg	2.5	NE	107	305	1.1	0.13	<0.077	<0.06	<0.057	<0.06	<0.055	<0.064	0.37	<0.066	<0.064	<0.068	NM	NM	<0.054	<0.056	<0.062	<0.055	NM	NM	<0.084	<0.082	NM	NM
Trichloroethene	mg/kg	0.0023	10	29	46	<0.056	<0.062	<0.077	<0.06	<0.057	<0.06	<0.055	<0.064	<0.063	<0.066	<0.064	<0.068	NM	NM	<0.054	<0.056	<0.062	<0.055	NM	NM	<0.084	<0.082	NM	NM
Xylene (Total)	mg/kg	5.4	NE	45	130	9.6	0.24	<0.23	<0.18	<0.17	<0.18	<0.17	<0.19	0.77	<0.2	<0.19	<0.2	NM	NM	<0.16	<0.17	<0.19	<0.17	NM	NM	<0.25	<0.25	NM	NM

Notes:

A full list of abbreviations is included in the table glossery

Table 2
Soil Analytical Results

Phase II Environmental Site Assessment
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

					Borings are ordered by Area:	Temporary Pavement for Staging Option 3																					
Boring ID	Units	2014 Screening SLV	20xTCLP level	Tier 1 Residential SRV	Tier 2 Industrial SRV	GP-341	GP-341	GP-164	GP-164	GP-164	GP-342	GP-342	GP-342	GP-342	GP-342	GP-342	GP-342	GP-342	GP-165	GP-343	GP-343	GP-344	GP-344	GP-178	GP-178	GP-178	GP-178
Field Sample ID						GP-341-3	GP-341-8	GP-164-2.5	GP-164-6.5	GP-164-16	GP-342-0.5	GP-342-1.5	GP-342-3	GP-342-6.5	GP-342-0.5	GP-342-1.5	GP-342-3	GP-342-6.5	GP-165-3	GP-343-1.5	GP-343-11	GP-344-2	GP-344-7	GP-178-0.5	GP-178-1.5	GP-178-3	GP-178-6
Laboratory ID						10479612008	10479612009	10446535005	10446535006	10446750023	10475634009	10475634010	10475634011	10475634012	10479612010	10479612011	10479612012	10479612013	10446535003	10475634017	10475634018	10475884001	10475884002	10446750011	10446750012	10446750013	10446750014
Sample Date						6/17/2019	6/17/2019	9/6/2018	9/6/2018	9/7/2018	5/20/2019	5/20/2019	5/20/2019	5/20/2019	6/17/2019	6/17/2019	6/17/2019	6/17/2019	9/6/2018	5/20/2019	5/20/2019	5/20/2019	5/20/2019	9/7/2018	9/7/2018	9/7/2018	9/7/2018
DRO and GRO																											
Diesel Range Organics	mg/kg	The MPCA Unregulated Fill Criteria for DRO and GRO is <100 mg/kg				NM	NM	78.6 (T6)	44.4 (T6)	<10.1 (T6)	NM	NM	NM	NM	NM	NM	NM	NM	267 (T6)	370 (T6)	28.6 (T7,T6)	NM	NM	NM	NM	167 (T6)	32.9 (T6)
Gasoline Range Organics	mg/kg					NM	NM	<11	<14	<13.1	NM	NM	<15.7 (G+)	<12.1	NM	NM	NM	NM	<12.5	<11.9 (G+)	<16.4	<10.9	<12.7	NM	NM	<12	<13.3
WDRO C10-C28 Silica Gel	mg/kg					NM	NM	NM	NM	NM	NM	NM	25.4 (T6)	<9.5	NM	NM	NM	NM	NM	NM	NM	<8.7	95.9	NM	NM	NM	NM
Metals																											
Antimony	mg/kg	5.4	NE	12	100	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Arsenic	mg/kg	5.8	100	9	20	NM	NM	2.8	3.2	2.2	<5.6 (D3)	4.4	3.1	<5.8 (D3)	NM	NM	NM	NM	3.8	3.9	3.9	4.2	2.6	NM	NM	5.9	4.3
Barium	mg/kg	1700	2000	1100	18000	NM	NM	42.3	70.8	46.4	174	153	93.8	49.1	NM	NM	NM	NM	161	91.8	79.7	83.5 (M1,R1)	80.9	NM	NM	189	29.2
Beryllium	mg/kg	2.7	NE	55	230	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium	mg/kg	8.8	20	25	200	NM	NM	<0.33 (D3)	<0.19	<0.18	<0.84 (D3)	0.90	0.32	<0.87 (D3)	NM	NM	NM	NM	1.1	0.54	1.3	0.23	<0.18	NM	NM	1.6	0.20
Chromium	mg/kg	36	100	87	650	NM	NM	15.1	18	21.7	40.8	17.8	21.4	20.5	NM	NM	NM	NM	19.7	20.2	32.8	16.8	24.1	NM	NM	30.9	11.3
Copper	mg/kg	700	NE	100	9000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Lead	mg/kg	2700	100	300	700	NM	NM	27.6	79.9	3.6	55.7	127	36.8	28.6	NM	NM	NM	NM	164	144	36.2	82.4 (M1,R1)	10	149	53.3	160	21.6
Mercury	mg/kg	3.3	4	0.5	1.5	0.078	0.55	0.25	0.59	<0.023	NM	NM	NM	0.073 (2M)	0.15	0.20	1.1	1.3	0.18	0.28	0.113	0.0289	0.104	NM	NM	0.62	0.032
Nickel	mg/kg	180	NE	560	2500	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Selenium	mg/kg	2.6	20	160	1300	NM	NM	<2.2 (D3)	<1.3	<1.2	<5.8 (D3)	<1.2	<1.5	<5.8 (D3)	NM	NM	NM	NM	<1.2	<1.2	<1.6	<1 (M1)	<1.2	NM	NM	<1.1	<1.2
Silver	mg/kg	7.9	100	160	1300	NM	NM	<1.1 (D3)	<0.64	<0.6	<2.8 (D3)	<0.59	<0.76	<2.9 (D3)	NM	NM	NM	NM	<0.58	<0.58	<0.79	<0.51	<0.59	NM	NM	<0.57	<0.6
Zinc	mg/kg	3000	NE	8700	75000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TCLP Metals																											
Lead TCLP	mg/L	5 mg/L TCLP Lead hazardous limit				NM	NM	NM	NM	NM	NM	<0.5	NM	NM	NM	NM	NM	NM	0.53	1.4	NM	NM	NM	NM	NM	1.1	NM
Mercury TCLP	mg/L	0.2 mg/L TCLP Mercury hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium TCLP	mg/L	1.0 mg/L TCLP Cadmium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Chromium TCLP	mg/L	5.0 mg/L TCLP Chromium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
PCBs																											
PCBs (Polychlorinated Biphenyls)	mg/kg	NE	NE	1.2	8	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	0.044	NM	NM	NM	NM	NM	NM	NM
Herbicides and Pesticides																											
2,4-D	mg/kg	0.5	200	0.5	0.5	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Triclopyr	mg/kg	0.3	NE	0.3	0.3	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Semi-VOCs																											
1-Methylnaphthalene	mg/kg	NE	NE	NE	NE	NM	NM	NM	NM	NM	NM	NM	<0.53	<0.38	NM	NM	NM	NM	NM	NM	NM	NM	<0.0394	NM	NM	NM	NM
2,4-Dinitrotoluene	mg/kg	0.013	2.6	50	355	NM	NM	NM	NM	NM	NM	NM	<0.53	<0.38	NM	NM	NM	NM	NM	NM	NM	NM	<0.394	NM	NM	NM	NM
2-Methylnaphthalene	mg/kg	NE	NE	100	369	NM	NM	NM	NM	NM	NM	NM	<0.53	<0.38	NM	NM	NM	NM	NM	NM	NM	NM	<0.0394	NM	NM	NM	NM
Acenaphthene	mg/kg	81	NE	1200	5260	NM	NM	0.15	<0.068	<0.013	NM	NM	<0.53	<0.38	NM	NM	NM	NM	1.7	0.0816	0.0461	0.0383	<0.0394	NM	NM	<0.12	0.014
Acenaphthylene	mg/kg	NE	NE	NE	NE	NM	NM	<0.056	<0.068	<0.013	NM	NM	<0.53	<0.38	NM	NM	NM	NM	<0.59	<0.0715	<0.00777	<0.0064	<0.0394	NM	NM	<0.12	<0.013
Anthracene	mg/kg	1300	NE	7880	45400	NM	NM	0.42	0.25	<0.013	NM	NM	0.59	<0.38	NM	NM	NM	NM	5.0	0.356	0.0806	0.224	0.0459	NM	NM	0.33	0.014
Benz(a)anthracene	mg/kg	NE	NE	NE	NE	NM	NM	0.75	0.44	<0.013	NM	NM	1.1	<0.38	NM	NM	NM	NM	7.1	0.907	0.11	0.574	0.0988	NM	NM	0.66	0.04
Benzo(a)pyrene	mg/kg	1.4	NE	2	3	NM	NM	0.68	0.47	<0.013	NM	NM	1.0	<0.38	NM	NM	NM	NM	6.9	0.746	0.0754	0.736	0.0846	NM	NM	0.68	0.041
Benzo(b)fluoranthene	mg/kg	NE	NE	NE	NE	NM	NM	0.85	0.52	<0.013	NM	NM	1.5	<0.38	NM	NM	NM	NM	8.1	1.02	0.0656	1.17	0.107	NM	NM	1.0	0.059
Benzo(g,h,i)perylene	mg/kg	NE	NE	NE	NE	NM	NM	0.41	0.28	<0.013	NM	NM	0.65	<0.38	NM	NM	NM	NM	4.3	0.442	0.038	0.724	0.0493	NM	NM	0.45	0.03
Benzo(k)fluoranthene	mg/kg	NE	NE	NE	NE	NM	NM	0.31	0.20	<0.013	NM	NM	0.59	<0.38	NM	NM	NM	NM	2.9	0.263	0.0214	0.406	<0.0394	NM	NM	0.43	0.019
Carbazole	mg/kg	NE	NE	700	1310	NM	NM	NM	NM	NM	NM	NM	<0.53	<0.38	NM	NM	NM	NM	NM	NM	NM	NM	<0.394	NM	NM	NM	NM
Chrysene	mg/kg	NE	NE	NE	NE	NM	NM	0.61	0.37	<0.013	NM	NM	1.4	<0.38	NM	NM	NM	NM	5.5	0.754	0.0982	0.611	0.0918	NM	NM	0.57	0.04
Dibenz(a,h)anthracene	mg/kg	NE	NE	NE	NE	NM	NM	0.09	<0.068	<0.013	NM	NM	<0.53	<0.38	NM	NM	NM	NM	0.83	0.124	0.0114	0.185	<0.0394	NM	NM	<0.12	<0.013
Dibenzofuran	mg/kg	NE	NE	104	810	NM	NM	NM	NM	NM	NM	NM	<0.53	<0.38	NM	NM	NM	NM	NM	NM	NM	NM	<0.394	NM	NM	NM	NM
Fluoranthene	mg/kg	670	NE	1080	6800	NM	NM	1.6	0.97	<0.013	NM	NM	3.4	0.40	NM	NM	NM	NM	19.4	1.73	0.188	0.881	0.176	NM	NM	1.6	0.082
Fluorene	mg/kg	110	NE	850	4120	NM	NM	0.17	<0.068	<0.013	NM	NM	<0.53	<0.38	NM	NM	NM	NM	2.3	0.103	0.0346	0.0419	<0.0394	NM	NM	<0.12	<0.013
Indeno(1,2,3-cd)pyrene	mg/kg	NE	NE	NE	NE	NM	NM	0.35	0.21	<0.013	NM	NM	0.6	<0.38	NM	NM	NM	NM	3.3	0.368	0.0262	0.618	0.0591	NM	NM	0.38	0.025
Naphthalene	mg/kg	NE	NE	NE	NE	NM	NM	<0.056	<0.068	<0.013	NM	NM	<0.53	<0.38	NM	NM	NM	NM	1.9	0.453	<0.0259	0.349	0.0622	NM	NM	0.13	0.025
Phenanthrene	mg/kg	NE	NE	NE	NE	NM	NM	1.5	0.53	<0.013	NM	NM	3	<0.38	NM	NM	NM	NM	19.1	1.26	0.29	0.56	0.155	NM	NM	0.91	0.064
Pyrene	mg/kg	440	NE	890	5800	NM	NM	1.3	0.75	<0.013	NM	NM	2.5	<0.38	NM	NM	NM	NM	14	1.54	0.233	0.769	0.177	NM	NM	1.2	0.069
BaP Equivalents																											
Benzo(a)pyrene Equivalents	mg/kg	1.4	NE	2	3	NM	NM	0.96	0.61	<0	NM	NM	1.4	<0	NM	NM	NM	NM	9.6	1.08	0.11	1.12	0.112	NM	NM	0.93	0.056
VOCs																											
1,2,4-Trimethylbenzene	mg/kg	2.7	NE	8	25	NM	NM	<0.056	<0.072	<0.064	NM	NM	<0.082	<0.058	NM	NM	NM	NM	<0.06	<0.063	<0.084	<0.058	<0.065	NM	NM	0.19	<0.062
1,3,5-Trimethylbenzene	mg/kg	2.7	NE	3	10	NM	NM	<0.056	<0.072	<0.064	NM	NM	<0.082	<0.058	NM	NM	NM	NM	<0.06	<0.063	<0.084	<0.058	<0.065	NM	NM	<0.061	<0.062
Benzene	mg/kg	0.017	10	6	10	NM	NM	<0.022	<0.029	<0.025	NM	NM	<0.033	<0.023	NM	NM	NM	NM	<0.024	<0.025	<0.034	<0.023	<0.026	NM	NM	<0.024	<0.025
Chlorobenzene	mg/kg	1.2	2000	11	32	NM	NM	<0.056	<0.072	<0.064	NM	NM	<0.082	<0.058	NM	NM	NM	NM	<0.06	<0.063	<0.084	<0.058	<0.065	NM	NM	<0.061	<0.062
Diethyl Ether	mg/kg	0.51	NE	NE	NE	NM	NM	<0.22	<0.29	<0.25	NM	NM	<0.33	<0.23	NM	NM	NM	NM	<0.24	<0.25	<0.34	<0.23	<0.26	NM	NM	<0.24	<0.25
Ethylbenzene	mg/kg	1.1	NE	200	200	NM	NM	<0.056	<0.072	<0.064	NM	NM	<0.082	<0.058	NM	NM	NM	NM	<0.06	<0.063	<0.084	<0.058	<0.065	NM	NM	<0.061	<0.062
Isopropylbenzene	mg/kg	9.5	NE	30	87	NM	NM	<0.056	<0.072	<0.064	NM	NM	<0.082	<0.058	NM	NM	NM	NM	<0.06	<0.063	<0.084	<0.058	<0.065	NM	NM	<0.061	<0.062
Naphthalene	mg/kg	4.5	NE	10	28	NM	NM	<0.22	<0.29	<0.25	NM	NM	<0.33	<0.23	NM	NM	NM	NM	0.65	<0.25	<0.34	<0.23	<0.26	NM	NM	<0.24	<0.25
n-Butylbenzene	mg/kg	NE	NE	30	92	NM	NM	<0.056	<0.072	<0.064	NM	NM	<0.082	<0.058	NM	NM	NM	NM	<0.06	<0.063	<0.084	<0.058	<0.065	NM	NM	<0.061	<0.062
n-Propylbenzene	mg/kg	NE	NE	30	93	NM	NM	<0.056	<0.072	<0.064	NM	NM	<0.082	<0.058	NM	NM	NM	NM	<0.06	<0.063	<0.084	<0.058	<0.065	NM	NM	<0.061	<0.062
p-Isopropyltoluene	mg/kg	NE	NE	NE	NE	NM	NM	<0.056	<0.072	<0.064	NM	NM	0.13	<0.058	NM	NM	NM	NM	<0.06	<0.063	<0.084	<0.058	<0.065	NM	NM	<0.061	<0.062
sec-Butylbenzene	mg/kg	NE	NE	25	70	NM	NM	<0.056	<0.072	<0.064	NM	NM	<0.082	<0.058	NM	NM	NM	NM	<0.06	<0.063	<0.084	<0.058	<0.065	NM	NM	<0.061	<0.062
tert-Butylbenzene	mg/kg	NE	NE	30	90	NM	NM	<0.056	<0.072	<0.064	NM	NM	<0.082	<0.058	NM	NM	NM	NM	<0.06	<0.063	<0.084	<0.058	<0.065	NM	NM	<0.061	<0.062
Tetrachloroethene	mg/kg	0.042	14	72	131	NM	NM	<0.22	<0.29	<0.25	NM	NM	<0.082	<0.058	NM	NM	NM	NM	<0.24	<0.063	<0.084	<0.058	<0.065	NM	NM	<0.24	<0.25
Toluene	mg/kg	2.5	NE	107	305	NM	NM	<0.056	<0.072	<0.064	NM	NM	0.37	<0.058	NM	NM	NM	NM	<0.06	0.093	<0.084	0.11	<0.065	NM	NM	<0.061	<0.062
Trichloroethene	mg/kg	0.0023	10	29	46	NM	NM	<0.056	<0.072	<0.064	NM	NM	<0.082	<0.058	NM	NM	NM	NM	<0.06	<0.063	<0.084	<0.058	<0.065	NM	NM	<0.061	<0.062
Xylene (Total)	mg/kg	5.4	NE	45	130	NM	NM	<0.17	<0.21	<0.19	NM	NM	<0.25	<0.18	NM	NM	NM	NM	<0.18	<0.19	<0.25	<0.17	<0.19	NM	NM	<0.18	<0.19

Notes:

A full list of abbreviations is included in the table glossery

Table 2
Soil Analytical Results

Phase II Environmental Site Assessment
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

Boring ID	Units	2014 Screening SLV	20xTCLP level	Tier 1 Residential SRV	Tier 2 Industrial SRV	GP-178	GP-345	GP-345	GP-346	GP-346	GP-217	GP-217	GP-303	GP-303	GP-304	GP-304	GP-235	GP-235	GP-235	GP-305	GP-305	GP-306	GP-306	GP-307	GP-307	GP-236	GP-239	GP-308
				Borings are ordered by Area:		Temporary Pavement for Staging Option 3									Lower Michigan Street													
Field Sample ID						GP-178-13	GP-345-1.5	GP-345-10.5	GP-346-2	GP-346-12	GP-217-3	GP-217-10	GP-303-3.5	GP-303-8.5	GP-304-3	GP-304-8	GP-235-2	GP-235-7	GP-235-15	GP-305-3	GP-305-7	GP-306-3.5	GP-306-7	GP-307-3	GP-307-6.5	GP-236-2.5	GP-239-2	GP-308-3
Laboratory ID						10446750015	10475634014	10475634015	10475884035	10475884036	10447291023	10447291022	10475384008	10475384009	10474936008	10474936009	10447291001	10447291002	10447291003	10474936011	10474936012	10474936014	10474936015	10474936017	10474936018	10447291013	10447291014	10475071001
Sample Date						9/7/2018	5/20/2019	5/20/2019	5/20/2019	5/20/2019	9/12/2018	9/12/2018	5/16/2019	5/16/2019	5/14/2019	5/14/2019	9/11/2018	9/11/2018	9/11/2018	5/14/2019	5/14/2019	5/14/2019	5/14/2019	5/14/2019	5/14/2019	9/12/2018	9/12/2018	5/15/2019
DRO and GRO																												
Diesel Range Organics	mg/kg	The MPCA Unregulated Fill Criteria for DRO and GRO is <100 mg/kg				22.2 (T6)	NM	NM	32.0 (T7,T6)	NM	155 (T7,T6)	<10.1	35.2 (T7,T6)	NM	24.9 (T6)	NM	50.7 (T7,T6)	<10.7	<10.6	183 (T7,T6)	33.6 (T6)	693 (T6)	913 (T6)	NM	NM	14.5 (T7,T6)	76.6 (T7,T6)	<9
Gasoline Range Organics	mg/kg					<15.5	<10.6 (G+)	<12.6	<11.9	<27.8	<11.6	<14.3	<10.6 (G+)	<14.5	<10.9	<15.4	<11.2	<13.3	<14.1	<12.3 (G+)	<13.4 (G+)	15.2 (G+)	<11.5 (G+)	11.6 (C0,R	<14.8 (G+)	<14.2	<15.2	<11.4
WDRO C10-C28 Silica Gel	mg/kg					NM	<8.8	<10.3	NM	<21.9	NM	NM	NM	14.6 (T7,T6)	NM	37.4 (T6)	NM	NM	NM	NM	NM	NM	NM	12.7 (T6)	253 (T6)	NM	NM	NM
Metals																												
Antimony	mg/kg	5.4	NE	12	100	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Arsenic	mg/kg	5.8	100	9	20	<7 (D3)	2.3	3.8	7.8	3.8	2.9	3.4	2.3	4.6	3.5	2.3	2.9	3.4	3.6	2.2	1.6	3.6	NM	<5.5 (D3)	3.7	3.8	5.2	<5.1 (D3)
Barium	mg/kg	1700	2000	1100	18000	114	37.6	79.2	26.1	106	36.8	118	27.9	116	30.4	19.9	60.2	111	135	25.1	13.7	477	NM	44.4	33	31.8	58.5	18.4
Beryllium	mg/kg	2.7	NE	55	230	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium	mg/kg	8.8	20	25	200	<1.1 (D3)	<0.16	0.39	<0.16	0.39	<0.17	<0.19	<0.16	<0.19	<0.16	<0.22	<0.17 (M1)	<0.18	<0.19	0.24	<0.18	12.2	NM	<0.82 (D3)	<0.2	<0.16	<0.2	<0.77 (D3)
Chromium	mg/kg	36	100	87	650	34.1	13.6	16.6	13.5	26.2	16.5	29.6	17.2	32.9	6.6	3.3	18	30.6	31.1	7.2	4.9	82.7	NM	23.6	29.8	12.5	15	16.4
Copper	mg/kg	700	NE	100	9000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Lead	mg/kg	2700	100	300	700	6.4	23.5	61.2	10.4	4.7	12.2	6.7	4.4	8.1	39.8	6.8	5.8	7.1	7.4	22	12.3	151	NM	5.6	3.8	42.2	318	12.6
Mercury	mg/kg	3.3	4	0.5	1.5	0.038	0.0408	0.0993	<0.0216	0.0723	0.066	<0.024	<0.02	<0.026	0.029	0.038	<0.02	<0.024	<0.025	0.22	0.069	4.1	NM	<0.021	<0.028	0.040	0.26	<0.022
Nickel	mg/kg	180	NE	560	2500	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Selenium	mg/kg	2.6	20	160	1300	<7 (D3)	<1	<1.3	<1	<2.6	<1.1	<1.3	<1.1	<1.3	<1.1	<1.5	<1.1	<1.2	<1.3	<1.2	<1.2	<1.2	NM	<5.5 (D3)	<1.4	<1	<1.3	<5.1 (D3)
Silver	mg/kg	7.9	100	160	1300	<3.5 (D3)	<0.52	<0.63	<0.52	<1.3	<0.56	<0.64	<0.53	<0.65	<0.53	<0.73	<0.57	<0.61	<0.65	<0.59	<0.59	<0.59	NM	<2.7 (D3)	<0.68	<0.52	<0.67	<2.6 (D3)
Zinc	mg/kg	3000	NE	8700	75000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TCLP Metals																												
Lead TCLP	mg/L	5 mg/L TCLP Lead hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<0.5	NM	NM	NM	NM	0.13	NM
Mercury TCLP	mg/L	0.2 mg/L TCLP Mercury hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<0.0006 (H2	NM	NM	NM	NM	NM	NM
Cadmium TCLP	mg/L	1.0 mg/L TCLP Cadmium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Chromium TCLP	mg/L	5.0 mg/L TCLP Chromium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
PCBs																												
PCBs (Polychlorinated Biphenyls)	mg/kg	NE	NE	1.2	8	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	0.098	NM	NM	BRL	NM	NM	NM
Herbicides and Pesticides																												
2,4-D	mg/kg	0.5	200	0.5	0.5	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Triclopyr	mg/kg	0.3	NE	0.3	0.3	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Semi-VOCs																												
1-Methylnaphthalene	mg/kg	NE	NE	NE	NE	NM	NM	NM	0.0528	<0.641	NM	NM	<0.36	<0.46	NM	<0.5	NM	NM	NM	NM	NM	NM	NM	<0.39	<0.48	NM	NM	NM
2,4-Dinitrotoluene	mg/kg	0.013	2.6	50	355	NM	NM	NM	<0.359	<8.41	NM	NM	<0.36	<0.46	NM	<0.5	NM	NM	NM	NM	NM	NM	NM	<0.39	<0.48	NM	NM	NM
2-Methylnaphthalene	mg/kg	NE	NE	100	369	NM	NM	NM	0.0714	<0.641	NM	NM	<0.36	<0.46	NM	<0.5	NM	NM	NM	NM	NM	NM	NM	<0.39	<0.48	NM	NM	NM
Acenaphthene	mg/kg	81	NE	1200	5260	<0.015	0.0169	0.0192	<0.0359	<0.641	<0.12	<0.013	<0.36	<0.46	<0.011	<0.5	<0.012	<0.013	<0.013	0.027	0.032	0.033	NM	<0.39	<0.48	<0.011	0.028	<0.011
Acenaphthylene	mg/kg	NE	NE	NE	NE	<0.015	<0.0065	<0.00879	<0.0359	<0.641	2.0	<0.013	<0.36	<0.46	<0.011	<0.5	<0.012	<0.013	<0.013	<0.012	<0.013	0.021	NM	<0.39	<0.48	<0.011	0.025	<0.011
Anthracene	mg/kg	1300	NE	7880	45400	<0.015	0.0669	0.0463	<0.0359	<0.641	1.9	<0.013	<0.36	<0.46	<0.011	<0.5	<0.012	<0.013	<0.013	<0.012	<0.013	0.064	NM	<0.39	<0.48	0.018	0.11	<0.011
Benz(a)anthracene	mg/kg	NE	NE	NE	NE	<0.015	0.198	0.127	<0.0359	<0.641	9.8	<0.013	<0.36	<0.46	0.046 (M1)	<0.5	0.017	<0.013	<0.013	0.11	0.13	0.17	NM	<0.39	<0.48	0.13	0.73	<0.011
Benzo(a)pyrene	mg/kg	1.4	NE	2	3	<0.015	0.191	0.109	<0.0359	<0.641	8.1	<0.013	<0.36	<0.46	0.039	<0.5	0.022	<0.013	<0.013	0.12	0.14	0.16	NM	<0.39	<0.48	0.13	0.68	<0.011
Benzo(b)fluoranthene	mg/kg	NE	NE	NE	NE	<0.015	0.269	0.129	<0.0359	<0.641	8.4	<0.013	<0.36	<0.46	0.06 (M1)	<0.5	0.026	<0.013	<0.013	0.14	0.19	0.22	NM	<0.39	<0.48	0.19	1.0	<0.011
Benzo(g,h,i)perylene	mg/kg	NE	NE	NE	NE	<0.015	0.143	0.0628	<0.0359	<0.641	3.9	<0.013	<0.36	<0.46	0.028	<0.5	0.016	<0.013	<0.013	0.076	0.092	0.12	NM	<0.39	<0.48	0.087	0.39	<0.011
Benzo(k)fluoranthene	mg/kg	NE	NE	NE	NE	<0.015	0.0922	0.0447	<0.0359	<0.641	2.5	<0.013	<0.36	<0.46	0.022	<0.5	<0.012	<0.013	<0.013	0.06	0.07	0.098	NM	<0.39	<0.48	0.065	0.29	<0.011
Carbazole	mg/kg	NE	NE	700	1310	NM	NM	NM	<0.359	<8.41	NM	NM	<0.36	<0.46	NM	<0.5	NM	NM	NM	NM	NM	NM	NM	<0.39	<0.48	NM	NM	NM
Chrysene	mg/kg	NE	NE	NE	NE	<0.015	0.195	0.108	<0.0359	<0.641	7.1	<0.013	<0.36	<0.46	0.046 (M1)	<0.5	0.017	<0.013	<0.013	0.14	0.15	0.21	NM	<0.39	<0.48	0.11	0.54	<0.011
Dibenz(a,h)anthracene	mg/kg	NE	NE	NE	NE	<0.015	0.037	0.016	<0.0359	<0.641	1.4	<0.013	<0.36	<0.46	<0.011	<0.5	<0.012	<0.013	<0.013	<0.012	<0.013	0.039	NM	<0.39	<0.48	0.027	0.13	<0.011
Dibenzofuran	mg/kg	NE	NE	104	810	NM	NM	NM	<0.359	<8.41	NM	NM	<0.36	<0.46	NM	<0.5	NM	NM	NM	NM	NM	NM	NM	<0.39	<0.48	NM	NM	NM
Fluoranthene	mg/kg	670	NE	1080	6800	<0.015	0.33	0.264	<0.0359	<0.641	12.5	<0.013	<0.36	<0.46	0.075 (M1)	<0.5	0.036	<0.013	<0.013	0.24	0.24	0.31	NM	<0.39	<0.48	0.13	0.99	<0.011
Fluorene	mg/kg	110	NE	850	4120	<0.015	0.0181	0.0179	<0.0359	<0.641	0.27	<0.013	<0.36	<0.46	<0.011	<0.5	<0.012	<0.013	<0.013	0.035	0.027	0.038	NM	<0.39	<0.48	<0.011	0.029	<0.011
Indeno(1,2,3-cd)pyrene	mg/kg	NE	NE	NE	NE	<0.015	0.118	0.0524	<0.0359	<0.641	3.5	<0.013	<0.36	<0.46	0.023	<0.5	0.015	<0.013	<0.013	0.065	0.078	0.10	NM	<0.39	<0.48	0.082	0.37	<0.011
Naphthalene	mg/kg	NE	NE	NE	NE	<0.015	0.141	0.0321	0.0471	<0.641	<0.12	<0.013	<0.36	<0.46	0.036	<0.5	<0.012	<0.013	<0.013	0.033	0.02	0.046	NM	<0.39	<0.48	0.062	0.057	<0.011
Phenanthrene	mg/kg	NE	NE	NE	NE	<0.015	0.227	0.168	0.0361	<0.641	5.6	<0.013	<0.36	<0.46	0.062 (M1)	<0.5	0.027	<0.013	<0.013	0.22	0.16	0.27	NM	<0.39	<0.48	0.094	0.38	<0.011
Pyrene	mg/kg	440	NE	890	5800	<0.015	0.303	0.223	<0.0359	<0.641	16.9	<0.013	<0.36	<0.46	0.07 (M1)	<0.5	0.033	<0.013	<0.013	0.23	0.25	0.31	NM	<0.39	<0.48	0.13	1.0	<0.011
BaP Equivalents																												
Benzo(a)pyrene Equivalents	mg/kg	1.4	NE	2	3	<0	0.281	0.154	<0	<0	11.4	<0	<0	<0	0.055	<0	0.028	<0	<0	0.16	0.19	0.24	NM	<0	<0	0.19	1.0	<0
VOCs																												
1,2,4-Trimethylbenzene	mg/kg	2.7	NE	8	25	<0.075	<0.055	<0.066	0.19	<0.13	<0.058	<0.065	<0.056	<0.07	<0.053	<0.073	<0.058	<0.067	<0.073	0.096	0.077	0.28	<0.06	<0.062	<0.072	0.23	0.10	<0.055
1,3,5-Trimethylbenzene	mg/kg	2.7	NE	3	10	<0.075	<0.055	<0.066	<0.056	<0.13	<0.058	<0.065	<0.056	<0.07	<0.053	<0.073	<0.058	<0.067	<0.073	<0.062	<0.064	<0.063	<0.06	<0.062	<0.072	<0.068	<0.07	<0.055
Benzene	mg/kg	0.017	10	6	10	<0.03	<0.022	<0.026	0.066	<0.054	<0.023	<0.026	<0.022	<0.028	<0.021	<0.029	<0.023	<0.027	<0.029	<0.025	<0.026	0.056	<0.024	<0.025	<0.029	0.053	<0.028	<0.022
Chlorobenzene	mg/kg	1.2	2000	11	32	<0.075	<0.055	<0.066	<0.056	<0.13	<0.058	<0.065	<0.056	<0.07	<0.053	<0.073	<0.058	<0.067	<0.073	<0.062	<0.064	<0.063	<0.06	<0.062	<0.072	<0.068	<0.07	<0.055
Diethyl Ether	mg/kg	0.51	NE	NE	NE	<0.3	<0.22	<0.26	<0.22	<0.54	<0.23	<0.26	<0.22	<0.28	<0.21	<0.29	<0.23	<0.27	<0.29	<0.25	<0.26	<0.25	<0.24	<0.25	<0.29	<0.27	<0.28	<0.22
Ethylbenzene	mg/kg	1.1	NE	200	200	<0.075	<0.055	<0.066	0.16	<0.13	<0.058	<0.065	<0.056	<0.07	<0.053	<0.073	<0.058	<0.067	<0.073	<0.062	<0.064	0.17	<0.06	<0.062	<0.072	0.082	<0.07	<0.055
Isopropylbenzene	mg/kg	9.5	NE	30	87	<0.075	<0.055	<0.066	<0.056	<0.13	<0.058	<0.065	<0.056	<0.07	<0.053	<0.073	<0.058	<0.067	<0.073	<0.062	<0.064	<0.063	<0.06	<0.062	<0.072	<0.068	<0.07	<0.055
Naphthalene	mg/kg	4.5	NE	10	28	<0.3	<0.22	<0.26	0.28	<0.54	<0.23	<0.26	<0.22	<0.28	<0.21	<0.29	<0.23	<0.27	<0.29	<0.25	<0.26	<0.25	<0.24	<0.25	<0.29	0.42	<0.28	<0.22
n-Butylbenzene	mg/kg	NE	NE	30	92	<0.075	<0.055	<0.066	<0.056	<0.13	<0.058	<0.065	<0.056	<0.07	<0.053	<0.073	<0.058	<0.067	<0.073	<0.062	<0.064	0.14	<0.06	<0.062	<0.072	<0.068	<0.07	<0.055
n-Propylbenzene	mg/kg	NE	NE	30	93	<0.075	<0.055	<0.066	0.057	<0.13	<0.058	<0.065	<0.056	<0.07	<0.053	<0.073	<0.058	<0.067	<0.073	<0.062	<0.064	0.11	<0.06	<0.062	<0.072	<0.068	<0.07	<0.055
p-Isopropyltoluene	mg/kg	NE	NE	NE	NE	<0.075	<0.055	<0.066	<0.056	<0.13	<0.058	<0.065	<0.056	<0.07	<0.053	<0.073	<0.058	<0.067	<0.073	<0.062	<0.064	<0.063	<0.06	<0.062	<0.072	0.27	0.17	<0.055
sec-Butylbenzene	mg/kg	NE	NE	25	70	<0.075	<0.055	<0.066	<0.056	<0.13	<0.058	<0.065	<0.056	<0.07	<0.053	<0.073	<0.058	<0.067	<0.073	<0.062	<0.064	<0.063	<0.06	<0.062	<0.072	<0.068	<0.07	<0.055
tert-Butylbenzene	mg/kg	NE	NE	30	90	<0.075	<0.055	<0.066	<0.056	<0.13	<0.058	<0.065	<0.056	<0.07	<0.053	<0.073	<0.058	<0.067	<0.073	<0.062	<0.064	<0.063	<0.06	<0.062	<0.072	<0.068	<0.07	<0.055
Tetrachloroethene	mg/kg	0.042	14	72	131	<0.3	<0.055	<0.066	<0.056	<0.13	<0.058	<0.065	<0.056	<0.07	<0.053	<0.073	<0.058	<0.067	<0.073	<0.062	<0.064	<0.063	<0.06	<0.062	<0.072	<0.068	<0.07	<0.055
Toluene	mg/kg	2.5	NE	107	305	<0.075	<0.055	<0.066	0.67	<0.13	<0.058	<0.065	<0.056	<0.07	<0.053	<0.073	<0.058	<0.067	<0.073	0.13	<0.064	0.32	<0.06	<0.062	<0.072	0.26	0.11	<0.055
Trichloroethene	mg/kg	0.0023	10	29	46	<0.075	<0.055	<0.066	<0.056	<0.13	<0.058	<0.065	<0.056	<0.07	<0.053	<0.073	<0.058	<0.067	<0.073	<0.062	<0.064	<0.063	<0.06	<0.062	0.072 (M1,F	<0.068	<0.07	<0.055
Xylene (Total)	mg/kg	5.4	NE	45	130	<0.23	<0.17	<0.2	0.89	<0.4	<0.17	<0.19	<0.17	<0.21	<0.16	<0.22	<0.17	<0.2	<0.22	0.26	<0.19	0.59	<0.18	<0.18	<0.22	0.65	0.26	<0.17

Notes:

A full list of abbreviations is included in the table glossery

Table 2
Soil Analytical Results

Phase II Environmental Site Assessment
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

				Borings are ordered by Area:		Lower Michigan Street																						
Boring ID	Units	2014 Screening SLV	20xTCLP level	Tier 1 Residential SRV	Tier 2 Industrial SRV	GP-308	GP-309	GP-309	GP-310	GP-310	GP-310	GP-311	GP-311	GP-247	GP-312	GP-312	GP-313	GP-313	GP-253	GP-253	GP-253	GP-314	GP-314	GP-315	GP-315	GP-254	GP-254	GP-254
Field Sample ID						GP-308-6.5	GP-309-3	GP-309-8	GP-310-1.5	GP-310-8	GP-310-15	GP-311-3.5	GP-311-7	GP-247-1	GP-312-1.5	GP-312-6	GP-313-2.5	GP-313-8	GP-253-2.5	GP-253-10	GP-253-15	GP-314-3.5	GP-314-8	GP-315-3.5	GP-315-7.5	GP-254-2	GP-254-10	GP-254-15
Laboratory ID						10475071002	10475434006	10475434007	10475384011	10475384012	10475384013	10475384015	10475384016	10447955009	10475384017	10475384018	10475434004	10475434005	10447650005	10447650006	10447650007	10475071004	10475071005	10475384021	10475384022	10447650001	10447650002	10447650003
Sample Date						5/15/2019	5/17/2019	5/17/2019	5/16/2019	5/16/2019	5/16/2019	5/16/2019	5/16/2019	9/17/2018	5/16/2019	5/16/2019	5/16/2019	5/16/2019	9/14/2018	9/14/2018	9/14/2018	5/15/2019	5/15/2019	5/16/2019	5/16/2019	9/13/2018	9/13/2018	9/13/2018
DRO and GRO																												
Diesel Range Organics	mg/kg	The MPCA Unregulated Fill Criteria for DRO and GRO is <100 mg/kg				NM	<8.2	<10.2	NM	NM	<10.3	NM	NM	324	64.9 (T7,T6)	10.4 (T7,T6)	<9.2	<10.4	130 (T7,T6)	<9.6	<10.4	NM	<10.3	NM	NM	<8.7	33.0 (T7,T6)	<12.2
Gasoline Range Organics	mg/kg					<13	<10.7	<12.4	<11.9 (G+)	<14.9 (G+,G+)	<12.8	<11.6 (G+,G+)	<12.4	<11.4	<10.5	<13.5	<11.6	<14.1	<13.7	<13	<11.9	<11.1 (G+,G+)	<12	<11.3	<28.2	<11.7	<17.6	<14.2
WDRO C10-C28 Silica Gel	mg/kg					<10.2	NM	NM	45.9 (T7,T6)	<11.4	NM	973 (T7,T6)	28.8 (T6)	NM	NM	NM	NM	NM	NM	NM	NM	23.8 (T7,T6)	NM	<9.1	209 (T6)	NM	NM	NM
Metals																												
Antimony	mg/kg	5.4	NE	12	100	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Arsenic	mg/kg	5.8	100	9	20	2.1	2.3	4.5	5.8	15.6	3.7	3.2	5.6	3.0	2.8	4.0	2.6	3.9	3.1	2.4	2.5	<5.3 (D3)	<5.9 (D3)	2.2	29.6	2.8	2.2	2.8
Barium	mg/kg	1700	2000	1100	18000	63	24.6	118	106	32.6	134	33.8	145	56.9	26.6	115	20.7	128	84.3	59.7	51.1	33.7	188	21.5	457	19.8	98.3	130
Beryllium	mg/kg	2.7	NE	55	230	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium	mg/kg	8.8	20	25	200	<0.18	<0.16	<0.19	<0.16	0.46	<0.18	<0.16	<0.18	0.31	<0.15	<0.18	<0.16	<0.19	<0.19	<0.18	<0.17	<0.79 (D3)	<0.88 (D3)	<0.15	1.4	<0.17	<0.25	<0.2
Chromium	mg/kg	36	100	87	650	24.5	17	32.3	14.8	5.3	31.5	19.2	45.8	14.7	20.5	31.8	17.9	30.8	15.7	16.7	13	30.5	42.8	18.3	30.3	9.6	28	28.1
Copper	mg/kg	700	NE	100	9000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Lead	mg/kg	2700	100	300	700	7.2	2.6	7.6	312	106	6.9	9.4	9.8	516	3.5	7.8	3.2	7.6	85.3	4.5	3.8	5.7	11.7	2.7	1720	12.7	6.9	6.3
Mercury	mg/kg	3.3	4	0.5	1.5	<0.022	<0.019	<0.025	0.021	0.2	<0.022	<0.022	<0.023	0.063	<0.021	<0.023	<0.022	<0.024	0.18	<0.021	<0.022	<0.022	0.026	<0.02	0.45	<0.019	0.18	<0.024
Nickel	mg/kg	180	NE	560	2500	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Selenium	mg/kg	2.6	20	160	1300	<1.2	<1	<1.3	<1.1	<6.8 (D3)	<1.2	<1.1	<1.2	<1.1	<1	<1.2	<1	<1.2	<1.2	<1.2	<1.2	<5.3 (D3)	<5.9 (D3)	<1	<2.7	<1.1	<1.7	<1.3
Silver	mg/kg	7.9	100	160	1300	<0.59	<0.52	<0.64	<0.54	<0.68	<0.61	<0.54	<0.59	<0.53	<0.51	<0.61	<0.52	<0.62	<0.62	<0.59	<0.58	<2.6 (D3)	<2.9 (D3)	<0.52	1.7	<0.55	<0.83	<0.66
Zinc	mg/kg	3000	NE	8700	75000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TCLP Metals																												
Lead TCLP	mg/L	5 mg/L TCLP Lead hazardous limit				NM	NM	NM	<0.5	<0.5	NM	NM	NM	0.5	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	0.84	NM	NM	NM
Mercury TCLP	mg/L	0.2 mg/L TCLP Mercury hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium TCLP	mg/L	1.0 mg/L TCLP Cadmium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Chromium TCLP	mg/L	5.0 mg/L TCLP Chromium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
PCBs																												
PCBs (Polychlorinated Biphenyls)	mg/kg	NE	NE	1.2	8	NM	NM	NM	NM	NM	NM	BRL	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	BRL	NM	NM	NM
Herbicides and Pesticides																												
2,4-D	mg/kg	0.5	200	0.5	0.5	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Triclopyr	mg/kg	0.3	NE	0.3	0.3	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Semi-VOCs																												
1-Methylnaphthalene	mg/kg	NE	NE	NE	NE	<0.41	NM	NM	<0.39	<0.48	NM	<0.36	<0.43	NM	<0.35	<0.42	NM	NM	NM	NM	NM	<0.36	NM	<0.37	<0.95	NM	NM	NM
2,4-Dinitrotoluene	mg/kg	0.013	2.6	50	355	<0.41	NM	NM	<0.39	<0.48	NM	<0.36	<0.43	NM	<0.35	<0.42	NM	NM	NM	NM	NM	<0.36	NM	<0.37	<0.95	NM	NM	NM
2-Methylnaphthalene	mg/kg	NE	NE	100	369	<0.41	NM	NM	<0.39	<0.48	NM	<0.36	<0.43	NM	<0.35	<0.42	NM	NM	NM	NM	NM	<0.36	NM	<0.37	<0.95	NM	NM	NM
Acenaphthene	mg/kg	81	NE	1200	5260	<0.41	<0.00625	<0.00792	<0.39	<0.48	<0.013	<0.36	<0.43	0.090	<0.35	<0.42	<0.00661	<0.00779	0.52	<0.012	<0.012	<0.36	<0.013	<0.37	<0.95	<0.011	<0.017	<0.014
Acenaphthylene	mg/kg	NE	NE	NE	NE	<0.41	<0.00625	<0.00792	<0.39	<0.48	<0.013	<0.36	<0.43	0.029	<0.35	<0.42	<0.00661	<0.00779	<0.26	<0.012	<0.012	<0.36	<0.013	<0.37	<0.95	<0.011	<0.017	<0.014
Anthracene	mg/kg	1300	NE	7880	45400	<0.41	<0.00625	<0.00792	<0.39	<0.48	<0.013	<0.36	<0.43	0.24	<0.35	<0.42	<0.00661	<0.00779	1.6	<0.012	<0.012	<0.36	<0.013	<0.37	<0.95	<0.011	<0.017	<0.014
Benz(a)anthracene	mg/kg	NE	NE	NE	NE	<0.41	<0.00625	<0.00792	<0.39	<0.48	<0.013	<0.36	<0.43	0.56	<0.35	<0.42	0.00776	<0.00779	5.4	<0.012	0.015	0.37	<0.013	<0.37	<0.95	<0.011	<0.017	<0.014
Benzo(a)pyrene	mg/kg	1.4	NE	2	3	<0.41	<0.00625	<0.00792	<0.39	<0.48	<0.013	<0.36	<0.43	0.6	<0.35	<0.42	<0.00661	<0.00779	4.9	<0.012	0.018	<0.36	<0.013	<0.37	<0.95	0.013	<0.017	<0.014
Benzo(b)fluoranthene	mg/kg	NE	NE	NE	NE	<0.41	<0.00625	<0.00792	<0.39	<0.48	<0.013	<0.36	<0.43	0.76	<0.35	<0.42	0.00826	<0.00779	6.4	<0.012	0.023	0.45	<0.013	<0.37	1.1	0.016	<0.017	<0.014
Benzo(g,h,i)perylene	mg/kg	NE	NE	NE	NE	<0.41	<0.00625	<0.00792	<0.39	<0.48	<0.013	<0.36	<0.43	0.35	<0.35	<0.42	<0.00661	<0.00779	2.8	<0.012	<0.012	<0.36	<0.013	<0.37	<0.95	<0.011	<0.017	<0.014
Benzo(k)fluoranthene	mg/kg	NE	NE	NE	NE	<0.41	<0.00625	<0.00792	<0.39	<0.48	<0.013	<0.36	<0.43	0.32	<0.35	<0.42	<0.00661	<0.00779	1.7	<0.012	<0.012	<0.36	<0.013	<0.37	<0.95	<0.011	<0.017	<0.014
Carbazole	mg/kg	NE	NE	700	1310	<0.41	NM	NM	<0.39	<0.48	NM	<0.36	<0.43	NM	<0.35	<0.42	NM	NM	NM	NM	NM	<0.36	NM	<0.37	<0.95	NM	NM	NM
Chrysene	mg/kg	NE	NE	NE	NE	<0.41	<0.00625	<0.00792	<0.39	<0.48	<0.013	<0.36	<0.43	0.60	<0.35	<0.42	0.00672	<0.00779	3.8	<0.012	0.013	0.38	<0.013	<0.37	<0.95	<0.011	<0.017	<0.014
Dibenz(a,h)anthracene	mg/kg	NE	NE	NE	NE	<0.41	<0.00625	<0.00792	<0.39	<0.48	<0.013	<0.36	<0.43	0.10	<0.35	<0.42	<0.00661	<0.00779	0.8	<0.012	<0.012	<0.36	<0.013	<0.37	<0.95	<0.011	<0.017	<0.014
Dibenzofuran	mg/kg	NE	NE	104	810	<0.41	NM	NM	<0.39	<0.48	NM	<0.36	<0.43	NM	<0.35	<0.42	NM	NM	NM	NM	NM	<0.36	NM	<0.37	<0.95	NM	NM	NM
Fluoranthene	mg/kg	670	NE	1080	6800	<0.41	<0.00625	<0.00792	<0.39	<0.48	<0.013	0.60	<0.43	1.4	<0.35	<0.42	0.0112	<0.00779	7.3	<0.012	0.025	0.79	<0.013	<0.37	1.7	0.021	<0.017	<0.014
Fluorene	mg/kg	110	NE	850	4120	<0.41	<0.00625	<0.00792	<0.39	<0.48	<0.013	<0.36	<0.43	0.11	<0.35	<0.42	<0.00661	<0.00779	0.70	<0.012	<0.012	<0.36	<0.013	<0.37	<0.95	<0.011	<0.017	<0.014
Indeno(1,2,3-cd)pyrene	mg/kg	NE	NE	NE	NE	<0.41	<0.00625	<0.00792	<0.39	<0.48	<0.013	<0.36	<0.43	0.30	<0.35	<0.42	<0.00661	<0.00779	2.6	<0.012	<0.012	<0.36	<0.013	<0.37	<0.95	<0.011	<0.017	<0.014
Naphthalene	mg/kg	NE	NE	NE	NE	<0.41	<0.0208	<0.0264	<0.39	<0.48	<0.013	<0.36	<0.43	0.082	<0.35	<0.42	<0.022	<0.026	0.67	<0.012	<0.012	<0.36	<0.013	<0.37	<0.95	<0.011	<0.017	<0.014
Phenanthrene	mg/kg	NE	NE	NE	NE	<0.41	<0.00625	<0.00792	<0.39	<0.48	<0.013	0.37	<0.43	1.0	<0.35	<0.42	<0.00661	<0.00779	5.2	<0.012	<0.012	0.61	<0.013	<0.37	1.1	<0.011	<0.017	<0.014
Pyrene	mg/kg	440	NE	890	5800	<0.41	<0.00625	<0.00792	<0.39	<0.48	<0.013	0.55	<0.43	1.1	<0.35	<0.42	0.0108	<0.00779	7.6	<0.012	0.02	0.64	<0.013	<0.37	1.5	0.018	<0.017	<0.014
BaP Equivalents																												
Benzo(a)pyrene Equivalents	mg/kg	1.4	NE	2	3	<0	<0	<0	<0	<0	<0	<0	<0	0.86	<0	<0	0.00167	<0	7.0	<0	0.022	0.086	<0	<0	0.11	0.015	<0	<0
VOCs																												
1,2,4-Trimethylbenzene	mg/kg	2.7	NE	8	25	<0.064	<0.05	<0.065	0.19	<0.07	<0.061	0.096	<0.067	<0.055	<0.054	<0.065	<0.059	<0.065	<0.064	<0.065	<0.06	<0.055	<0.063	<0.054	<0.14	<0.06	<0.084	<0.069
1,3,5-Trimethylbenzene	mg/kg	2.7	NE	3	10	<0.064	<0.05	<0.065	<0.057	<0.07	<0.061	<0.052	<0.067	<0.055	<0.054	<0.065	<0.059	<0.065	<0.064	<0.065	<0.06	<0.055	<0.063	<0.054	<0.14	<0.06	<0.084	<0.069
Benzene	mg/kg	0.017	10	6	10	<0.026	<0.02	<0.026	0.037	<0.028	<0.025	0.15	<0.027	<0.022	<0.021	<0.026	<0.024	<0.026	<0.026	<0.026	<0.024	<0.022	<0.025	<0.022	<0.056	<0.024	<0.034	<0.028
Chlorobenzene	mg/kg	1.2	2000	11	32	<0.064	<0.05	<0.065	<0.057	<0.07	<0.061	<0.052	<0.067	<0.055	<0.054	<0.065	<0.059	<0.065	<0.064	<0.065	<0.06	<0.055	<0.063	<0.054	<0.14	<0.06	<0.084	<0.069
Diethyl Ether	mg/kg	0.51	NE	NE	NE	<0.26	<0.2	<0.26	<0.23	<0.28	<0.25	<0.21	<0.27	<0.22	<0.21	<0.26	<0.24	<0.26	<0.26	<0.26	<0.24	<0.22	<0.25	<0.22	<0.56	<0.24	<0.34	<0.28
Ethylbenzene	mg/kg	1.1	NE	200	200	<0.064	<0.05	<0.065	0.072	<0.07	<0.061	0.098	<0.067	<0.055	<0.054	<0.065	<0.059	<0.065	<0.064	<0.065	<0.06	<0.055	<0.063	<0.054	<0.14	<0.06	<0.084	<0.069
Isopropylbenzene	mg/kg	9.5	NE	30	87	<0.064	<0.05	<0.065	<0.057	<0.07	<0.061	<0.052	<0.067	<0.055	<0.054	<0.065	<0.059	<0.065	<0.064	<0.065	<0.06	<0.055	<0.063	<0.054	<0.14	<0.06	<0.084	<0.069
Naphthalene	mg/kg	4.5	NE	10	28	<0.26	<0.2	<0.26	0.29	<0.28	<0.25	0.50	<0.27	<0.22	<0.21	<0.26	<0.24	<0.26	<0.26	<0.26	<0.24	<0.22	<0.25	<0.22	<0.56	<0.24	<0.34	<0.28
n-Butylbenzene	mg/kg	NE	NE	30	92	<0.064	<0.05	<0.065	<0.057	<0.07	<0.061	<0.052	<0.067	<0.055	<0.054	<0.065	<0.059	<0.065	<0.064	<0.065	<0.06	<0.055	<0.063	<0.054	<0.14	<0.06	<0.084	<0.069
n-Propylbenzene	mg/kg	NE	NE	30	93	<0.064	<0.05	<0.065	<0.057	<0.07	<0.061	<0.052	<0.067	<0.055	<0.054	<0.065	<0.059	<0.065	<0.064	<0.065	<0.06	<0.055	<0.063	<0.054	<0.14	<0.06	<0.084	<0.069
p-Isopropyltoluene	mg/kg	NE	NE	NE	NE	<0.064	<0.05	<0.065	<0.057	0.11	<0.061	<0.052	<0.067	<0.055	<0.054	<0.065	<0.059	<0.065	<0.064	<0.065	<0.06	<0.055	<0.063	<0.054	<0.14	<0.06	<0.084	<0.069
sec-Butylbenzene	mg/kg	NE	NE	25	70	<0.064	<0.05	<0.065	<0.057	<0.07	<0.061	<0.052	<0.067	<0.055	<0.054	<0.065	<0.059	<0.065	<0.064	<0.065	<0.06	<0.055	<0.063	<0.054	<0.14	<0.06	<0.084	<0.069
tert-Butylbenzene	mg/kg	NE	NE	30	90	<0.064	<0.05	<0.065	<0.057	<0.07	<0.061	<0.052	<0.067	<0.055	<0.054	<0.065	<0.059	<0.065	<0.064	<0.065	<0.06	<0.055	<0.063	<0.054	<0.14	<0.06	<0.084	<0.069
Tetrachloroethene	mg/kg	0.042	14	72	131	<0.064	<0.05	<0.065	<0.057	<0.07	<0.061	<0.052	<0.067	<0.055	<0.054	<0.065	<0.059	<0.065	<0.064	<0.065	<0.06	<0.055	<0.063	<0.054	<0.14	<0.06	<0.084	<0.069
Toluene	mg/kg	2.5	NE	107	305	<0.064	<0.05	<0.065	0.21	0.27	<0.061	0.55	0.19	<0.055	<0.054	<0.065	<0.059	<0.065	<0.064	<0.065	<0.06	0.066	<0.063	<0.054	<0.14	<0.06	<0.084	<0.069
Trichloroethene	mg/kg	0.0023	10	29	46	<0.064	<0.05	<0.065	<0.057	<0.07	<0.061	<0.052	<0.067	<0.055	<0.054	<0.065	<0.059	<0.065	<0.064	<0.065	<0.06	<0.055	<0.063	<0.054	<0.14	<0.06	<0.084	<0.069
Xylene (Total)	mg/kg	5.4	NE	45	130	<0.19	<0.15	<0.2	0.63	<0.21	<0.18	0.44	<0.2	<0.16	<0.16	<0.19	<0.18	<0.2	<0.19	<0.2	<0.18	<0.16	<0.19	<0.16	<0.42	<0.18	<0.25	<0.21

Notes:

A full list of abbreviations is included in the table glossery

Table 2
Soil Analytical Results

Phase II Environmental Site Assessment
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

				Borings are ordered by Area:		Lower Michigan Street																						
Boring ID	Units	*2014 Screening SLV*	20xTCLP level	Tier 1 Residential SRV	**Tier 2 Industrial SRV**	GP-316	GP-316	GP-317	GP-317	GP-318	GP-318	GP-257	GP-257	GP-319	GP-319	GP-320	GP-320	GP-261	GP-261	GP-261	GP-262b	GP-262b	GP-321	GP-321	GP-321	GP-322	GP-322	GP-323
Field Sample ID						GP-316-4	GP-316-7	GP-317-3	GP-317-7	GP-318-3	GP-318-6.5	GP-257-4	GP-257-12.5	GP-319-3.5	GP-319-7.5	GP-320-4	GP-320-6.5	GP-261-4	GP-261-8.5	GP-261-15	GP-262b-1	GP-262b-8	GP-321-3	GP-321-8	GP-321-10.5	GP-322-4	GP-322-8	GP-323-1.5
Laboratory ID						10475384025	10475384026	10475071006	10475071007	10475071009	10475071010	10447462015	10447462016	10475071012	10475071013	10475434001	10475434002	10447462012	10447462013	10447462014	10447462007	10447462008	10475071016	10475071017	10475071018	10475384004	10475384005	10475384001
Sample Date						5/16/2019	5/16/2019	5/15/2019	5/15/2019	5/15/2019	5/15/2019	9/13/2018	9/13/2018	5/15/2019	5/15/2019	5/16/2019	5/16/2019	9/13/2018	9/13/2018	9/13/2018	9/13/2018	9/13/2018	5/15/2019	5/15/2019	5/15/2019	5/15/2019	5/15/2019	5/15/2019
DRO and GRO																												
Diesel Range Organics	mg/kg	The MPCA Unregulated Fill Criteria for DRO and GRO is <100 mg/kg				11.2 (T7,T6)	<10.4	NM	NM	<8.8	NM	<8.8	103 (T7,T6)	NM	NM	29.7 (T7,T6)	<9	457	13.1 (T7,T6)	1410 (T6)	93.6 (T7,T6)	323 (T6)	<9.3	NM	NM	38.8 (T6)	<10.1	67.0 (T7,T6)
Gasoline Range Organics	mg/kg					<10.6	<12.2 (G+)	<10.4	<16.1	<10.8	<17 (G+)	<10.6	<53.5 (1M)	<10.9 (G+)	<11.3	<10.9	<11.2	<11.7	<11.3	<18.5	<12.1	<12.3	<12	<16 (G-)	<13.3	<11.6 (G+)	<12.2	<10.8
WDRO C10-C28 Silica Gel	mg/kg					NM	NM	<8.4	35.8 (T6)	NM	<13.1	NM	38.6	30.1 (T7,T6)	<8.8	NM	NM	NM	NM	NM	NM	NM	NM	22.7 (T6)	<10.8	NM	NM	NM
Metals																												
Antimony	mg/kg	5.4	NE	12	100	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Arsenic	mg/kg	5.8	100	9	20	2.4	3.0	<4.8 (D3)	3.0	<4.9 (D3)	5.9	1.9	5.3	11.1	<1.1	2.4	2.6	2.1	1.9	3.3	5.1	3.3	1.8	5.1	7.5	1.9	4.2	2.4
Barium	mg/kg	1700	2000	1100	18000	23.6	52.4	24.3	39.2	29.5	136	27.4	266	79.5	31.8	18.4	34.4	34.9	33.2	54.4	119	90.1	21.6	140	40.4	11.4	34	31.9
Beryllium	mg/kg	2.7	NE	55	230	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium	mg/kg	8.8	20	25	200	<0.15	<0.18	<0.73 (D3)	<0.23	<0.73 (D3)	<0.25	<0.15	0.53	0.37	<0.16	<0.15	<0.15	<0.17	<0.17	2.0	0.28	<0.17	<0.15	0.40	1.6	<0.17	0.22	<0.15
Chromium	mg/kg	36	100	87	650	18.1	18	21.1	15.2	22.5	10.1	13.1	11.8	18.8	4.8	16.9	13.7	14.2	12.1	7.0	26.9	21.7	15.6	12.6	13.4	6.3	11.4	21.6
Copper	mg/kg	700	NE	100	9000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Lead	mg/kg	2700	100	300	700	4.8	48.4	3.9	50.5	4.5	47.5	2.8	63.3	361	1.4	3.2	3.3	32.1	3.5	60.9	101	423	3.0	152	76.9	4.1	36.7	5.8
Mercury	mg/kg	3.3	4	0.5	1.5	<0.021	0.063	<0.02	0.36	<0.021	<0.033	<0.02	0.31	0.30	<0.021	<0.02	<0.021	<0.022	<0.023	0.23	0.14	0.17	<0.023	0.22	<0.025	0.022	<0.024	<0.02
Nickel	mg/kg	180	NE	560	2500	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Selenium	mg/kg	2.6	20	160	1300	<2.1 (D3)	<1.2	<4.8 (D3)	<1.5	<4.9 (D3)	<1.7	<1	<3.2	1.2	<1.1	<1	<1	<1.1	<1.1	<1.7	<1.1	<1.2	<1	<1.6	<1.3	<1.1	<1.1	<0.98
Silver	mg/kg	7.9	100	160	1300	<0.51	<0.61	<2.4 (D3)	<0.77	<2.4 (D3)	<0.83	<0.5	<1.6	<0.55	<0.53	<0.51	<0.52	<0.56	<0.56	<0.84	<0.55	<0.58	<0.51	<0.79	<0.66	<0.57	<0.56	<0.49
Zinc	mg/kg	3000	NE	8700	75000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TCLP Metals																												
Lead TCLP	mg/L	5 mg/L TCLP Lead hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<0.05	NM	9.7	NM	NM	NM	NM
Mercury TCLP	mg/L	0.2 mg/L TCLP Mercury hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium TCLP	mg/L	1.0 mg/L TCLP Cadmium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Chromium TCLP	mg/L	5.0 mg/L TCLP Chromium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
PCBs																												
PCBs (Polychlorinated Biphenyls)	mg/kg	NE	NE	1.2	8	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	BRL	NM	NM	NM	NM	NM	NM	NM	NM
Herbicides and Pesticides																												
2,4-D	mg/kg	0.5	200	0.5	0.5	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Triclopyr	mg/kg	0.3	NE	0.3	0.3	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Semi-VOCs																												
1-Methylnaphthalene	mg/kg	NE	NE	NE	NE	<0.36	<0.41	<0.34	<0.54	NM	<0.55	NM	NM	0.50	<0.35	<0.35	<0.37	NM	NM	NM	NM	NM	<0.37	<0.52	<0.44	<0.38	<0.41	NM
2,4-Dinitrotoluene	mg/kg	0.013	2.6	50	355	<0.36	<0.41	<0.34	<0.54	NM	<0.55	NM	NM	<0.37	<0.35	<0.35	<0.37	NM	NM	NM	NM	NM	<0.37	<0.52	<0.44	<0.38	<0.41	NM
2-Methylnaphthalene	mg/kg	NE	NE	100	369	<0.36	<0.41	<0.34	<0.54	NM	<0.55	NM	NM	0.62	<0.35	<0.35	<0.37	NM	NM	NM	NM	NM	<0.37	<0.52	<0.44	<0.38	<0.41	NM
Acenaphthene	mg/kg	81	NE	1200	5260	<0.36	<0.41	<0.34	<0.54	<0.011	<0.55	<0.011	0.089	<0.37	<0.35	<0.35	<0.37	<0.011	<0.012	3.0	0.94	<0.012	<0.37	<0.52	<0.44	<0.38	<0.41	0.013
Acenaphthylene	mg/kg	NE	NE	NE	NE	<0.36	<0.41	<0.34	<0.54	<0.011	<0.55	<0.011	<0.033	<0.37	<0.35	<0.35	<0.37	<0.011	<0.012	<0.35	0.30	<0.012	<0.37	<0.52	<0.44	<0.38	<0.41	0.066
Anthracene	mg/kg	1300	NE	7880	45400	<0.36	<0.41	<0.34	<0.54	<0.011	<0.55	<0.011	0.11	<0.37	<0.35	<0.35	<0.37	0.015	<0.012	5.6	3.4	<0.012	<0.37	<0.52	<0.44	<0.38	<0.41	0.12
Benz(a)anthracene	mg/kg	NE	NE	NE	NE	<0.36	<0.41	<0.34	<0.54	<0.011	<0.55	<0.011	0.47	<0.37	<0.35	<0.35	<0.37	<0.011	<0.012	8.8	4.6	0.016	<0.37	1.7	<0.44	<0.38	<0.41	0.43
Benzo(a)pyrene	mg/kg	1.4	NE	2	3	<0.36	<0.41	<0.34	<0.54	<0.011	<0.55	<0.011	0.46	<0.37	<0.35	<0.35	<0.37	<0.011	<0.012	7.3	5.6	0.013	<0.37	1.7	<0.44	<0.38	<0.41	0.38
Benzo(b)fluoranthene	mg/kg	NE	NE	NE	NE	<0.36	<0.41	<0.34	<0.54	<0.011	<0.55	<0.011	0.59	0.48	<0.35	<0.35	<0.37	<0.011	0.012	8	7.8	0.016	<0.37	2.0	<0.44	<0.38	<0.41	0.41
Benzo(g,h,i)perylene	mg/kg	NE	NE	NE	NE	<0.36	<0.41	<0.34	<0.54	<0.011	<0.55	<0.011	0.21	<0.37	<0.35	<0.35	<0.37	<0.011	<0.012	4.2	2.9	<0.012	<0.37	1.0	<0.44	<0.38	<0.41	0.20
Benzo(k)fluoranthene	mg/kg	NE	NE	NE	NE	<0.36	<0.41	<0.34	<0.54	<0.011	<0.55	<0.011	0.17	<0.37	<0.35	<0.35	<0.37	<0.011	<0.012	2.5	2.5	<0.012	<0.37	0.85	<0.44	<0.38	<0.41	0.20
Carbazole	mg/kg	NE	NE	700	1310	<0.36	<0.41	<0.34	<0.54	NM	<0.55	NM	NM	<0.37	<0.35	<0.35	<0.37	NM	NM	NM	NM	NM	<0.37	<0.52	<0.44	<0.38	<0.41	NM
Chrysene	mg/kg	NE	NE	NE	NE	<0.36	<0.41	<0.34	<0.54	<0.011	<0.55	<0.011	0.37	0.39	<0.35	<0.35	<0.37	<0.011	<0.012	6.1	6.4	0.017	<0.37	1.7	<0.44	<0.38	<0.41	0.45
Dibenz(a,h)anthracene	mg/kg	NE	NE	NE	NE	<0.36	<0.41	<0.34	<0.54	<0.011	<0.55	<0.011	<0.033	<0.37	<0.35	<0.35	<0.37	<0.011	<0.012	0.97	0.98	<0.012	<0.37	<0.52	<0.44	<0.38	<0.41	0.075
Dibenzofuran	mg/kg	NE	NE	104	810	<0.36	<0.41	<0.34	<0.54	NM	<0.55	NM	NM	<0.37	<0.35	<0.35	<0.37	NM	NM	NM	NM	NM	<0.37	<0.52	<0.44	<0.38	<0.41	NM
Fluoranthene	mg/kg	670	NE	1080	6800	<0.36	<0.41	<0.34	<0.54	<0.011	0.72	<0.011	0.72	0.57	<0.35	<0.35	<0.37	<0.011	0.020	15.2	8.8	0.020	<0.37	2.8	<0.44	<0.38	<0.41	0.56
Fluorene	mg/kg	110	NE	850	4120	<0.36	<0.41	<0.34	<0.54	<0.011	<0.55	<0.011	0.10	<0.37	<0.35	<0.35	<0.37	0.025	<0.012	3.3	1.3	<0.012	<0.37	<0.52	<0.44	<0.38	<0.41	0.03
Indeno(1,2,3-cd)pyrene	mg/kg	NE	NE	NE	NE	<0.36	<0.41	<0.34	<0.54	<0.011	<0.55	<0.011	0.22	<0.37	<0.35	<0.35	<0.37	<0.011	<0.012	3.5	2.6	<0.012	<0.37	0.9	<0.44	<0.38	<0.41	0.17
Naphthalene	mg/kg	NE	NE	NE	NE	<0.36	<0.41	<0.34	<0.54	<0.011	<0.55	<0.011	0.092	0.41	<0.35	<0.35	<0.37	<0.011	<0.012	1.8	<0.24	<0.012	<0.37	<0.52	<0.44	<0.38	<0.41	<0.011
Phenanthrene	mg/kg	NE	NE	NE	NE	<0.36	<0.41	<0.34	<0.54	<0.011	0.70	<0.011	0.64	0.56	<0.35	<0.35	<0.37	0.038	0.013	19.9	6.9	0.014	<0.37	1.3	<0.44	<0.38	<0.41	0.31
Pyrene	mg/kg	440	NE	890	5800	<0.36	<0.41	<0.34	<0.54	<0.011	0.91	<0.011	0.72	0.53	<0.35	<0.35	<0.37	<0.011	0.019	14.1	7.8	0.028	<0.37	2.7	<0.44	<0.38	<0.41	0.58
BaP Equivalents																												
Benzo(a)pyrene Equivalents	mg/kg	1.4	NE	2	3	<0	<0	<0	<0	<0	<0	<0	0.61	0.052	<0	<0	<0	<0	0.0012	10.2	8.0	0.016	<0	2.3	<0	<0	<0	0.55
VOCs																												
1,2,4-Trimethylbenzene	mg/kg	2.7	NE	8	25	<0.055	<0.064	<0.052	<0.081	<0.056	<0.087	<0.054	<0.27	0.12	<0.055	0.23	<0.057	<0.06	0.28	<0.092	<0.061	<0.062	<0.055	<0.081	<0.068	0.12	<0.062	<0.054
1,3,5-Trimethylbenzene	mg/kg	2.7	NE	3	10	<0.055	<0.064	<0.052	<0.081	<0.056	<0.087	<0.054	<0.27	<0.055	<0.055	<0.055	<0.057	<0.06	<0.06	<0.092	<0.061	<0.062	<0.055	<0.081	<0.068	<0.06	<0.062	<0.054
Benzene	mg/kg	0.017	10	6	10	<0.022	0.031	<0.021	<0.033	<0.023	<0.035	<0.021	<0.11	<0.022	<0.022	0.049	<0.023	<0.024	<0.024	0.053	<0.024	<0.025	<0.022	<0.032	<0.027	0.029 (M1,R1)	<0.025	<0.022
Chlorobenzene	mg/kg	1.2	2000	11	32	<0.055	<0.064	<0.052	<0.081	<0.056	<0.087	<0.054	<0.27	<0.055	<0.055	<0.055	<0.057	<0.06	<0.06	<0.092	<0.061	<0.062	<0.055	<0.081	<0.068	<0.06	<0.062	<0.054
Diethyl Ether	mg/kg	0.51	NE	NE	NE	<0.22	<0.26	<0.21	<0.33	<0.23	<0.35	<0.21	<1.1	<0.22	<0.22	<0.22	<0.23	<0.24	<0.24	<0.37	<0.24	<0.25	<0.22	<0.32	<0.27	<0.24	<0.25	<0.22
Ethylbenzene	mg/kg	1.1	NE	200	200	<0.055	<0.064	<0.052	<0.081	<0.056	<0.087	<0.054	<0.27	<0.055	<0.055	0.11	<0.057	<0.06	<0.06	<0.092	<0.061	<0.062	<0.055	<0.081	<0.068	<0.06	<0.062	<0.054
Isopropylbenzene	mg/kg	9.5	NE	30	87	<0.055	<0.064	<0.052	<0.081	<0.056	<0.087	<0.054	<0.27	<0.055	<0.055	0.066	<0.057	<0.06	<0.06	<0.092	<0.061	<0.062	<0.055	<0.081	<0.068	<0.06	<0.062	<0.054
Naphthalene	mg/kg	4.5	NE	10	28	<0.22	<0.26	<0.21	<0.33	<0.23	<0.35	<0.21	<1.1	<0.22	<0.22	0.24	<0.23	<0.24	<0.24	2.7	<0.24	<0.25	<0.22	<0.32	<0.27	0.30	<0.25	<0.22
n-Butylbenzene	mg/kg	NE	NE	30	92	<0.055	<0.064	<0.052	<0.081	<0.056	<0.087	<0.054	<0.27	<0.055	<0.055	<0.055	<0.057	<0.06	<0.06	<0.092	<0.061	<0.062	<0.055	<0.081	<0.068	<0.06	<0.062	<0.054
n-Propylbenzene	mg/kg	NE	NE	30	93	<0.055	<0.064	<0.052	<0.081	<0.056	<0.087	<0.054	<0.27	<0.055	<0.055	0.08	<0.057	<0.06	<0.06	<0.092	<0.061	<0.062	<0.055	<0.081	<0.068	<0.06	<0.062	<0.054
p-Isopropyltoluene	mg/kg	NE	NE	NE	NE	<0.055	<0.064	<0.052	<0.081	<0.056	<0.087	<0.054	<0.27	<0.055	<0.055	<0.055	<0.057	<0.06	<0.06	1.9	3.8 (M1)	<0.062	<0.055	<0.081	<0.068	<0.06	<0.062	<0.054
sec-Butylbenzene	mg/kg	NE	NE	25	70	<0.055	<0.064	<0.052	<0.081	<0.056	<0.087	<0.054	<0.27	<0.055	<0.055	<0.055	<0.057	<0.06	<0.06	<0.092	<0.061	<0.062	<0.055	<0.081	<0.068	<0.06	<0.062	<0.054
tert-Butylbenzene	mg/kg	NE	NE	30	90	<0.055	<0.064	<0.052	<0.081	<0.056	<0.087	<0.054	<0.27	<0.055	<0.055	<0.055	<0.057	<0.06	<0.06	<0.092	<0.061	<0.062	<0.055	<0.081	<0.068	<0.06	<0.062	<0.054
Tetrachloroethene	mg/kg	0.042	14	72	131	<0.055	<0.064	<0.052	<0.081	<0.056	<0.087	<0.054	<0.27	<0.055	<0.055	<0.055	<0.057	<0.06	<0.06	<0.092	<0.061	<0.062	<0.055	<0.081	<0.068	<0.06	<0.062	<0.054
Toluene	mg/kg	2.5	NE	107	305	0.14	0.19	<0.052	0.083	<0.056	<0.087	<0.054	<0.27	0.12	<0.055	0.35 (M1,R1)	<0.057	<0.06	0.079	0.30	<0.061	<0.062	0.060	<0.081	<0.068	0.18 (M1,R1)	<0.062	<0.054
Trichloroethene	mg/kg	0.0023	10	29	46	<0.055	<0.064	<0.052	<0.081	<0.056	<0.087	<0.054	<0.27	<0.055	<0.055	<0.055	<0.057	<0.06	<0.06	<0.092	<0.061	<0.062	<0.055	<0.081	<0.068	<0.06	<0.062	<0.054
Xylene (Total)	mg/kg	5.4	NE	45	130	<0.17	<0.19	<0.15	<0.24	<0.17	<0.26	<0.16	<0.8	0.38	<0.17	0.78 (RS,R1)	<0.17	<0.18	<0.18	<0.28	<0.18	<0.19	<0.16	<0.24	<0.2	0.37	<0.19	<0.16

Notes:

A full list of abbreviations is included in the table glossary

Table 2
Soil Analytical Results

Phase II Environmental Site Assessment
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

Borings are ordered by Area:						Lower Michigan Street													W 1st St & Piedmont Ave					Michigan and Superior Street				
Boring ID	Units	2014 Screening SLV	20xTCLP level	Tier 1 Residential SRV	Tier 2 Industrial SRV	GP-323	GP-323	GP-360	GP-361	GP-361	GP-362	GP-363	GP-363	GP-433	GP-433	GP-434	GP-364	GP-364	GP-324	GP-324	GP-327	GP-325	GP-326	GP-071	GP-074	GP-072	GP-075	GP-075
Field Sample ID						GP-323-8	GP-323-11.5	GP-360-3	GP-361-3	GP-361-7	GP-362-2	GP-363-1.5	GP-363-6.5	GP-433-3	GP-433-7	GP-434-2	GP-364-2	GP-364-7.5	GP-324-2	GP-324-8	GP-327-2	GP-325-2.5	GP-326-3	GP-071-1	GP-074-1	GP-072-2	GP-075-3	GP-075-9
Laboratory ID						10475384002	10475384003	10484416019	10484416016	10484416017	10476121016	10476121014	10476121015	10484416003	10484416022	10484416002	10476121017	10476121018	10474936022	10474936025	10474936026	10474936023	10474936024	10445985001	10445985008	10445985015	10445985006	10445985007
Sample Date						5/15/2019	5/15/2019	7/23/2019	7/23/2019	7/23/2019	5/22/2019	5/22/2019	5/22/2019	7/22/2019	7/22/2019	7/22/2019	5/22/2019	5/22/2019	5/13/2019	5/13/2019	5/13/2019	5/13/2019	5/13/2019	8/30/2018	8/31/2018	8/31/2018	8/31/2018	8/31/2018
DRO and GRO																												
Diesel Range Organics	mg/kg	The MPCA Unregulated Fill Criteria for DRO and GRO is <100 mg/kg				NM	NM	<8	<9.7	NM	<8.6	NM	918 (T6)	90.1 (T6)	NM	NM	NM	23.4 (T7,T6)	380 (T7,T6)	<10	229 (T6)	<9.1	<9.2	25.6 (T6)	<8.2	<9	161 (T6)	76.4 (T6)
Gasoline Range Organics	mg/kg					<10.9 (G-,G+)	<12.8	<10.1	<11.9	<21.7	<10.5	25.7 (G-,G+)	<12.3	<11.3	<12 (G+)	<11.6	<10.3	<12.3	<10.4	<12.8	<11.5	<11.6	<11.4 (C0,M1,)	<11.6	<12	<11.2	<12.6 (M1)	<12.9
WDRO C10-C28 Silica Gel	mg/kg					195 (T6)	12.5 (T6)	NM	NM	70.6 (T6)	NM	122 (T7,T6)	NM	NM	79.8 (T7,T6)	79.0 (T7,T6)	571	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Metals																												
Antimony	mg/kg	5.4	NE	12	100	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Arsenic	mg/kg	5.8	100	9	20	4.9	2.3	1.2	1.2	8.5	1.5	6.4	3.2	5.4	2.9	2.6	3.2	4.0	2.6	3.5	5.9	3.1	2.5	14.8 (M1)	3.6	2.8	3.7	4.3
Barium	mg/kg	1700	2000	1100	18000	38.3	61.6	9.5	10.7	182	11.7	67.5	68.6	101	36.7	63.7	31.7	79.7	20.1	43.4	66.6	49.7	21.2	77.4 (M1)	42.3	96.4	75.1	73.7
Beryllium	mg/kg	2.7	NE	55	230	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium	mg/kg	8.8	20	25	200	0.38	<0.18	<0.15	<0.17	0.82	<0.15	0.32	<0.16	0.62	0.26	<0.16	0.17	<0.18	<0.16	<0.18	<0.78 (D3)	0.18	0.25	0.18	1.2	<0.16	0.19	0.64
Chromium	mg/kg	36	100	87	650	16.1	18.3	5.9	5.4	30.3	7.0	15.2	23.2	46	14.6	20.7	42.1	23.3	15.2	22.8	32.8	14.8	13.9	13.1	15.7	34.3	21.5	18.3
Copper	mg/kg	700	NE	100	9000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Lead	mg/kg	2700	100	300	700	94.6	5.0	25.5	2.6	142	3.0	81.6	53.5	187	74.9	13.3 (M1,R1)	150	28.1	13.9	9.3	6.9	69.5	7.3	159 (M1,R1)	246	9.1	41.7	217
Mercury	mg/kg	3.3	4	0.5	1.5	0.053	0.031	<0.02	<0.022	0.32	<0.0222	0.232	0.489	0.16	0.037	<0.02	0.0856	0.132	0.13	0.098	0.027	1.8	0.059	0.13	0.26	0.044	<0.021	0.15
Nickel	mg/kg	180	NE	560	2500	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Selenium	mg/kg	2.6	20	160	1300	<1.1	<1.2	<1	<1.2	<2	<1	<1.1	<1.1	<1	<1.2	<1.1	<0.99	<1.2	<1.1	<1.2	<5.2 (D3)	<1.1	<1.1	<1.1	<1	<1	<1.2	<1.2
Silver	mg/kg	7.9	100	160	1300	<0.55	<0.61	<0.52	<0.58	<0.98	<0.51	<0.57	<0.54	<0.52	<0.58	<0.54	2.1	<0.6	<0.53	<0.61	<2.6 (D3)	<0.53	<0.55	<0.54	<0.52	<0.52	<0.61	<0.6
Zinc	mg/kg	3000	NE	8700	75000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TCLP Metals																												
Lead TCLP	mg/L	5 mg/L TCLP Lead hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<0.5	NM	NM	NM	NM	NM	NM	NM	0.21	NM	NM	NM
Mercury TCLP	mg/L	0.2 mg/L TCLP Mercury hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium TCLP	mg/L	1.0 mg/L TCLP Cadmium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Chromium TCLP	mg/L	5.0 mg/L TCLP Chromium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
PCBs																												
PCBs (Polychlorinated Biphenyls)	mg/kg	NE	NE	1.2	8	BRL	NM	NM	NM	NM	NM	BRL	BRL	NM	NM	NM	BRL	NM	BRL	NM	BRL	NM	NM	NM	NM	NM	NM	NM
Herbicides and Pesticides																												
2,4-D	mg/kg	0.5	200	0.5	0.5	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Triclopyr	mg/kg	0.3	NE	0.3	0.3	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Semi-VOCs																												
1-Methylnaphthalene	mg/kg	NE	NE	NE	NE	<1.9	NM	NM	NM	<0.69	<0.37	0.0861	0.214	NM	<0.39	NM	<1.79	<0.039	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2,4-Dinitrotoluene	mg/kg	0.013	2.6	50	355	<1.9	NM	NM	NM	<0.69	<3.7	<0.389	<0.795	NM	<0.39	NM	<17.9	<0.39	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2-Methylnaphthalene	mg/kg	NE	NE	100	369	<1.9	NM	NM	NM	<0.69	<0.37	0.0973	0.349	NM	<0.39	NM	<1.79	<0.039	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Acenaphthene	mg/kg	81	NE	1200	5260	2.3	<0.013	<0.01	<0.012	<0.69	<0.37	0.0791	0.522	0.21	<0.39	<0.011	<1.79	<0.039	<0.011	<0.012	<0.011	0.13	0.013	0.068 (M1)	0.048	<0.011	0.15	0.13
Acenaphthylene	mg/kg	NE	NE	NE	NE	<1.9	<0.013	<0.01	<0.012	<0.69	<0.37	<0.0389	0.0997	0.086	<0.39	<0.011	<1.79	<0.039	0.012	<0.012	<0.011	0.14	<0.011	0.045	0.032	<0.011	0.049	0.06
Anthracene	mg/kg	1300	NE	7880	45400	12.5	<0.013	<0.01	<0.012	<0.69	<0.37	0.171	1.15	0.32	<0.39	<0.011	2.31	<0.039	0.023	<0.012	<0.011	0.29	0.016	0.24 (M1,R1)	0.25	<0.011	0.35	0.41
Benz(a)anthracene	mg/kg	NE	NE	NE	NE	17.5	<0.013	<0.01	0.037	<0.69	<0.37	0.418	2.71	0.97	<0.39	0.018	5.89	0.104	0.078	0.025	0.023	1.8	0.032	0.81 (M1,R1)	1.5	0.02	0.96	0.98
Benzo(a)pyrene	mg/kg	1.4	NE	2	3	16.3	<0.013	<0.01	0.036	<0.69	<0.37	0.333	2.27	1.0	<0.39	0.019	4.25	0.103	0.12	0.03	0.043	<0.011	0.03	0.89 (M1,R1)	1.2	0.021	1.1	1.1
Benzo(b)fluoranthene	mg/kg	NE	NE	NE	NE	18.5	<0.013	<0.01	0.048	0.82	<0.37	0.394	2.66	1.4	0.60	0.028	5.93	0.124	0.12	0.038	0.058	<0.011	0.041	1.0 (M1,R1)	1.2	0.027	1.2	1.3
Benzo(g,h,i)perylene	mg/kg	NE	NE	NE	NE	9.8	<0.013	<0.01	0.023	<0.69	<0.37	0.191	1.19	0.63	<0.39	0.014	1.92	0.063	0.13	0.025	0.18	1.6	0.024	0.51 (M1,R1)	0.62	0.012	0.66	0.70
Benzo(k)fluoranthene	mg/kg	NE	NE	NE	NE	6.6	<0.013	<0.01	0.018	<0.69	<0.37	0.152	0.98	0.5	<0.39	0.012	1.81	0.042	0.049	0.014	0.021	0.90	0.016	0.34 (M1)	0.50	<0.011	0.57	0.57
Carbazole	mg/kg	NE	NE	700	1310	<1.9	NM	NM	NM	<0.69	<3.7	<0.389	<0.795	NM	<0.39	NM	<17.9	<0.39	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Chrysene	mg/kg	NE	NE	NE	NE	17.7	<0.013	<0.01	0.035	<0.69	<0.37	0.37	2.32	1.0	<0.39	0.019	5.02	0.086	0.094	0.027	0.028	2.0	0.035	0.87 (M1,R1)	1.7	0.018	1.0	1.1
Dibenz(a,h)anthracene	mg/kg	NE	NE	NE	NE	2.3	<0.013	<0.01	<0.012	<0.69	<0.37	0.0471	0.322	0.15	<0.39	<0.011	<1.79	<0.039	0.026	<0.012	0.021	0.33	<0.011	<0.011 (M1)	<0.011	<0.011	<0.012	<0.013
Dibenzofuran	mg/kg	NE	NE	104	810	<1.9	NM	NM	NM	<0.69	<3.7	<0.389	<0.795	NM	<0.39	NM	<17.9	<0.39	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Fluoranthene	mg/kg	670	NE	1080	6800	42.4	<0.013	<0.01	0.061	1.1	0.445	0.755	5.17	1.9	0.48	0.037	10.1	0.145	0.11	0.055	0.028	2.4	0.088	1.7 (M1,R1)	2.0	0.037	2.1	2.5
Fluorene	mg/kg	110	NE	850	4120	4.1	<0.013	<0.01	<0.012	<0.69	<0.37	0.0693	0.548	0.17	<0.39	<0.011	<1.79	<0.039	<0.011	<0.012	<0.011	0.095	<0.011	0.060 (M1,R1)	0.043	<0.011	0.15	0.14
Indeno(1,2,3-cd)pyrene	mg/kg	NE	NE	NE	NE	8.0	<0.013	<0.01	0.02	<0.69	<0.37	0.215	1.44	0.58	<0.39	0.012	2.34	0.0759	0.073	0.019	0.055	1.1	0.02	0.37 (M1,R1)	0.47	0.011	0.55	0.56
Naphthalene	mg/kg	NE	NE	NE	NE	<1.9	<0.013	<0.01	<0.012	<0.69	<0.37	0.0861	1.04	0.12	<0.39	<0.011	<1.79	<0.039	<0.011	<0.012	<0.011	0.022	<0.011	0.034	0.014	<0.011	0.09	0.079
Phenanthrene	mg/kg	NE	NE	NE	NE	42.7	<0.013	<0.01	0.024	<0.69	<0.37	0.651	4.42	1.7	<0.39	0.019	8.31	0.0867	0.045	0.031	0.013	1.4	0.095	0.92 (M1,R1)	0.71	<0.011	1.6	1.7
Pyrene	mg/kg	440	NE	890	5800	42.8	<0.013	<0.01	0.05	1.1	<0.37	0.773	4.24	1.8	0.45	0.029	8.35	0.15	0.13	0.050	0.035	3.2	0.079	1.4 (M1,R1)	2.9	0.03	1.8	1.9
BaP Equivalents																												
Benzo(a)pyrene Equivalents	mg/kg	1.4	NE	2	3	22.8	<0	<0	0.049	0.082	<0	0.481	3.25	1.4	0.060	0.026	5.90	0.138	0.17	0.040	0.071	0.58	0.041	1.16 (M1,R1)	1.6	0.027	1.4	1.5
VOCs																												
1,2,4-Trimethylbenzene	mg/kg	2.7	NE	8	25	<0.056	<0.065	<0.05	<0.062	<0.1	<0.055	0.19	<0.06	0.11	<0.06	0.21	<0.052	<0.058	<0.056	<0.061	<0.055	<0.056	<0.056	0.12	<0.053	<0.058	<0.064	<0.063
1,3,5-Trimethylbenzene	mg/kg	2.7	NE	3	10	<0.056	<0.065	<0.05	<0.062	<0.1	<0.055	0.063	<0.06	<0.056	<0.06	<0.061	<0.052	<0.058	<0.056	<0.061	<0.055	<0.056	<0.056	<0.059	<0.053	<0.058	<0.064	<0.063
Benzene	mg/kg	0.017	10	6	10	0.033	<0.026	<0.02	<0.025	0.051	<0.022	0.15	<0.024	<0.023	<0.024	<0.024	<0.021	<0.023	<0.022	<0.024	<0.022	<0.022	<0.022	<0.024	<0.021	<0.023	<0.026	0.027
Chlorobenzene	mg/kg	1.2	2000	11	32	<0.056	<0.065	<0.05	<0.062	<0.1	<0.055	<0.06	<0.06	<0.056	<0.06	<0.061	<0.052	<0.058	<0.056	<0.061	<0.055	<0.056	<0.056	<0.24	<0.053	<0.058	<0.064	<0.063
Diethyl Ether	mg/kg	0.51	NE	NE	NE	<0.22	<0.26	<0.2	<0.25	<0.4	<0.22	<0.24	<0.24	<0.23	<0.24	<0.24	<0.21	<0.23	<0.22	<0.24	<0.22	<0.22	<0.22	<0.24	<0.21	<0.23	<0.26	<0.25
Ethylbenzene	mg/kg	1.1	NE	200	200	0.076	<0.065	<0.05	<0.062	<0.1	0.059	0.16	<0.06	0.069	<0.06	0.076	<0.052	<0.058	<0.056	<0.061	<0.055	<0.056	<0.056	<0.059	<0.053	<0.058	<0.064	<0.063
Isopropylbenzene	mg/kg	9.5	NE	30	87	<0.056	<0.065	<0.05	<0.062	<0.1	<0.055	0.13	<0.06	<0.056	<0.06	<0.061	<0.052	<0.058	<0.056	<0.061	<0.055	<0.056	<0.056	<0.24	<0.053	<0.058	<0.064	<0.063
Naphthalene	mg/kg	4.5	NE	10	28	0.32	<0.26	<0.2	<0.25	<0.4	<0.22	0.30	1.0	0.42	<0.24	0.51	<0.21	<0.23	<0.22	<0.24	<0.22	<0.22	<0.22	<0.24	<0.21	<0.23	0.31	<0.25
n-Butylbenzene	mg/kg	NE	NE	30	92	<0.056	<0.065	<0.05	<0.062	<0.1	<0.055	<0.06	<0.06	<0.056	<0.06	<0.061	<0.052	<0.058	<0.056	<0.061	<0.055	<0.056	<0.056	<0.059	<0.053	<0.058	<0.064	<0.063
n-Propylbenzene	mg/kg	NE	NE	30	93	<0.056	<0.065	<0.05	<0.062	<0.1	<0.055	0.13	<0.06	<0.056	<0.06	0.063	<0.052	<0.058	<0.056	<0.061	<0.055	<0.056	<0.056	<0.059	<0.053	<0.058	<0.064	<0.063
p-Isopropyltoluene	mg/kg	NE	NE	NE	NE	0.071	<0.065	<0.05	<0.062	<0.1	<0.055	<0.06	<0.06	<0.056	<0.06	<0.061	<0.052	<0.058	<0.056	<0.061	<0.055	<0.056	<0.056	<0.059	<0.053	<0.058	<0.064	<0.063
sec-Butylbenzene	mg/kg	NE	NE	25	70	<0.056	<0.065	<0.05	<0.062	<0.1	<0.055	0.074	<0.06	<0.056	<0.06	0.061	<0.052	<0.058	<0.056	<0.061	<0.055	<0.056	<0.056	<0.059	<0.053	<0.058	<0.064	<0.063
tert-Butylbenzene	mg/kg	NE	NE	30	90	<0.056	<0.065	<0.05	<0.062	<0.1	<0.22	<0.24	<0.24	<0.056	<0.06	<0.061	<0.21	<0.23	<0.056	<0.061	<0.055	<0.056	<0.056	<0.059	<0.053	<0.058	<0.064	<0.063
Tetrachloroethene	mg/kg	0.042	14	72	131	<0.056	<0.065	<0.05	<0.062	<0.1	<0.055	<0.06	<0.06	<0.056	<0.06	<0.061	<0.052	<0.058	<0.056	<0.061	<0.055	<0.056	<0.056	<0.059	<0.21	<0.23	<0.26	<0.25
Toluene	mg/kg	2.5	NE	107	305	<0.056	<0.065	<0.05	<0.062	<0.1	<0.055	0.60	<0.06	0.093	<0.06	0.17	<0.052	<0.058	<0.056	<0.061	<0.055	<0.056	<0.056	0.11	<0.053	<0.058	0.066	0.16
Trichloroethene	mg/kg	0.0023	10	29	46	<0.056	<0.065	<0.05	<0.062	<0.1	<0.055	<0.06	<0.06	<0.056	<0.06	<0.061	<0.052	<0.058	<0.056	<0.061	<0.055	<0.056	<0.056	<0.059	<0.053	<0.058	<0.064	<0.063
Xylene (Total)	mg/kg	5.4	NE	45	130	<0.17	<0.2	<0.3	<0.37	<0.6	2.9	0.99	<0.18	0.70	<0.36	0.52	<0.16	<0.17	<0.17	<0.18	<0.16	<0.17	<0.17	<0.53	<0.16	<0.17	<0.19	0.26

Notes:

A full list of abbreviations is included in the table glossary

Table 2
Soil Analytical Results

Phase II Environmental Site Assessment
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

				Borings are ordered by Area:		Michigan and Superior Street																	Bridge 69902					
Boring ID	Units	2014 Screening SLV	20xTCLP level	Tier 1 Residential SRV	Tier 2 Industrial SRV	GP-076	GP-076	GP-077	GP-077	GP-079	GP-079	GP-080	GP-080	GP-081	GP-082	GP-082	GP-083	GP-083	GP-084	GP-085	GP-086	GP-088	GP-171	GP-171	GP-171	GP-171	GP-171	GP-182
Field Sample ID						GP-076-2	GP-076-10.5	GP-077-1	GP-077-6	GP-079-2	GP-079-7	GP-080-1	GP-080-6	GP-081-1.5	GP-082-3	GP-082-7	GP-083-3.5	GP-083-8	GP-084-1.5	GP-085-2.5	GP-086-0.5	GP-088-0.5	GP-171-2	GP-171-8.5	GP-171-0.5	GP-171-1.5	GP-171-16	GP-182-0.5
Laboratory ID						10445985004	10445985005	10445985009	10445985010	10445985002	10445985003	10445985011	10445985012	10445985014	10446142004	10446142005	10445985016	10445985017	10446142003	10448151013	10446142002	10446142001	10446750003	10446750004	10446750024	10446750025	10446750026	10473051014
Sample Date						8/31/2018	8/31/2018	8/31/2018	8/31/2018	8/31/2018	8/31/2018	8/31/2018	8/31/2018	8/31/2018	9/4/2018	9/4/2018	8/31/2018	8/31/2018	9/4/2018	9/19/2018	9/4/2018	9/4/2018	9/6/2018	9/6/2018	9/7/2018	9/7/2018	9/7/2018	5/1/2019
DRO and GRO																												
Diesel Range Organics	mg/kg	The MPCA Unregulated Fill Criteria for DRO and GRO is <100 mg/kg				30.1 (T6)	1150 (T6)	385 (T6)	<8.9	50.7 (T6)	11.4 (T6)	23.8 (T6)	<9.4	67.1 (T6)	<8.8	<8.8	16.4 (T6)	<9	<9.4	<9.2	230	73.6 (T6)	32.6 (T6)	33.4 (T6)	NM	NM	86.2 (T7,T6)	NM
Gasoline Range Organics	mg/kg					<12.6	<12.7	<11	<11.9	<12.9	<15.1	<11.1	<12.5	<10.5	<11.6	<12.2	<11.3	<11.5	<11.4	<11.8	<12.7	<10.3	<12.2	<15.3	NM	NM	<28.9	NM
WDRO C10-C28 Silica Gel	mg/kg					NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Metals																												
Antimony	mg/kg	5.4	NE	12	100	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Arsenic	mg/kg	5.8	100	9	20	4.8	15.1	4.2	3.0	3.1	4.9	2.1	2.9	3.9	2.7	3.5	3.7	2.1	2.0	14.5	18.8	5.6 (M1)	2.5	2.1	NM	NM	3.8 (M1)	2.1
Barium	mg/kg	1700	2000	1100	18000	96.5	209	79.1	47.5	125	146	29.2	80.1	66.7	30.4	32.9	24.8	42.1	55.8	31.9	136	119 (M1)	69.9	29	NM	NM	98 (M1)	43.1
Beryllium	mg/kg	2.7	NE	55	230	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium	mg/kg	8.8	20	25	200	0.54	0.34	0.75	<0.18	<0.17	0.20	<0.16	<0.18	<0.16	<0.16	<0.17	<0.15	<0.16	<0.17	<0.16	1.3	0.52 (M1)	<0.17	<0.22	NM	NM	<0.42 (M1)	<0.15
Chromium	mg/kg	36	100	87	650	88.9	28.7	31.4	18.7	29.5	31.5	15.1	21.8	18.8	10.8	13.5	6.4	15.7	13.8	12.7	38.1	30.9 (M1,R1)	11.8	14.7	NM	NM	29.8 (M1)	14.1
Copper	mg/kg	700	NE	100	9000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Lead	mg/kg	2700	100	300	700	318	1120	358	25.2	26.9	79.9	3.7	29.5	93.7	2.9	3.7	16.7	3.2	9.1	25.4	585	122 (M1)	26.4	5.1	118	36.7	5.3 (M1)	55.9
Mercury	mg/kg	3.3	4	0.5	1.5	0.13	0.92	0.060	0.12	0.60	0.17	<0.019	0.24	1.5	<0.022	0.021	0.041	<0.02	0.046	0.22	0.46	0.098	0.048	<0.027	NM	NM	0.071	0.041
Nickel	mg/kg	180	NE	560	2500	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Selenium	mg/kg	2.6	20	160	1300	<1.1	<1.3	<1.1	<1.2	<1.2	<1.3	<1	<1.2	<1	<1.1	<1.1	<2 (D3)	<1.1	<1.1	<1.1	<1.2	<1 (M1)	<1.1	<1.4	NM	NM	<2.8 (M1)	<1
Silver	mg/kg	7.9	100	160	1300	<0.55	<0.63	<0.53	<0.59	<0.58	<0.65	<0.52	<0.6	<0.52	<0.54	<0.57	<0.5	<0.55	<0.56	<0.54	<0.59	<0.51 (M1)	<0.57	<0.72	NM	NM	<1.4 (M1)	<0.51
Zinc	mg/kg	3000	NE	8700	75000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TCLP Metals																												
Lead TCLP	mg/L	5 mg/L TCLP Lead hazardous limit				0.73	0.69	0.066	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	1.4 (1M)	NM	NM	NM	NM	NM	NM	NM
Mercury TCLP	mg/L	0.2 mg/L TCLP Mercury hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium TCLP	mg/L	1.0 mg/L TCLP Cadmium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Chromium TCLP	mg/L	5.0 mg/L TCLP Chromium hazardous limit				<0.05	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
PCBs																												
PCBs (Polychlorinated Biphenyls)	mg/kg	NE	NE	1.2	8	NM	BRL	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	0.059	NM	NM	NM	NM	NM	NM	NM
Herbicides and Pesticides																												
2,4-D	mg/kg	0.5	200	0.5	0.5	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Triclopyr	mg/kg	0.3	NE	0.3	0.3	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Semi-VOCs																												
1-Methylnaphthalene	mg/kg	NE	NE	NE	NE	<0.39	NM	NM	0	NM	NM	NM	<0.4	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2,4-Dinitrotoluene	mg/kg	0.013	2.6	50	355	<0.39	NM	NM	NM	NM	NM	NM	<0.4	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2-Methylnaphthalene	mg/kg	NE	NE	100	369	<0.39	NM	NM	NM	NM	NM	NM	<0.4	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Acenaphthene	mg/kg	81	NE	1200	5260	<0.39	13.2	0.46	<0.012	0.022	0.093	<0.011	<0.4	0.24	<0.011	<0.012	4.5	<0.011	0.017	NM	0.18	0.047 (M1,R1)	<0.012	<0.015	NM	NM	<0.03	NM
Acenaphthylene	mg/kg	NE	NE	NE	NE	<0.39	9.8	0.12	<0.012	0.022	0.063	0.053	<0.4	0.17	<0.011	<0.012	<1.1	<0.011	0.012	NM	0.2	0.024 (M1)	0.021	<0.015	NM	NM	<0.03	NM
Anthracene	mg/kg	1300	NE	7880	45400	<0.39	73.9	1.4	0.031	0.096	0.36	0.069	<0.4	0.78	<0.011	<0.012	16.1	<0.011	0.11	NM	1.6	0.13 (M1,R1)	0.043	<0.015	NM	NM	<0.03	NM
Benz(a)anthracene	mg/kg	NE	NE	NE	NE	0.87	73.4	3.6	0.11	0.32	0.49	0.23	<0.4	1.8	0.017	<0.012	17.8	0.029	0.78	NM	6.9	0.56 (M1,R1)	0.13	<0.015	NM	NM	<0.03	NM
Benzo(a)pyrene	mg/kg	1.4	NE	2	3	0.78	67.8	3.6	0.11	0.31	0.43	0.20	<0.4	1.8	0.017	<0.012	16	0.029	0.72	NM	6.4	0.55 (M1,R1)	0.14	<0.015	NM	NM	<0.03	NM
Benzo(b)fluoranthene	mg/kg	NE	NE	NE	NE	1.1	77.5	4.1	0.15	0.39	0.54	0.27	<0.4	2.1	0.021	<0.012	19	0.036	1.0	NM	10.5	0.74 (M1,R1)	0.18	<0.015	NM	NM	<0.03	NM
Benzo(g,h,i)perylene	mg/kg	NE	NE	NE	NE	0.5	33.4	2.3	0.075	0.18	0.23	0.11	<0.4	1.0	<0.011	<0.012	6.9	0.018	0.34	NM	3.5	0.25 (M1,R1)	0.097	<0.015	NM	NM	<0.03	NM
Benzo(k)fluoranthene	mg/kg	NE	NE	NE	NE	0.49	40.5	1.8	0.052	0.16	0.24	0.11	<0.4	0.88	<0.011	<0.012	8.2	0.013	0.29	NM	3.2	0.21 (M1,R1)	0.063	<0.015	NM	NM	<0.03	NM
Carbazole	mg/kg	NE	NE	700	1310	<0.39	NM	NM	NM	NM	NM	NM	<0.4	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Chrysene	mg/kg	NE	NE	NE	NE	0.85	75.1	3.5	0.099	0.29	0.54	0.19	<0.4	1.8	0.013	<0.012	16.2	0.024	0.68	NM	6.5	0.50 (M1,R1)	0.12	<0.015	NM	NM	<0.03	NM
Dibenz(a,h)anthracene	mg/kg	NE	NE	NE	NE	<0.39	<1.3	0.74	<0.012	<0.012	<0.014	<0.011	<0.4	<0.011	<0.011	<0.012	<1.1	<0.011	0.11	NM	1.1	0.063 (M1,R1)	<0.012	<0.015	NM	NM	<0.03	NM
Dibenzofuran	mg/kg	NE	NE	104	810	<0.39	NM	NM	NM	NM	NM	NM	<0.4	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Fluoranthene	mg/kg	670	NE	1080	6800	1.8	211	7.5	0.21	0.58	1.4	0.38	<0.4	4.5	0.032	<0.012	41.7	0.053	1.2	NM	13	1.1 (M1,R1)	0.24	<0.015	NM	NM	<0.03	NM
Fluorene	mg/kg	110	NE	850	4120	<0.39	28.3	0.35	<0.012	0.025	0.19	0.012	<0.4	0.27	<0.011	<0.012	5.3	<0.011	0.014	NM	0.2	0.044 (M1,R1)	<0.012	<0.015	NM	NM	<0.03	NM
Indeno(1,2,3-cd)pyrene	mg/kg	NE	NE	NE	NE	0.45	34.1	2.0	0.06	0.17	0.22	0.095	<0.4	0.89	<0.011	<0.012	7.3	0.016	0.31	NM	3.4	0.21 (M1,R1)	0.081	<0.015	NM	NM	<0.03	NM
Naphthalene	mg/kg	NE	NE	NE	NE	<0.39	3.5	0.16	<0.012	0.019	0.076	<0.011	<0.4	0.06	<0.011	<0.012	<1.1	<0.011	0.026	NM	0.15	0.028 (M1,R1)	0.041	<0.015	NM	NM	<0.03	NM
Phenanthrene	mg/kg	NE	NE	NE	NE	1.1	202	4.6	0.10	0.27	1.4	0.13	<0.4	2.9	0.013	<0.012	32.7	0.022	0.27	NM	5.1	0.63 (M1,R1)	0.14	<0.015	NM	NM	<0.03	NM
Pyrene	mg/kg	440	NE	890	5800	1.5	147	6.2	0.17	0.49	1.0	0.28	<0.4	3.4	0.025	<0.012	30.2	0.043	0.97	NM	10.9	0.88 (M1,R1)	0.19	<0.015	NM	NM	<0.03	NM
BaP Equivalents																												
Benzo(a)pyrene Equivalents	mg/kg	1.4	NE	2	3	2.0	91.1	5.2	0.15	0.42	0.58	0.27	0.1375	2.4	0.021	<0	21.4	0.039	1.0	NM	9.5	0.76 (M1,R1)	0.19	<0	NM	NM	<0	NM
VOCs																												
1,2,4-Trimethylbenzene	mg/kg	2.7	NE	8	25	0.18	<0.067	0.079	<0.057	0.067	<0.072	<0.054	<0.058	<0.053	<0.056	<0.06	<0.054	<0.059	<0.057	<0.058	<0.07	0.15	<0.061	<0.082	NM	NM	<0.14	NM
1,3,5-Trimethylbenzene	mg/kg	2.7	NE	3	10	<0.066	<0.067	<0.059	<0.057	<0.064	<0.072	<0.054	<0.058	<0.053	<0.056	<0.06	<0.054	<0.059	<0.057	<0.058	<0.07	<0.07	<0.061	<0.082	NM	NM	<0.14	NM
Benzene	mg/kg	0.017	10	6	10	<0.026	<0.027	0.073	<0.023	<0.026	<0.029	<0.022	<0.023	<0.021	<0.022	<0.024	<0.022	<0.024	<0.023	<0.023	<0.028	0.054	<0.024	<0.033	NM	NM	<0.057	NM
Chlorobenzene	mg/kg	1.2	2000	11	32	<0.26	<0.067	<0.059	<0.057	<0.26	<0.29	<0.054	<0.058	<0.053	<0.056	<0.06	<0.054	<0.059	<0.057	<0.058	<0.07	<0.07	<0.061	<0.082	NM	NM	<0.14	NM
Diethyl Ether	mg/kg	0.51	NE	NE	NE	<0.26	<0.27	<0.24	<0.23	<0.26	<0.29	<0.22	<0.23	<0.21	<0.22	<0.24	<0.22	<0.24	<0.23	<0.23	<0.28	<0.28	<0.24	<0.33	NM	NM	<0.57	NM
Ethylbenzene	mg/kg	1.1	NE	200	200	0.082	<0.067	<0.059	<0.057	<0.064	<0.072	<0.054	<0.058	<0.053	<0.056	<0.06	<0.054	<0.059	<0.057	<0.058	<0.07	0.075	<0.061	<0.082	NM	NM	<0.14	NM
Isopropylbenzene	mg/kg	9.5	NE	30	87	<0.26	<0.067	<0.059	<0.057	<0.26	<0.29	<0.054	<0.058	<0.053	<0.056	<0.06	<0.054	<0.059	<0.057	<0.058	<0.07	<0.07	<0.061	<0.082	NM	NM	<0.14	NM
Naphthalene	mg/kg	4.5	NE	10	28	0.35	<0.27	<0.24	<0.23	<0.26	<0.29	<0.22	<0.23	<0.21	<0.22	<0.24	<0.22	<0.24	<0.23	<0.23	<0.28	0.32	<0.24	<0.33	NM	NM	<0.57	NM
n-Butylbenzene	mg/kg	NE	NE	30	92	<0.066	<0.067	<0.059	<0.057	<0.064	<0.072	<0.054	<0.058	<0.053	<0.056	<0.06	<0.054	<0.059	<0.057	<0.058	<0.07	<0.07	<0.061	<0.082	NM	NM	<0.14	NM
n-Propylbenzene	mg/kg	NE	NE	30	93	0.069	<0.067	<0.059	<0.057	<0.064	<0.072	<0.054	<0.058	<0.053	<0.056	<0.06	<0.054	<0.059	<0.057	<0.058	<0.07	<0.07	<0.061	<0.082	NM	NM	<0.14	NM
p-Isopropyltoluene	mg/kg	NE	NE	NE	NE	<0.066	<0.067	<0.059	<0.057	<0.064	<0.072	<0.054	<0.058	<0.053	<0.056	<0.06	<0.054	<0.059	<0.057	<0.058	<0.07	<0.07	<0.061	<0.082	NM	NM	<0.14	NM
sec-Butylbenzene	mg/kg	NE	NE	25	70	<0.066	<0.067	<0.059	<0.057	<0.064	<0.072	<0.054	<0.058	<0.053	<0.056	<0.06	<0.054	<0.059	<0.057	<0.058	<0.07	<0.07	<0.061	<0.082	NM	NM	<0.14	NM
tert-Butylbenzene	mg/kg	NE	NE	30	90	<0.066	<0.067	<0.059	<0.057	<0.064	<0.072	<0.054	<0.058	<0.053	<0.056	<0.06	<0.054	<0.059	<0.057	<0.058	<0.07	<0.07	<0.061	<0.082	NM	NM	<0.14	NM
Tetrachloroethene	mg/kg	0.042	14	72	131	<0.066	<0.27	<0.24	<0.23	<0.064	<0.072	<0.22	<0.23	<0.21	<0.22	<0.24	<0.22	<0.24	<0.23	<0.058	0.33	<0.28	<0.24	<0.33	NM	NM	<0.57	NM
Toluene	mg/kg	2.5	NE	107	305	0.18	<0.067	0.17	<0.057	0.079	<0.072	<0.054	<0.058	<0.053	<0.056	<0.06	0.080	<0.059	<0.057	<0.058	<0.07	0.40	0.066	<0.082	NM	NM	<0.14	NM
Trichloroethene	mg/kg	0.0023	10	29	46	<0.066	<0.067	<0.059	<0.057	<0.064	<0.072	<0.054	<0.058	<0.053	<0.056	<0.06	<0.054	<0.059	<0.057	<0.058	<0.07	<0.07	<0.061	<0.082	NM	NM	<0.14	NM
Xylene (Total)	mg/kg	5.4	NE	45	130	<0.59	<0.2	0.26	<0.17	<0.58	<0.64	<0.16	<0.17	<0.16	<0.17	<0.18	<0.16	<0.18	<0.17	<0.17	<0.21	0.64	<0.18	<0.25	NM	NM	<0.43	NM

Notes:

A full list of abbreviations is included in the table glossery

Table 2
Soil Analytical Results

Phase II Environmental Site Assessment
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

Boring ID	Units	2014 Screening SLV	20xTCLP level	Tier 1 Residential SRV	Tier 2 Industrial SRV	GP-182	GP-182	GP-182	GP-183	GP-183	GP-183	GP-183	GP-183	GP-273	GP-273	GP-184	GP-186	GP-185	GP-185	GP-185	GP-185	GP-187	GP-187	GP-188	GP-188	GP-197	GP-197	GP-197
Field Sample ID						GP-182-1.5	GP-182-4	GP-182-8	GP-183-0.5	GP-183-1.5	GP-183-3	GP-183-12.5	GP-183-16	GP-273-1.5	GP-273-8.5	GP-184-2	GP-186-5.5	GP-185-0.5	GP-185-2	GP-185-7	GP-185-14	GP-187-4	GP-187-12	GP-188-3	GP-188-10	GP-197-0.5	GP-197-1.5	GP-197-4
Laboratory ID						10473051015	10473051016	10473051017	10473051019	10473051020	10473051021	10473051022	10473051023	10474106015	10474106016	10474106014	10474106006	10474106009	10474106010	10474106011	10474106012	10473870023	10473870024	10473870020	10473870021	10473870006	10473870007	10473870008
Sample Date						5/1/2019	5/1/2019	5/1/2019	5/1/2019	5/1/2019	5/1/2019	5/1/2019	5/1/2019	5/8/2019	5/8/2019	5/8/2019	5/8/2019	5/8/2019	5/8/2019	5/8/2019	5/8/2019	5/7/2019	5/7/2019	5/7/2019	5/7/2019	5/6/2019	5/6/2019	5/6/2019
Borings are ordered by Area:						Bridge 69902																						
DRO and GRO																												
Diesel Range Organics	mg/kg	The MPCA Unregulated Fill Criteria for DRO and GRO is <100 mg/kg				NM	117 (T7,T6)	NM	NM	NM	<10.5	NM	46.6 (T7,T6)	NM	24.6 (T6)	NM	<9.1	NM	NM	<9.5	NM	NM	NM	<9.1	NM	NM	NM	<8.9
Gasoline Range Organics	mg/kg					NM	<13.4 (G+)	<12.9	NM	NM	<12.6	<11.9	<13.3	<6.2 (GO)	6.90 (G+)	<6.1	<5.7	NM	<6.6	<6	<6.5	<7.3	9.70 (G+)	<5.7	18.0 (G+)	NM	NM	<2.9
WDRO C10-C28 Silica Gel	mg/kg					NM	NM	129 (T7,T6)	NM	NM	NM	14.7 (T6)	NM	59.5 (T7,T6)	NM	118 (T7,T6)	NM	NM	31.7 (T7,T6)	NM	<10.2	22.9 (T6)	1250 (T6)	NM	745 (T6)	NM	NM	NM
Metals																												
Antimony	mg/kg	5.4	NE	12	100	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Arsenic	mg/kg	5.8	100	9	20	<5.3 (D3)	3.8	4.3	2.4	<5.1 (D3)	4.5	<5.6 (D3)	<6.4 (D3)	3.6	1.5	3.5	<5.2 (D3)	2.3	3.8	1.4	<5.9 (D3)	1.4	2.2	1.3	<1.2	1.6	<1.1	1.1
Barium	mg/kg	1700	2000	1100	18000	44.4	182	67.5	37.6	53.4	151	72.5	123	103	14.7	118	27.7	85.4	91.7	11.5	92.5	9.3	55.7	13.7	7.5	23.8	12.5	8.6
Beryllium	mg/kg	2.7	NE	55	230	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium	mg/kg	8.8	20	25	200	<0.79 (D3)	0.23	<0.17	<0.15	<0.77 (D3)	<0.36 (D3)	<0.84 (D3)	<0.95 (D3)	<0.17	<0.17	0.2	<0.78 (D3)	0.28	<0.19	<0.16	<0.89 (D3)	<0.21	0.64	<0.17	<0.18	<0.17	<0.16	<0.16
Chromium	mg/kg	36	100	87	650	20.4	19.3	11.2	14	21.6	30.5	18.8	41.4	11.9	6.7	14.7	8.1	22.9	22.6	4.9	30.6	10.2	7.7	6.4	3.6	10	5.4	7.0
Copper	mg/kg	700	NE	100	9000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Lead	mg/kg	2700	100	300	700	5.0	65	49.2	8.4	5.4	27.4	52.1	8.8	34.7	6.7	51.3	6.2	55.1	38.9	2.2	11.7	1.8	57.6	1.7	3.7	80.5	1.6	1.4
Mercury	mg/kg	3.3	4	0.5	1.5	<0.019	0.27	0.066	0.022	<0.019	0.066	0.063	0.033	0.066	<0.02	0.088	<0.021	0.048	0.077	<0.022	0.11	<0.026	0.30	<0.023	<0.023	0.025	<0.02	<0.023
Nickel	mg/kg	180	NE	560	2500	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Selenium	mg/kg	2.6	20	160	1300	<5.3 (D3)	<1.2	<1.1	<1	<5.1 (D3)	<2.4 (D3)	<5.6 (D3)	<6.4 (D3)	<1.2	<1.2	<1.1	<5.2 (D3)	<1.2	<1.3	<1.1	<5.9 (D3)	<1.4	<1.2	<1.1	<1.2	<1.1	<1.1	<1.1
Silver	mg/kg	7.9	100	160	1300	<2.6 (D3)	<0.6	<0.57	<0.51	<2.6 (D3)	<1.2 (D3)	<2.8 (D3)	<3.2 (D3)	<0.58	<0.58	<0.54	<2.6 (D3)	<0.58	<0.63	<0.55	<3 (D3)	<0.69	0.71	<0.57	<0.61	<0.55	<0.55	<0.53
Zinc	mg/kg	3000	NE	8700	75000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TCLP Metals																												
Lead TCLP	mg/L	5 mg/L TCLP Lead hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Mercury TCLP	mg/L	0.2 mg/L TCLP Mercury hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium TCLP	mg/L	1.0 mg/L TCLP Cadmium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Chromium TCLP	mg/L	5.0 mg/L TCLP Chromium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
PCBs																												
PCBs (Polychlorinated Biphenyls)	mg/kg	NE	NE	1.2	8	NM	3.5	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	BRL	NM	BRL	NM	NM	NM
Herbicides and Pesticides																												
2,4-D	mg/kg	0.5	200	0.5	0.5	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Triclopyr	mg/kg	0.3	NE	0.3	0.3	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Semi-VOCs																												
1-Methylnaphthalene	mg/kg	NE	NE	NE	NE	NM	NM	NM	NM	NM	NM	<0.39	NM	<0.4	NM	<0.39	NM	NM	<0.44	NM	NM	NM	NM	NM	NM	NM	NM	NM
2,4-Dinitrotoluene	mg/kg	0.013	2.6	50	355	NM	NM	NM	NM	NM	NM	<0.39	NM	<0.4	NM	<0.39	NM	NM	<0.44	NM	NM	NM	NM	NM	NM	NM	NM	NM
2-Methylnaphthalene	mg/kg	NE	NE	100	369	NM	NM	NM	NM	NM	NM	<0.39	NM	<0.4	NM	<0.39	NM	NM	<0.44	NM	NM	NM	NM	NM	NM	NM	NM	NM
Acenaphthene	mg/kg	81	NE	1200	5260	NM	0.11	0.072	NM	NM	0.021	<0.39	<0.013	<0.4	<0.012	<0.39	<0.011	NM	<0.44	<0.012	<0.013	<0.015	0.063	<0.011	<0.012	NM	NM	<0.012
Acenaphthylene	mg/kg	NE	NE	NE	NE	NM	<0.066	<0.061	NM	NM	<0.013	<0.39	<0.013	<0.4	<0.012	<0.39	<0.011	NM	<0.44	<0.012	<0.013	<0.015	0.023	<0.011	<0.012	NM	NM	<0.012
Anthracene	mg/kg	1300	NE	7880	45400	NM	0.3	0.2	NM	NM	0.047	<0.39	<0.013	<0.4	0.017	<0.39	<0.011	NM	<0.44	<0.012	<0.013	<0.015	0.086	<0.011	0.018	NM	NM	<0.012
Benz(a)anthracene	mg/kg	NE	NE	NE	NE	NM	1.2	0.54	NM	NM	0.072	<0.39	<0.013	<0.4	0.056	<0.39	<0.011	NM	<0.44	<0.012	0.053	<0.015	0.41	<0.011	0.066	NM	NM	<0.012
Benzo(a)pyrene	mg/kg	1.4	NE	2	3	NM	1.1	0.49	NM	NM	0.068	<0.39	<0.013	<0.4	0.048	<0.39	<0.011	NM	<0.44	<0.012	0.043	<0.015	0.26	<0.011	0.053	NM	NM	<0.012
Benzo(b)fluoranthene	mg/kg	NE	NE	NE	NE	NM	1.5	0.6	NM	NM	0.088	<0.39	<0.013	<0.4	0.071	<0.39	<0.011	NM	<0.44	<0.012	0.059	<0.015	0.42	<0.011	0.086	NM	NM	<0.012
Benzo(g,h,i)perylene	mg/kg	NE	NE	NE	NE	NM	0.84	0.37	NM	NM	0.045	<0.39	<0.013	<0.4	0.034	<0.39	<0.011	NM	<0.44	<0.012	0.029	<0.015	0.20	<0.011	0.039	NM	NM	<0.012
Benzo(k)fluoranthene	mg/kg	NE	NE	NE	NE	NM	0.52	0.21	NM	NM	0.03	<0.39	<0.013	<0.4	0.025	<0.39	<0.011	NM	<0.44	<0.012	0.022	<0.015	0.20	<0.011	0.045	NM	NM	<0.012
Carbazole	mg/kg	NE	NE	700	1310	NM	NM	NM	NM	NM	NM	<0.39	NM	<0.4	NM	<0.39	NM	NM	<0.44	NM	NM	NM	NM	NM	NM	NM	NM	NM
Chrysene	mg/kg	NE	NE	NE	NE	NM	1.1	0.58	NM	NM	0.071	<0.39	<0.013	<0.4	0.05	<0.39	<0.011	NM	<0.44	<0.012	0.051	<0.015	0.53	<0.011	0.075	NM	NM	<0.012
Dibenz(a,h)anthracene	mg/kg	NE	NE	NE	NE	NM	0.24	0.11	NM	NM	0.013	<0.39	<0.013	<0.4	<0.012	<0.39	<0.011	NM	<0.44	<0.012	<0.013	<0.015	0.056	<0.011	<0.012	NM	NM	<0.012
Dibenzofuran	mg/kg	NE	NE	104	810	NM	NM	NM	NM	NM	NM	<0.39	NM	<0.4	NM	<0.39	NM	NM	<0.44	NM	NM	NM	NM	NM	NM	NM	NM	NM
Fluoranthene	mg/kg	670	NE	1080	6800	NM	1.4	1.0	NM	NM	0.17	<0.39	<0.013	0.43	0.10	0.5	<0.011	NM	0.67	<0.012	0.091	<0.015	0.75	<0.011	0.14	NM	NM	<0.012
Fluorene	mg/kg	110	NE	850	4120	NM	0.11	0.095	NM	NM	0.017	<0.39	<0.013	<0.4	0.012	<0.39	<0.011	NM	<0.44	<0.012	<0.013	<0.015	0.085	<0.011	<0.012	NM	NM	<0.012
Indeno(1,2,3-cd)pyrene	mg/kg	NE	NE	NE	NE	NM	0.78	0.29	NM	NM	0.042	<0.39	<0.013	<0.4	0.026	<0.39	<0.011	NM	<0.44	<0.012	0.021	<0.015	0.15	<0.011	0.035	NM	NM	<0.012
Naphthalene	mg/kg	NE	NE	NE	NE	NM	0.078	0.14	NM	NM	<0.013	<0.39	<0.013	<0.4	<0.012	<0.39	<0.011	NM	<0.44	<0.012	<0.013	<0.015	0.048	<0.011	<0.012	NM	NM	<0.012
Phenanthrene	mg/kg	NE	NE	NE	NE	NM	1.0	0.9	NM	NM	0.16	<0.39 (M1)	<0.013	0.41	0.078	<0.39	<0.011	NM	0.53	<0.012	0.049	<0.015	0.58	<0.011	0.083	NM	NM	<0.012
Pyrene	mg/kg	440	NE	890	5800	NM	1.3	1.0	NM	NM	0.13	<0.39	<0.013	<0.4	0.091	0.41	<0.011	NM	0.59	<0.012	0.095	<0.015	0.83	<0.011	0.12	NM	NM	<0.012
BaP Equivalents																												
Benzo(a)pyrene Equivalents	mg/kg	1.4	NE	2	3	NM	1.6	0.72	NM	NM	0.099	<0	<0	<0	0.066	<0	<0	NM	<0	<0	0.059	<0	0.41	<0	0.077	NM	NM	<0
VOCs																												
1,2,4-Trimethylbenzene	mg/kg	2.7	NE	8	25	NM	0.11	<0.063	NM	NM	<0.062	<0.062	<0.067	0.066	<0.061	0.17	<0.059	NM	<0.066	<0.061	<0.067	<0.07	<0.065	<0.056	<0.06	NM	NM	<0.057
1,3,5-Trimethylbenzene	mg/kg	2.7	NE	3	10	NM	<0.069	<0.063	NM	NM	<0.062	<0.062	<0.067	<0.061	<0.061	<0.071	<0.059	NM	<0.066	<0.061	<0.067	<0.07	<0.065	<0.056	<0.06	NM	NM	<0.057
Benzene	mg/kg	0.017	10	6	10	NM	0.049	<0.025	NM	NM	<0.025	<0.025	<0.027	0.035	<0.024	0.051	<0.024	NM	<0.026	<0.024	<0.027	<0.028	<0.026	<0.022	<0.024	NM	NM	<0.023
Chlorobenzene	mg/kg	1.2	2000	11	32	NM	<0.069	<0.063	NM	NM	<0.062	<0.062	<0.067	<0.061	<0.061	0.078	<0.059	NM	<0.066	<0.061	<0.067	<0.07	<0.065	<0.056	<0.06	NM	NM	<0.057
Diethyl Ether	mg/kg	0.51	NE	NE	NE	NM	<0.28	<0.25	NM	NM	<0.25	<0.25	<0.27	<0.24	<0.24	<0.28	<0.24	NM	<0.26	<0.24	<0.27	<0.28	<0.26	<0.22	<0.24	NM	NM	<0.23
Ethylbenzene	mg/kg	1.1	NE	200	200	NM	<0.069	<0.063	NM	NM	<0.062	<0.062	<0.067	<0.061	<0.061	<0.071	<0.059	NM	<0.066	<0.061	<0.067	<0.07	<0.065	<0.056	<0.06	NM	NM	<0.057
Isopropylbenzene	mg/kg	9.5	NE	30	87	NM	<0.069	<0.063	NM	NM	<0.062	<0.062	<0.067	<0.061	<0.061	<0.071	<0.059	NM	<0.066	<0.061	<0.067	<0.07	<0.065	<0.056	<0.06	NM	NM	<0.057
Naphthalene	mg/kg	4.5	NE	10	28	NM	<0.28	<0.25	NM	NM	<0.25	<0.25	<0.27	<0.24	<0.24	0.32	<0.24	NM	<0.26	<0.24	<0.27	<0.28	<0.26	<0.22	<0.24	NM	NM	<0.23
n-Butylbenzene	mg/kg	NE	NE	30	92	NM	<0.069	<0.063	NM	NM	<0.062	<0.062	<0.067	<0.061	<0.061	<0.071	<0.059	NM	<0.066	<0.061	<0.067	<0.07	<0.065	<0.056	<0.06	NM	NM	<0.057
n-Propylbenzene	mg/kg	NE	NE	30	93	NM	<0.069	<0.063	NM	NM	<0.062	<0.062	<0.067	<0.061	<0.061	<0.071	<0.059	NM	<0.066	<0.061	<0.067	<0.07	<0.065	<0.056	<0.06	NM	NM	<0.057
p-Isopropyltoluene	mg/kg	NE	NE	NE	NE	NM	<0.069	<0.063	NM	NM	<0.062	<0.062	<0.067	<0.061	<0.061	<0.071	<0.059	NM	<0.066	<0.061	<0.067	<0.07	<0.065	<0.056	<0.06	NM	NM	<0.057
sec-Butylbenzene	mg/kg	NE	NE	25	70	NM	<0.069	<0.063	NM	NM	<0.062	<0.062	<0.067	<0.061	<0.061	<0.071	<0.059	NM	<0.066	<0.061	<0.067	<0.07	<0.065	<0.056	<0.06	NM	NM	<0.057
tert-Butylbenzene	mg/kg	NE	NE	30	90	NM	<0.069	<0.063	NM	NM	<0.062	<0.062	<0.067	<0.061	<0.061	<0.071	<0.059	NM	<0.066	<0.061	<0.067	<0.07	<0.065	<0.056	<0.06	NM	NM	<0.057
Tetrachloroethene	mg/kg	0.042	14	72	131	NM	<0.069	<0.063	NM	NM	<0.062	<0.062	<0.067	<0.061	<0.061	<0.071	<0.059	NM	<0.066	<0.061	<0.067	<0.07	<0.065	<0.056	<0.06	NM	NM	<0.057
Toluene	mg/kg	2.5	NE	107	305	NM	0.18	<0.063	NM	NM	<0.062	0.16	<0.067	0.13	<0.061	0.25	<0.059	NM	<0.066	<0.061	<0.067	<0.07	<0.065	<0.056	0.11	NM	NM	<0.057
Trichloroethene	mg/kg	0.0023	10	29	46	NM	<0.069	<0.063	NM	NM	<0.062	<0.062	<0.067	<0.061	<0.061	<0.071	<0.059	NM	<0.066	<0.061	<0.067	<0.07	<0.065	<0.056	<0.06	NM	NM	<0.057
Xylene (Total)	mg/kg	5.4	NE	45	130	NM	0.35	<0.19	NM	NM	<0.18	<0.19	<0.2	0.19	<0.18	0.38	<0.18	NM	<0.2	<0.18	<0.2	<0.21	<0.19	<0.17	<0.18	NM	NM	<0.17

Notes:

A full list of abbreviations is included in the table glossery

Table 2
Soil Analytical Results

Phase II Environmental Site Assessment
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

				Borings are ordered by Area:		Bridge 69905																	Garfield Ave Temporary Ramp Widening					
Boring ID	Units	2014 Screening SLV	20xTCLP level	Tier 1 Residential SRV	Tier 2 Industrial SRV	GP-227	GP-227	GP-227	GP-228	GP-228	GP-228	GP-228	GP-229	GP-229	GP-229	GP-229	GP-244	GP-244	GP-244	GP-249	GP-249	GP-249	GP-349	GP-350	GP-351	GP-353	GP-354	GP-354
Field Sample ID						GP-227-0.5	GP-227-1.5	GP-227-4	GP-228-0.5	GP-228-1.5	GP-228-3	GP-228-8	GP-229-0.5	GP-229-1.5	GP-229-2.5	GP-229-7	GP-244-2	GP-244-9	GP-244-15	GP-249-3	GP-249-7	GP-249-15	GP-349-2	GP-350-3	GP-351-1.5	GP-353-4	GP-354-1.5	GP-354-10
Laboratory ID						10473594001	10473594002	10473594003	10473490007	10473490008	10473490009	10473490010	10473490001	10473490002	10473490003	10473490004	10448151001	10448151002	10448151003	10448151005	10448151006	10448151007	10476320012	10476320009	10476320019	10476320007	10476320016	10476320017
Sample Date						5/6/2019	5/6/2019	5/6/2019	5/3/2019	5/3/2019	5/3/2019	5/3/2019	5/2/2019	5/2/2019	5/2/2019	5/2/2019	9/18/2018	9/18/2018	9/18/2018	9/19/2018	9/19/2018	9/19/2018	5/23/2019	5/23/2019	5/22/2019	5/23/2019	5/22/2019	5/22/2019
DRO and GRO																												
Diesel Range Organics	mg/kg	The MPCA Unregulated Fill Criteria for DRO and GRO is <100 mg/kg				NM	NM	<10.3	NM	NM	17.8 (T6)	NM	NM	NM	97.2 (T7,T6)	NM	69.7 (T7,T6)	9.7	<10.7	<9.6	29.1 (T6)	<11.4	<9.3	<8.8	NM	<8.8	NM	<9.1
Gasoline Range Organics	mg/kg					NM	NM	<3.2	NM	NM	<2.8	<4.3	NM	NM	<3	<3	13.7 (G-)	<10.8 (M1)	<13.5	<11.9	<20.9	<14	<11.2	<10.3	<11.3	<10.7	<10.5	<11.5
WDRO C10-C28 Silica Gel	mg/kg					NM	NM	NM	NM	NM	NM	83.4 (T6)	NM	NM	NM	11.3	NM	NM	NM	NM	NM	NM	NM	NM	<9	NM	<8.7	NM
Metals																												
Antimony	mg/kg	5.4	NE	12	100	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Arsenic	mg/kg	5.8	100	9	20	1.7	<1.1	3.0	3.1	3.6	3.3	7.1	2.5	4.1	3.6	2.6	7.0	2.6	2.3	7.2	2.1	<6.6 (D3)	2.6	1.4	1.8	1.2	1.4	1.4
Barium	mg/kg	1700	2000	1100	18000	23.8	11	45.5	97.9	42.4	44.5	88	55.2	110	71.2	26.2	92.9	50.8	133	40.4	51.6	188	53.4	13.4	18.9	12	12.6	19.5
Beryllium	mg/kg	2.7	NE	55	230	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium	mg/kg	8.8	20	25	200	<0.15	<0.16	<0.18	0.4	<0.18	<0.16	0.39	0.17	0.41	<0.18	<0.17	0.33	<0.15	<0.17	0.17	<0.25	<0.99 (D3)	<0.16	<0.15	<0.16	<0.16	<0.16	<0.17
Chromium	mg/kg	36	100	87	650	9.4	5.0	17.7	27.7	16.8	15.7	25.7	15	15.7	13.3	11.4	16.2	13.8	35.3	10	12	41.6	23.5	8.1	10.8	8.9	7.7	8.6
Copper	mg/kg	700	NE	100	9000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Lead	mg/kg	2700	100	300	700	228	2.4	6.2	84.9	19.1	6.1	44.3	27.6	28.2	31.4	5.7	376 (P6)	3.2	6.4	79.8	3.7	9.3	6.3	3.2	4.5	2.6	3.1	3.8
Mercury	mg/kg	3.3	4	0.5	1.5	<0.02	<0.021	<0.026	<0.02	0.032	<0.02	0.34	0.035	0.045	0.055	0.023	0.11	0.021	0.065	0.14	0.079	0.031	<0.021	<0.02	<0.02	<0.019	<0.021	<0.022
Nickel	mg/kg	180	NE	560	2500	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Selenium	mg/kg	2.6	20	160	1300	<1	<1.1	<1.2	<1.1	<1.2	<1	<1.7	<1.1	<1.2	<1.2	<1.2	<1.1 (M1)	<1	<1.2	<1.1	<1.7	<6.8 (D3)	<1.1	<0.99	<1.1	<1.1	<1	<1.1
Silver	mg/kg	7.9	100	160	1300	<0.51	<0.54	<0.59	<0.56	<0.6	<0.52	<0.85	<0.55	<0.61	<0.61	<0.58	<0.53	<0.5	<0.58	<0.56	<0.84	<3.3 (D3)	<0.54	<0.5	<0.55	<0.53	<0.52	<0.56
Zinc	mg/kg	3000	NE	8700	75000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TCLP Metals																												
Lead TCLP	mg/L	5 mg/L TCLP Lead hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<0.05	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Mercury TCLP	mg/L	0.2 mg/L TCLP Mercury hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium TCLP	mg/L	1.0 mg/L TCLP Cadmium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Chromium TCLP	mg/L	5.0 mg/L TCLP Chromium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
PCBs																												
PCBs (Polychlorinated Biphenyls)	mg/kg	NE	NE	1.2	8	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Herbicides and Pesticides																												
2,4-D	mg/kg	0.5	200	0.5	0.5	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Triclopyr	mg/kg	0.3	NE	0.3	0.3	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Semi-VOCs																												
1-Methylnaphthalene	mg/kg	NE	NE	NE	NE	NM	NM	NM	NM	NM	NM	NM	NM	NM	<2	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2,4-Dinitrotoluene	mg/kg	0.013	2.6	50	355	NM	NM	NM	NM	NM	NM	NM	NM	NM	<2	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2-Methylnaphthalene	mg/kg	NE	NE	100	369	NM	NM	NM	NM	NM	NM	NM	NM	NM	<2	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Acenaphthene	mg/kg	81	NE	1200	5260	NM	NM	<0.013	NM	NM	<0.011	0.045	NM	NM	<2	0.031	<0.011	<0.011	<0.013	0.012	<0.018	<0.014	<0.00639	<0.00649	<0.00683	<0.00635	<0.00646	<0.00624
Acenaphthylene	mg/kg	NE	NE	NE	NE	NM	NM	<0.013	NM	NM	0.019	0.047	NM	NM	<2	0.034	<0.011	<0.011	<0.013	<0.011	<0.018	<0.014	<0.00639	<0.00649	<0.00683	<0.00635	<0.00646	<0.00624
Anthracene	mg/kg	1300	NE	7880	45400	NM	NM	<0.013	NM	NM	<0.011	0.11	NM	NM	<2	0.026	0.012	<0.011	<0.013	0.047	<0.018	<0.014	<0.00639	<0.00649	<0.00683	<0.00635	<0.00646	<0.00624
Benz(a)anthracene	mg/kg	NE	NE	NE	NE	NM	NM	<0.013	NM	NM	0.022	0.44	NM	NM	<2	0.055	0.054	<0.011	<0.013	0.14	<0.018	<0.014	<0.00639	<0.00649	0.00683	<0.00635	<0.00646	<0.00624
Benzo(a)pyrene	mg/kg	1.4	NE	2	3	NM	NM	<0.013	NM	NM	0.018	0.34	NM	NM		0.052	0.052	<0.011	<0.013	0.13	<0.018	<0.014	<0.00639	<0.00649	<0.00683	<0.00635	<0.00646	<0.00624
Benzo(b)fluoranthene	mg/kg	NE	NE	NE	NE	NM	NM	0.015	NM	NM	0.027	0.46	NM	NM	<2	0.062	0.074	<0.011	<0.013	0.16	<0.018	<0.014	<0.00639	<0.00649	0.00943	<0.00635	<0.00646	<0.00624
Benzo(g,h,i)perylene	mg/kg	NE	NE	NE	NE	NM	NM	<0.013	NM	NM	0.019	0.30	NM	NM	<2	0.04	0.035	<0.011	<0.013	0.079	<0.018	<0.014	<0.00639	<0.00649	<0.00683	<0.00635	<0.00646	<0.00624
Benzo(k)fluoranthene	mg/kg	NE	NE	NE	NE	NM	NM	<0.013	NM	NM	<0.011	0.24	NM	NM	<2	0.022	0.025	<0.011	<0.013	0.058	<0.018	<0.014	<0.00639	<0.00649	<0.00683	<0.00635	<0.00646	<0.00624
Carbazole	mg/kg	NE	NE	700	1310	NM	NM	NM	NM	NM	NM	NM	NM	NM	<2	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Chrysene	mg/kg	NE	NE	NE	NE	NM	NM	0.013	NM	NM	0.021	0.47	NM	NM	<2	0.16	0.044	<0.011	<0.013	0.10	<0.018	<0.014	<0.00639	<0.00649	0.00907	<0.00635	<0.00646	<0.00624
Dibenz(a,h)anthracene	mg/kg	NE	NE	NE	NE	NM	NM	<0.013	NM	NM	<0.011	0.085	NM	NM	<2	<0.012	0.012	<0.011	<0.013	0.022	<0.018	<0.014	<0.00639	<0.00649	<0.00683	<0.00635	<0.00646	<0.00624
Dibenzofuran	mg/kg	NE	NE	104	810	NM	NM	NM	NM	NM	NM	NM	NM	NM	<2	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Fluoranthene	mg/kg	670	NE	1080	6800	NM	NM	0.023	NM	NM	0.039	0.91	NM	NM	<2	0.13	0.079	<0.011	<0.013	0.21	0.018	<0.014	<0.00639	<0.00649	0.011	<0.00635	<0.00646	<0.00624
Fluorene	mg/kg	110	NE	850	4120	NM	NM	<0.013	NM	NM	<0.011	0.068	NM	NM	<2	0.016	<0.011	<0.011	<0.013	0.014	<0.018	<0.014	<0.00639	<0.00649	<0.00683	<0.00635	<0.00646	<0.00624
Indeno(1,2,3-cd)pyrene	mg/kg	NE	NE	NE	NE	NM	NM	<0.013	NM	NM	0.013	0.21	NM	NM	<2	0.024	0.031	<0.011	<0.013	0.073	<0.018	<0.014	<0.00639	<0.00649	<0.00683	<0.00635	<0.00646	<0.00624
Naphthalene	mg/kg	NE	NE	NE	NE	NM	NM	<0.013	NM	NM	0.017	0.038	NM	NM	<2	<0.012	0.097	<0.011	<0.013	<0.011	<0.018	<0.014	<0.0213	<0.0216	<0.0228	<0.0212	<0.0215	<0.0208
Phenanthrene	mg/kg	NE	NE	NE	NE	NM	NM	0.014	NM	NM	0.033	0.44	NM	NM	<2	0.092	0.11	<0.011	<0.013	0.16	<0.018	<0.014	<0.00639	<0.00649	0.0123	<0.00635	<0.00646	<0.00624
Pyrene	mg/kg	440	NE	890	5800	NM	NM	0.02	NM	NM	0.041	1.1	NM	NM	<2	0.28	0.07	0.016	<0.013	0.20	<0.018	<0.014	<0.00639	<0.00649	0.0107	<0.00635	<0.00646	<0.00624
BaP Equivalents																												
Benzo(a)pyrene Equivalents	mg/kg	1.4	NE	2	3	NM	NM	0.0016	NM	NM	0.024	0.53	NM	NM	<0	0.070	0.078	<0	<0	0.19	<0	<0	<0	<0	0.00172	<0	<0	<0
VOCs																												
1,2,4-Trimethylbenzene	mg/kg	2.7	NE	8	25	NM	NM	<0.065	NM	NM	<0.059	<0.085	NM	NM	<0.061	<0.06	1.1	<0.055	<0.065	<0.062	<0.1	<0.069	<0.056	<0.053	<0.055	<0.053	<0.056	<0.057
1,3,5-Trimethylbenzene	mg/kg	2.7	NE	3	10	NM	NM	<0.065	NM	NM	<0.059	<0.085	NM	NM	<0.061	<0.06	0.30	<0.055	<0.065	<0.062	<0.1	<0.069	<0.056	<0.053	<0.055	<0.053	<0.056	<0.057
Benzene	mg/kg	0.017	10	6	10	NM	NM	<0.026	NM	NM	<0.024	<0.034	NM	NM	0.027	<0.024	0.47	<0.022	<0.026	<0.025	<0.04	<0.027	<0.022	<0.021	<0.022	<0.021	<0.023	<0.023
Chlorobenzene	mg/kg	1.2	2000	11	32	NM	NM	<0.065	NM	NM	<0.059	<0.085	NM	NM	<0.061	<0.06	<0.063	<0.055	<0.065	<0.062	<0.1	<0.069	<0.056	<0.053	<0.055	<0.053	<0.056	<0.057
Diethyl Ether	mg/kg	0.51	NE	NE	NE	NM	NM	<0.26	NM	NM	<0.24	<0.34	NM	NM	<0.24	<0.24	<0.25	<0.22	<0.26	<0.25	<0.4	<0.27	<0.22	<0.21	<0.22	<0.21	<0.23	<0.23
Ethylbenzene	mg/kg	1.1	NE	200	200	NM	NM	<0.065	NM	NM	<0.059	<0.085	NM	NM	<0.061	<0.06	0.67	<0.055	<0.065	<0.062	<0.1	<0.069	<0.056	<0.053	<0.055	<0.053	<0.056	<0.057
Isopropylbenzene	mg/kg	9.5	NE	30	87	NM	NM	<0.065	NM	NM	<0.059	<0.085	NM	NM	<0.061	<0.06	0.13	<0.055	<0.065	<0.062	<0.1	<0.069	<0.056	<0.053	<0.055	<0.053	<0.056	<0.057
Naphthalene	mg/kg	4.5	NE	10	28	NM	NM	<0.26	NM	NM	<0.24	<0.34	NM	NM	0.26	<0.24	0.73	<0.22	<0.26	<0.25	<0.4	<0.27	<0.22	<0.21	<0.22	<0.21	<0.23	<0.23
n-Butylbenzene	mg/kg	NE	NE	30	92	NM	NM	<0.065	NM	NM	<0.059	<0.085	NM	NM	<0.061	<0.06	0.088	<0.055	<0.065	<0.062	<0.1	<0.069	<0.056	<0.053	<0.055	<0.053	<0.056	<0.057
n-Propylbenzene	mg/kg	NE	NE	30	93	NM	NM	<0.065	NM	NM	<0.059	<0.085	NM	NM	<0.061	<0.06	0.27	<0.055	<0.065	<0.062	<0.1	<0.069	<0.056	<0.053	<0.055	<0.053	<0.056	<0.057
p-Isopropyltoluene	mg/kg	NE	NE	NE	NE	NM	NM	<0.065	NM	NM	<0.059	<0.085	NM	NM	<0.061	<0.06	0.078	<0.055	<0.065	<0.062	<0.1	<0.069	<0.056	<0.053	<0.055	<0.053	<0.056	<0.057
sec-Butylbenzene	mg/kg	NE	NE	25	70	NM	NM	<0.065	NM	NM	<0.059	<0.085	NM	NM	<0.061	<0.06	<0.063	<0.055	<0.065	<0.062	<0.1	<0.069	<0.056	<0.053	<0.055	<0.053	<0.056	<0.057
tert-Butylbenzene	mg/kg	NE	NE	30	90	NM	NM	<0.065	NM	NM	<0.059	<0.085	NM	NM	<0.061	<0.06	<0.063	<0.055	<0.065	<0.062	<0.1	<0.069	<0.056	<0.053	<0.055	<0.053	<0.056	<0.057
Tetrachloroethene	mg/kg	0.042	14	72	131	NM	NM	<0.065	NM	NM	<0.059	<0.085	NM	NM	<0.061	<0.06	<0.063	<0.055	<0.065	<0.062	<0.1	<0.069	<0.056	<0.053	<0.055	<0.053	<0.056	<0.057
Toluene	mg/kg	2.5	NE	107	305	NM	NM	<0.065	NM	NM	<0.059	<0.085	NM	NM	0.17	<0.06	2.9	<0.055	<0.065	0.067	<0.1	<0.069	<0.056	<0.053	<0.055	<0.053	<0.056	<0.057
Trichloroethene	mg/kg	0.0023	10	29	46	NM	NM	<0.065	NM	NM	<0.059	<0.085	NM	NM	<0.061	<0.06	<0.063	<0.055	<0.065	<0.062	<0.1	<0.069	<0.056	<0.053	<0.055	<0.053	<0.056	<0.057
Xylene (Total)	mg/kg	5.4	NE	45	130	NM	NM	<0.19	NM	NM	<0.18	<0.26	NM	NM	<0.18	<0.18	3.8	<0.16	<0.2	<0.19	<0.3	<0.21	<0.17	<0.16	<0.17	<0.16	<0.17	<0.17

Notes:

A full list of abbreviations is included in the table glossery

Table 2
Soil Analytical Results

Phase II Environmental Site Assessment
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

				Borings are ordered by Area:		Garfield Ave Temporary Ramp Widening							I-535/Garfield Bridge Demolition															
Boring ID	Units	2014 Screening SLV	20xTCLP level	Tier 1 Residential SRV	Tier 2 Industrial SRV	GP-355	GP-356	GP-356	GP-357	GP-357	GP-358	GP-359	GP-264	GP-264	GP-265	GP-265	GP-265	GP-266	GP-267	GP-267	GP-329	GP-329	GP-330	GP-330	GP-330	GP-330	GP-331	GP-331
Field Sample ID						GP-355-3	GP-356-1.5	GP-356-13	GP-357-2	GP-357-10	GP-358-0.5	GP-359-1	GP-264-2	GP-264-10	GP-265-0.5	GP-265-1.5	GP-265-10	GP-266-1.5	GP-267-2	GP-267-10	GP-329-1	GP-329-10	GP-330-0.5	GP-330-1.5	GP-330-3.5	GP-330-10	GP-331-1	GP-331-8.5
Laboratory ID						10476320001	10476121021	10476121022	10476121019	10476121020	10476320005	10476320003	10474360007	10474360008	10474487001	10474487002	10474487003	10474360010	10474360001	10474360002	10473870012	10473870013	10473870015	10473870016	10473870017	10473870018	10474360004	10474360005
Sample Date						5/22/2019	5/22/2019	5/22/2019	5/22/2019	5/22/2019	5/23/2019	5/23/2019	5/9/2019	5/9/2019	5/10/2019	5/10/2019	5/10/2019	5/9/2019	5/8/2019	5/8/2019	5/7/2019	5/7/2019	5/7/2019	5/7/2019	5/7/2019	5/7/2019	5/8/2019	5/8/2019
DRO and GRO																												
Diesel Range Organics	mg/kg	The MPCA Unregulated Fill Criteria for DRO and GRO is <100 mg/kg				<8.6	NM	<8.4	NM	<8.7	<8.9	107 (T6)	<8.5	<10.5	NM	71.1 (T7,T6)	<10.1	66.3 (T7,T6)	71 .0(T7,T6)	<9	98.5 (T6)	<9.5	NM	99.4 (T7,T6)	16.9 (T7,T6)	<10	51.1 (T7,T6)	<10
Gasoline Range Organics	mg/kg					<10.5	<10.7	<10.2	<11.4	<11.1	<11.2	<10.4	<12.6 (2M)	<12.4	NM	<11	<12.5	15.5 (G+)	19.0 (G+,2M	<12.3 (2M)	13.1 (GO)	<3.7	NM	11.5 (GO)	<2.9	<6.2	11.6 (G+,2M	<12.2
WDRO C10-C28 Silica Gel	mg/kg					NM	<8.6	NM	<9.3	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Metals																												
Antimony	mg/kg	5.4	NE	12	100	NM	<1	NM	<1.1	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Arsenic	mg/kg	5.8	100	9	20	1.2	1.3	1.4	2.9	1.3	1.8	2.3	2.3	1.5	*8.8*	*10.9*	<1.2	3.2	*19.3*	1.3	*13.5*	1.3	*19.4*	*11.8*	*6.9*	<1.1	*7.4*	<1.2
Barium	mg/kg	1700	2000	1100	18000	10.4	13.5	10.8	54.5	11	29.9	39	13	8.6	104 (M1)	57.8	6.0	25.6	116	7.0	210	6.7	434	98.8	35.3	6.1	165	10.6
Beryllium	mg/kg	2.7	NE	55	230	NM	<0.26	NM	0.44	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium	mg/kg	8.8	20	25	200	<0.16	<0.16	<0.14	<0.16	<0.15	<0.16	0.25	<0.15	<0.18	1.6	0.89	<0.18	0.17	1.5	<0.18	1.8	<0.19	4.6	0.72	<0.17	<0.17	1.0	<0.18
Chromium	mg/kg	36	100	87	650	6.6	5.7	8.2	20.4	6.7	13.4	22.7	5.8	4.6	20.5	15.7	3.8	10.6	19.6	3.3	17.1	3.6	26.9	13.9	16.9	2.9	28	3.6
Copper	mg/kg	700	NE	100	9000	NM	8.7	NM	22.3	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Lead	mg/kg	2700	100	300	700	1.9	2.1	2.1	14.5	2.0	4.8	56.7	12.2	1.3	304 (M1)	132	1.5	48.3	214	1.1	213	1.0	520	193	5.4	0.97	108	1.6
Mercury	mg/kg	3.3	4	0.5	1.5	<0.021	<0.0212	<0.0216	<0.0216	<0.0212	<0.021	<0.019	<0.02	<0.024	0.12	0.097	<0.026	<0.019	0.16	<0.022	0.26	<0.024	0.36	0.16	<0.02	<0.024	<0.021	0.039
Nickel	mg/kg	180	NE	560	2500	NM	8.2	NM	16.4	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Selenium	mg/kg	2.6	20	160	1300	<1	<1	<0.94	<1.1	<1	<1.1	<1	<1	<1.2	*<5.2 (D3)*	<1	<1.2	<1	<1.2	<1.2	*<6 (D3)*	<1.3	<1.2	<1.1	<1.1	<1.1	<1.1	<1.2
Silver	mg/kg	7.9	100	160	1300	<0.52	<0.52	<0.47	<0.55	<0.5	<0.53	<0.51	<0.51	<0.58	<2.6 (D3)	<0.51	<0.59	<0.52	<0.61	<0.61	<3 (D3)	<0.63	<0.6	<0.56	<0.57	<0.57	<0.54	<0.59
Zinc	mg/kg	3000	NE	8700	75000	NM	11.4	NM	31.5	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TCLP Metals																												
Lead TCLP	mg/L	5 mg/L TCLP Lead hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	<0.5	NM	NM	NM	<0.5	NM	<0.5	NM	<0.5	NM	NM	NM	<0.5	NM
Mercury TCLP	mg/L	0.2 mg/L TCLP Mercury hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium TCLP	mg/L	1.0 mg/L TCLP Cadmium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Chromium TCLP	mg/L	5.0 mg/L TCLP Chromium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
PCBs																												
PCBs (Polychlorinated Biphenyls)	mg/kg	NE	NE	1.2	8	NM	NM	NM	NM	NM	NM	BRL	NM	NM	NM	NM	NM	NM	NM	NM	BRL	NM	NM	0.075	NM	NM	BRL	NM
Herbicides and Pesticides																												
2,4-D	mg/kg	0.5	200	0.5	0.5	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Triclopyr	mg/kg	0.3	NE	0.3	0.3	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Semi-VOCs																												
1-Methylnaphthalene	mg/kg	NE	NE	NE	NE	NM	NM	NM	NM	NM	<0.0372	NM	NM	NM	NM	<0.35	NM	<0.35	0.75	NM	<0.4	NM	NM	<0.39	<0.38	NM	<0.36	NM
2,4-Dinitrotoluene	mg/kg	0.013	2.6	50	355	NM	NM	NM	NM	NM	*<0.372*	NM	NM	NM	NM	*<0.35*	NM	*<0.35*	*<0.42*	NM	*<0.4*	NM	NM	*<0.39*	*<0.38*	NM	*<0.36*	NM
2-Methylnaphthalene	mg/kg	NE	NE	100	369	NM	NM	NM	NM	NM	<0.0372	NM	NM	NM	NM	<0.35	NM	<0.35	0.93	NM	<0.4	NM	NM	<0.39	<0.38	NM	<0.36	NM
Acenaphthene	mg/kg	81	NE	1200	5260	<0.00634	<0.00635	<0.00647	<0.00648	<0.00637	<0.0372	<0.00654	<0.01	<0.013	NM	<0.35	<0.013	<0.35	<0.42	<0.012	<0.4	<0.013	NM	<0.39	<0.38	<0.012	<0.36	<0.013
Acenaphthylene	mg/kg	NE	NE	NE	NE	<0.00634	<0.00635	<0.00647	<0.00648	<0.00637	<0.0372	<0.00654	<0.01	<0.013	NM	<0.35	<0.013	<0.35	<0.42	<0.012	<0.4	<0.013	NM	<0.39	<0.38	<0.012	<0.36	<0.013
Anthracene	mg/kg	1300	NE	7880	45400	<0.00634	<0.00635	<0.00647	0.0105	<0.00637	<0.0372	0.00904	<0.01	<0.013	NM	<0.35	<0.013	<0.35	<0.42	<0.012	<0.4	<0.013	NM	<0.39	<0.38	<0.012	<0.36	<0.013
Benz(a)anthracene	mg/kg	NE	NE	NE	NE	<0.00634	<0.00635	<0.00647	0.0424	<0.00637	<0.0372	0.0349	0.015	<0.013	NM	<0.35	<0.013	<0.35	0.58	<0.012	<0.4	<0.013	NM	<0.39	<0.38	<0.012	<0.36	<0.013
Benzo(a)pyrene	mg/kg	1.4	NE	2	3	<0.00634	<0.00635	<0.00647	0.0332	<0.00637	<0.0372	0.0358	0.015	<0.013	NM	<0.35	<0.013	<0.35	0.51	<0.012	<0.4	<0.013	NM	<0.39	<0.38	<0.012	<0.36	<0.013
Benzo(b)fluoranthene	mg/kg	NE	NE	NE	NE	<0.00634	<0.00635	<0.00647	0.0548	<0.00637	<0.0372	0.0436	0.027	<0.013	NM	<0.35	<0.013	<0.35	0.81	<0.012	<0.4	<0.013	NM	<0.39	<0.38	<0.012	<0.36	<0.013
Benzo(g,h,i)perylene	mg/kg	NE	NE	NE	NE	<0.00634	<0.00635	<0.00647	0.0311	<0.00637	<0.0372	0.0481	0.018	<0.013	NM	<0.35	<0.013	<0.35	0.47	<0.012	0.42	<0.013	NM	<0.39	<0.38	<0.012	<0.36	<0.013
Benzo(k)fluoranthene	mg/kg	NE	NE	NE	NE	<0.00634	<0.00635	<0.00647	0.0124	<0.00637	<0.0372	0.0137	<0.01	<0.013	NM	<0.35	<0.013	<0.35	<0.42	<0.012	<0.4	<0.013	NM	<0.39	<0.38	<0.012	<0.36	<0.013
Carbazole	mg/kg	NE	NE	700	1310	NM	NM	NM	NM	NM	<0.372	NM	NM	NM	NM	<0.35	NM	<0.35	<0.42	NM	<0.4	NM	NM	<0.39	<0.38	NM	<0.36	NM
Chrysene	mg/kg	NE	NE	NE	NE	<0.00634	<0.00635	<0.00647	0.048	<0.00637	<0.0372	0.0281	0.024	<0.013	NM	<0.35	<0.013	<0.35	0.68	<0.012	<0.4	<0.013	NM	<0.39	<0.38	<0.012	<0.36	<0.013
Dibenz(a,h)anthracene	mg/kg	NE	NE	NE	NE	<0.00634	<0.00635	<0.00647	0.0075	<0.00637	<0.0372	0.0085	<0.01	<0.013	NM	<0.35	<0.013	<0.35	<0.42	<0.012	<0.4	<0.013	NM	<0.39	<0.38	<0.012	<0.36	<0.013
Dibenzofuran	mg/kg	NE	NE	104	810	NM	NM	NM	NM	NM	<0.372	NM	NM	NM	NM	<0.35	NM	<0.35	<0.42	NM	<0.4	NM	NM	<0.39	<0.38	NM	<0.36	NM
Fluoranthene	mg/kg	670	NE	1080	6800	<0.00634	<0.00635	<0.00647	0.0743	<0.00637	<0.0372	0.0645	0.034	<0.013	NM	<0.35	<0.013	<0.35	1.1	<0.012	<0.4	<0.013	NM	<0.39	<0.38	<0.012	0.41	<0.013
Fluorene	mg/kg	110	NE	850	4120	<0.00634	<0.00635	<0.00647	<0.00648	<0.00637	<0.0372	<0.00654	<0.01	<0.013	NM	<0.35	<0.013	<0.35	<0.42	<0.012	<0.4	<0.013	NM	<0.39	<0.38	<0.012	<0.36	<0.013
Indeno(1,2,3-cd)pyrene	mg/kg	NE	NE	NE	NE	<0.00634	<0.00635	<0.00647	0.0215	<0.00637	<0.0372	0.0233	0.013	<0.013	NM	<0.35	<0.013	<0.35	<0.42	<0.012	<0.4	<0.013	NM	<0.39	<0.38	<0.012	<0.36	<0.013
Naphthalene	mg/kg	NE	NE	NE	NE	<0.0211	<0.0212	<0.0216	<0.0216	<0.0212	<0.0372	<0.0218	0.065	<0.013	NM	<0.35	<0.013	<0.35	0.75	<0.012	<0.4	<0.013	NM	<0.39	<0.38	<0.012	<0.36	<0.013
Phenanthrene	mg/kg	NE	NE	NE	NE	<0.00634	<0.00635	<0.00647	0.0589	<0.00637	<0.0372	0.0316	0.059	<0.013	NM	<0.35	<0.013	<0.35	1.0	<0.012	<0.4	<0.013	NM	<0.39	<0.38	<0.012	<0.36	<0.013
Pyrene	mg/kg	440	NE	890	5800	<0.00634	<0.00635	<0.00647	0.0739	<0.00637	<0.0372	0.0513	0.03	<0.013	NM	<0.35	<0.013	<0.35	0.84	<0.012	<0.4	<0.013	NM	<0.39	<0.38	<0.012	<0.36	<0.013
BaP Equivalents																												
Benzo(a)pyrene Equivalents	mg/kg	1.4	NE	2	3	<0	<0	<0	0.0510	<0	<0	0.0524	0.021	<0	NM	<0	<0	<0	0.66	<0	<0	<0	NM	<0	<0	<0	<0	<0
VOCs																												
1,2,4-Trimethylbenzene	mg/kg	2.7	NE	8	25	<0.058	<0.05	<0.052	<0.058	<0.055	<0.053	<0.053	0.14	<0.064	NM	0.34	<0.064	0.40	0.34	<0.06	0.33	<0.061	NM	0.26	<0.061	<0.064	<0.053	<0.061
1,3,5-Trimethylbenzene	mg/kg	2.7	NE	3	10	<0.058	<0.05	<0.052	<0.058	<0.055	<0.053	<0.053	<0.061	<0.064	NM	0.085	<0.064	0.076	0.088	<0.06	0.096	<0.061	NM	0.076	<0.061	<0.064	<0.053	<0.061
Benzene	mg/kg	0.017	10	6	10	*<0.023*	*<0.02*	*<0.021*	*<0.023*	*<0.022*	*<0.021*	*<0.021*	*0.11*	*<0.026*	NM	*0.067*	*<0.026*	*0.094*	*0.19*	*<0.024*	*0.095*	*<0.025*	NM	*0.090*	*<0.024*	*<0.026*	*<0.021*	*<0.024*
Chlorobenzene	mg/kg	1.2	2000	11	32	<0.058	<0.05	<0.052	<0.058	<0.055	<0.053	<0.053	<0.061	<0.064	NM	<0.055	<0.064	<0.054	<0.063	<0.06	<0.062	<0.061	NM	<0.057	<0.061	<0.064	<0.053	<0.061
Diethyl Ether	mg/kg	0.51	NE	NE	NE	<0.23	<0.2	<0.21	<0.23	<0.22	<0.21	<0.21	<0.24	<0.26	NM	<0.22	<0.26	<0.21	<0.25	<0.24	<0.25 (M1)	<0.25	NM	<0.23	<0.24	<0.26	<0.21	<0.24
Ethylbenzene	mg/kg	1.1	NE	200	200	<0.058	<0.05	<0.052	<0.058	<0.055	<0.053	<0.053	0.086	<0.064	NM	0.12	<0.064	0.16	0.16	<0.06	0.14	<0.061	NM	0.13	<0.061	<0.064	<0.053	<0.061
Isopropylbenzene	mg/kg	9.5	NE	30	87	<0.058	<0.05	<0.052	<0.058	<0.055	<0.053	<0.053	<0.061	<0.064	NM	0.096	<0.064	0.09	0.09	<0.06	0.13	<0.061	NM	0.11	<0.061	<0.064	<0.053	<0.061
Naphthalene	mg/kg	4.5	NE	10	28	<0.23	<0.2	<0.21	<0.23	<0.22	<0.21	<0.21	<0.24	<0.26	NM	0.61	<0.26	0.56	0.47	<0.24	0.54	<0.25	NM	0.45	<0.24	<0.26	<0.21	<0.24
n-Butylbenzene	mg/kg	NE	NE	30	92	<0.058	<0.05	<0.052	<0.058	<0.055	<0.053	<0.053	<0.061	<0.064	NM	<0.055	<0.064	<0.054	<0.063	<0.06	<0.062	<0.061	NM	<0.057	<0.061	<0.064	<0.053	<0.061
n-Propylbenzene	mg/kg	NE	NE	30	93	<0.058	<0.05	<0.052	<0.058	<0.055	<0.053	<0.053	<0.061	<0.064	NM	0.073	<0.064	0.12	0.11	<0.06	0.11	<0.061	NM	0.089	<0.061	<0.064	<0.053	<0.061
p-Isopropyltoluene	mg/kg	NE	NE	NE	NE	<0.058	<0.05	<0.052	<0.058	<0.055	<0.053	<0.053	<0.061	<0.064	NM	<0.055	<0.064	<0.054	<0.063	<0.06	<0.062	<0.061	NM	<0.057	<0.061	<0.064	<0.053	<0.061
sec-Butylbenzene	mg/kg	NE	NE	25	70	<0.058	<0.05	<0.052	<0.058	<0.055	<0.053	<0.053	<0.061	<0.064	NM	<0.055	<0.064	<0.054	<0.063	<0.06	0.08	<0.061	NM	0.067	<0.061	<0.064	<0.053	<0.061
tert-Butylbenzene	mg/kg	NE	NE	30	90	<0.058	<0.2	<0.21	<0.23	<0.22	<0.053	<0.053	<0.061	<0.064	NM	<0.055	<0.064	<0.054	<0.063	<0.06	<0.062	<0.061	NM	<0.057	<0.061	<0.064	<0.053	<0.061
Tetrachloroethene	mg/kg	0.042	14	72	131	*<0.058*	*<0.05*	*<0.052*	*<0.058*	*<0.055*	*<0.053*	*<0.053*	*<0.061*	*<0.064*	NM	*<0.055*	*<0.064*	*<0.054*	*<0.063*	*<0.06*	*<0.062*	*<0.061*	NM	*<0.057*	*<0.061*	*<0.064*	*<0.053*	*<0.061*
Toluene	mg/kg	2.5	NE	107	305	<0.058	<0.05	<0.052	<0.058	<0.055	<0.053	<0.053	0.44	<0.064	NM	0.60	<0.064	0.55	0.74	<0.06	0.62	<0.061	NM	0.47	<0.061	<0.064	<0.053	<0.061
Trichloroethene	mg/kg	0.0023	10	29	46	*<0.058*	*<0.05*	*<0.052*	*<0.058*	*<0.055*	*<0.053*	*<0.053*	*<0.061*	*<0.064*	NM	*<0.055*	*<0.064*	*<0.054*	*<0.063*	*<0.06*	*<0.062*	*<0.061*	NM	*<0.057*	*<0.061*	*<0.064*	*<0.053*	*<0.061*
Xylene (Total)	mg/kg	5.4	NE	45	130	<0.17	<0.15	<0.16	<0.17	<0.16	<0.16	<0.16	0.58	<0.19	NM	1.2	<0.19	1.4	1.3	<0.18	1.2	<0.18	NM	0.93	<0.18	<0.19	<0.16	<0.18

Notes:

A full list of abbreviations is included in the table glossery

Table 2
Soil Analytical Results

Phase II Environmental Site Assessment
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

				Borings are ordered by Area:		I-535/Garfield Bridge Demolition														I-35 Low-Level Bridge Demolition								
Boring ID	Units	2014 Screening SLV	20xTCLP level	Tier 1 Residential SRV	Tier 2 Industrial SRV	GP-333	GP-333	GP-333	GP-333	GP-334	GP-334	GP-335	GP-335	GP-336	GP-336	GP-337	GP-337	GP-435	GP-435	GP-153	GP-153	GP-153	GP-153	GP-157	GP-157	GP-157	GP-157	GP-159
Field Sample ID						GP-333-0.5	GP-333-1.5	GP-333-3	GP-333-10	GP-334-5	GP-334-15	GP-335-3	GP-335-10	GP-336-3	GP-336-11	GP-337-1	GP-337-8	GP-435-2	GP-435-8	GP-153-0.5	GP-153-1.5	GP-153-3	GP-153-12	GP-157-0.5	GP-157-1.5	GP-157-3	GP-157-10	GP-159-0.5
Laboratory ID						10474487008	10474487009	10474487010	10474487011	10474487005	10474487006	10474360019	10474360020	10474360013	10474360014	10474360016	10474360017	10484416004	10484416005	10452340010	10452340011	10452340012	10452340013	10447922017	10447922018	10447922019	10447922020	10452519004
Sample Date						5/10/2019	5/10/2019	5/10/2019	5/10/2019	5/10/2019	5/10/2019	5/9/2019	5/9/2019	5/9/2019	5/9/2019	5/9/2019	5/9/2019	7/23/2019	7/23/2019	10/18/2018	10/18/2018	10/18/2018	10/18/2018	9/18/2018	9/18/2018	9/18/2018	9/18/2018	10/18/2018
DRO and GRO																												
Diesel Range Organics	mg/kg	The MPCA Unregulated Fill Criteria for DRO and GRO is <100 mg/kg				NM	NM	<8.9	<10.8	<9.9	<10.2	29.0 (T7,T6)	<9.9	<8.9	<9.9	58.6 (T7,T6)	<8.7	NM	NM	NM	NM	<8.5	NM	NM	NM	99.6 (T7,T6)	224 (T6)	NM
Gasoline Range Organics	mg/kg					NM	NM	<10.4	<14.1	<12.2	<12.8	23.5 (G+,M1)	<12.4	<10.8	<12.4	23.7 (G+)	<10.7	<13.2	<13.1	NM	NM	<11.4	<12.1	NM	NM	<15.4	<18.7	NM
WDRO C10-C28 Silica Gel	mg/kg					NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<9.5	<9.9	NM	NM	NM	<9.2	NM	NM	NM	NM	NM
Metals																												
Antimony	mg/kg	5.4	NE	12	100	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Arsenic	mg/kg	5.8	100	9	20	4.8	4.1	2.9	2.3	1.5	1.7	18.5	1.7	1.8	1.3	3.9	2.2	3.0	<1.2	6.2	1.6	2.7	<1.1	NM	NM	2.0	1.8	NM
Barium	mg/kg	1700	2000	1100	18000	59.6	75.1	31	22.6	13.1	10.4	81	6.4	11.4	7.5	52.5	23.5	56.4	6.3	85.6	25.7	35.7	9.3	NM	NM	46	56.2	NM
Beryllium	mg/kg	2.7	NE	55	230	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium	mg/kg	8.8	20	25	200	0.77	0.66	0.29	<0.19	<0.17	<0.18	2.0	<0.18	0.8	<0.17	0.49	<0.16	1.2	<0.17	0.4	<0.17	<0.32 (D3)	<0.17	NM	NM	<0.19	<0.24	NM
Chromium	mg/kg	36	100	87	650	20.4	18.9	7.4	7.1	5.0	5.9	14	3.7	5.7	5.5	10.2	8.9	11.4	4.1	19.9	7.8	15.6	9.5	NM	NM	14.4	18.1	NM
Copper	mg/kg	700	NE	100	9000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Lead	mg/kg	2700	100	300	700	301	264	58.6	14.9	8.5	1.4	224	1.1	6.3	1.8	72.3	2.2	163	1.2	77.7	16.2	4.3	1.5	170	5.9	17.8	5.6	136
Mercury	mg/kg	3.3	4	0.5	1.5	0.044	0.042	0.038	<0.025	0.03	<0.025	0.21	<0.025	<0.022	<0.024	0.022	<0.019	0.059	<0.024	<0.023	<0.021	<0.019	<0.021	NM	NM	0.068	0.046	NM
Nickel	mg/kg	180	NE	560	2500	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Selenium	mg/kg	2.6	20	160	1300	<2 (D3)	<2 (D3)	<1.1	<1.3	<1.1	<1.2	<1.1	<1.2	<1	<1.2	<1.1	<1.1	<1.2	<1.2	<1.1	<1.1	<2.1 (D3)	<1.1	NM	NM	<1.2	<1.6	NM
Silver	mg/kg	7.9	100	160	1300	<1 (D3)	<0.99 (D3)	<0.53	<0.65	<0.57	<0.59	<0.54	<0.61	<0.5	<0.58	<0.54	<0.53	<0.58	<0.58	<0.57	<0.56	<1.1 (D3)	<0.56	NM	NM	<0.62	<0.8	NM
Zinc	mg/kg	3000	NE	8700	75000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TCLP Metals																												
Lead TCLP	mg/L	5 mg/L TCLP Lead hazardous limit				<0.5	NM	NM	NM	NM	NM	<0.5	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<0.5	NM	NM	NM	<0.5
Mercury TCLP	mg/L	0.2 mg/L TCLP Mercury hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium TCLP	mg/L	1.0 mg/L TCLP Cadmium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Chromium TCLP	mg/L	5.0 mg/L TCLP Chromium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
PCBs																												
PCBs (Polychlorinated Biphenyls)	mg/kg	NE	NE	1.2	8	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Herbicides and Pesticides																												
2,4-D	mg/kg	0.5	200	0.5	0.5	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Triclopyr	mg/kg	0.3	NE	0.3	0.3	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Semi-VOCs																												
1-Methylnaphthalene	mg/kg	NE	NE	NE	NE	NM	NM	<0.36	NM	NM	NM	NM	NM	NM	NM	<0.36	NM	<0.41	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2,4-Dinitrotoluene	mg/kg	0.013	2.6	50	355	NM	NM	<0.36	NM	NM	NM	NM	NM	NM	NM	<0.36	NM	<0.41	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2-Methylnaphthalene	mg/kg	NE	NE	100	369	NM	NM	<0.36	NM	NM	NM	NM	NM	NM	NM	<0.36	NM	<0.41	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Acenaphthene	mg/kg	81	NE	1200	5260	NM	NM	<0.36	<0.013	<0.012	<0.012	0.018	<0.012	<0.011	<0.012	<0.36	<0.011	<0.41	<0.013	NM	NM	<0.011	<0.011	NM	NM	<0.067	<0.017	NM
Acenaphthylene	mg/kg	NE	NE	NE	NE	NM	NM	<0.36	<0.013	<0.012	<0.012	0.027	<0.012	<0.011	<0.012	<0.36	<0.011	<0.41	<0.013	NM	NM	<0.011	<0.011	NM	NM	<0.067	<0.017	NM
Anthracene	mg/kg	1300	NE	7880	45400	NM	NM	<0.36	<0.013	<0.012	<0.012	0.079	<0.012	0.011	<0.012	<0.36	<0.011	<0.41	<0.013	NM	NM	<0.011	<0.011	NM	NM	0.13	<0.017	NM
Benz(a)anthracene	mg/kg	NE	NE	NE	NE	NM	NM	<0.36	<0.013	0.031	<0.012	0.23	<0.012	0.021	<0.012	<0.36	<0.011	<0.41	<0.013	NM	NM	<0.011	<0.011	NM	NM	0.29	<0.017	NM
Benzo(a)pyrene	mg/kg	1.4	NE	2	3	NM	NM	<0.36	<0.013	0.029	<0.012	0.24	<0.012	0.017	<0.012	<0.36	<0.011	<0.41	<0.013	NM	NM	<0.011	<0.011	NM	NM	0.32	<0.017	NM
Benzo(b)fluoranthene	mg/kg	NE	NE	NE	NE	NM	NM	<0.36	<0.013	0.035	<0.012	0.35	<0.012	0.029	<0.012	<0.36	<0.011	<0.41	<0.013	NM	NM	<0.011	<0.011	NM	NM	0.43	<0.017	NM
Benzo(g,h,i)perylene	mg/kg	NE	NE	NE	NE	NM	NM	<0.36	<0.013	0.018	<0.012	0.18	<0.012	0.017	<0.012	<0.36	<0.011	<0.41	<0.013	NM	NM	<0.011	<0.011	NM	NM	0.22	<0.017	NM
Benzo(k)fluoranthene	mg/kg	NE	NE	NE	NE	NM	NM	<0.36	<0.013	0.016	<0.012	0.12	<0.012	0.013	<0.012	<0.36	<0.011	<0.41	<0.013	NM	NM	<0.011	<0.011	NM	NM	0.17	<0.017	NM
Carbazole	mg/kg	NE	NE	700	1310	NM	NM	<0.36	NM	NM	NM	NM	NM	NM	NM	<0.36	NM	<0.41	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Chrysene	mg/kg	NE	NE	NE	NE	NM	NM	<0.36	<0.013	0.028	<0.012	0.29	<0.012	0.026	<0.012	<0.36	<0.011	<0.41	<0.013	NM	NM	<0.011	<0.011	NM	NM	0.26	<0.017	NM
Dibenz(a,h)anthracene	mg/kg	NE	NE	NE	NE	NM	NM	<0.36	<0.013	<0.012	<0.012	0.053	<0.012	<0.011	<0.012	<0.36	<0.011	<0.41	<0.013	NM	NM	<0.011	<0.011	NM	NM	<0.067	<0.017	NM
Dibenzofuran	mg/kg	NE	NE	104	810	NM	NM	<0.36	NM	NM	NM	NM	NM	NM	NM	<0.36	NM	<0.41	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Fluoranthene	mg/kg	670	NE	1080	6800	NM	NM	<0.36	<0.013	0.048	<0.012	0.44	<0.012	0.051	<0.012	<0.36	<0.011	<0.41	<0.013	NM	NM	<0.011	<0.011	NM	NM	0.56	0.18	NM
Fluorene	mg/kg	110	NE	850	4120	NM	NM	<0.36	<0.013	<0.012	<0.012	0.021	<0.012	<0.011	<0.012	<0.36	<0.011	<0.41	<0.013	NM	NM	<0.011	<0.011	NM	NM	<0.067	<0.017	NM
Indeno(1,2,3-cd)pyrene	mg/kg	NE	NE	NE	NE	NM	NM	<0.36	<0.013	0.014	<0.012	0.15	<0.012	0.014	<0.012	<0.36	<0.011	<0.41	<0.013	NM	NM	<0.011	<0.011	NM	NM	0.18	<0.017	NM
Naphthalene	mg/kg	NE	NE	NE	NE	NM	NM	<0.36	<0.013	<0.012	<0.012	0.23	<0.012	0.020	<0.012	<0.36	<0.011	<0.41	<0.013	NM	NM	<0.011	<0.011	NM	NM	0.15	<0.017	NM
Phenanthrene	mg/kg	NE	NE	NE	NE	NM	NM	<0.36	<0.013	0.018	<0.012	0.34	<0.012	0.054	<0.012	<0.36	<0.011	<0.41	<0.013	NM	NM	<0.011	<0.011	NM	NM	0.42	<0.017	NM
Pyrene	mg/kg	440	NE	890	5800	NM	NM	<0.36	<0.013	0.043	<0.012	0.40	<0.012	0.041	<0.012	<0.36	<0.011	<0.41	<0.013	NM	NM	<0.011	<0.011	NM	NM	0.51	<0.017	NM
BaP Equivalents																												
Benzo(a)pyrene Equivalents	mg/kg	1.4	NE	2	3	NM	NM	<0	<0	0.039	<0	0.36	<0	0.025	<0	<0	<0	<0	<0	NM	NM	<0	<0	NM	NM	0.43	<0	NM
VOCs																												
1,2,4-Trimethylbenzene	mg/kg	2.7	NE	8	25	NM	NM	<0.053	<0.064	<0.058	<0.06	0.86	<0.059	<0.054	<0.061	0.55	<0.053	<0.063	<0.061	NM	NM	<0.058	<0.058	NM	NM	<0.072	<0.093	NM
1,3,5-Trimethylbenzene	mg/kg	2.7	NE	3	10	NM	NM	<0.053	<0.064	<0.058	<0.06	0.15	<0.059	<0.054	<0.061	0.12	<0.053	<0.063	<0.061	NM	NM	<0.058	<0.058	NM	NM	<0.072	<0.093	NM
Benzene	mg/kg	0.017	10	6	10	NM	NM	<0.021	<0.026	<0.023	<0.024	0.048	<0.024	<0.022	<0.024	0.50	<0.021	<0.025	<0.024	NM	NM	<0.023	<0.023	NM	NM	<0.029	<0.037	NM
Chlorobenzene	mg/kg	1.2	2000	11	32	NM	NM	<0.053	<0.064	<0.058	<0.06	<0.053	<0.059	<0.054	<0.061	<0.057	<0.053	<0.063	<0.061	NM	NM	<0.058	<0.058	NM	NM	<0.072	<0.093	NM
Diethyl Ether	mg/kg	0.51	NE	NE	NE	NM	NM	<0.21	<0.26	<0.23	<0.24	<0.21	<0.24	<0.22	<0.24	<0.23	<0.21	<0.25	<0.24	NM	NM	<0.23	<0.23	NM	NM	<0.29	<0.37	NM
Ethylbenzene	mg/kg	1.1	NE	200	200	NM	NM	<0.053	<0.064	<0.058	<0.06	0.32	<0.059	<0.054	<0.061	0.47	<0.053	<0.063	<0.061	NM	NM	<0.058	<0.058	NM	NM	<0.072	<0.093	NM
Isopropylbenzene	mg/kg	9.5	NE	30	87	NM	NM	<0.053	<0.064	<0.058	<0.06	0.54	<0.059	<0.054	<0.061	0.21	<0.053	<0.063	<0.061	NM	NM	<0.058	<0.058	NM	NM	<0.072	<0.093	NM
Naphthalene	mg/kg	4.5	NE	10	28	NM	NM	<0.21	<0.26	<0.23	<0.24	1.5	<0.24	<0.22	<0.24	1.1	<0.21	<0.25	<0.24	NM	NM	<0.23	<0.23	NM	NM	<0.29	<0.37	NM
n-Butylbenzene	mg/kg	NE	NE	30	92	NM	NM	<0.053	<0.064	<0.058	<0.06	0.15	<0.059	<0.054	<0.061	0.067	<0.053	<0.063	<0.061	NM	NM	<0.058	<0.058	NM	NM	<0.072	<0.093	NM
n-Propylbenzene	mg/kg	NE	NE	30	93	NM	NM	<0.053	<0.064	<0.058	<0.06	0.75	<0.059	<0.054	<0.061	0.35	<0.053	<0.063	<0.061	NM	NM	<0.058	<0.058	NM	NM	<0.072	<0.093	NM
p-Isopropyltoluene	mg/kg	NE	NE	NE	NE	NM	NM	<0.053	<0.064	<0.058	<0.06	0.10	<0.059	<0.054	<0.061	<0.057	<0.053	<0.063	<0.061	NM	NM	<0.058	<0.058	NM	NM	0.095	<0.093	NM
sec-Butylbenzene	mg/kg	NE	NE	25	70	NM	NM	<0.053	<0.064	<0.058	<0.06	0.17	<0.059	<0.054	<0.061	0.062	<0.053	<0.063	<0.061	NM	NM	<0.058	<0.058	NM	NM	<0.072	<0.093	NM
tert-Butylbenzene	mg/kg	NE	NE	30	90	NM	NM	<0.053	<0.064	<0.058	<0.06	<0.053	<0.059	<0.054	<0.061	<0.057	<0.053	<0.063	<0.061	NM	NM	<0.058	<0.058	NM	NM	<0.072	<0.093	NM
Tetrachloroethene	mg/kg	0.042	14	72	131	NM	NM	<0.053	<0.064	<0.058	<0.06	<0.053	<0.059	<0.054	<0.061	<0.057	<0.053	<0.063	<0.061	NM	NM	<0.058	<0.058	NM	NM	<0.072	<0.093	NM
Toluene	mg/kg	2.5	NE	107	305	NM	NM	<0.053	<0.064	<0.058	<0.06	0.30	<0.059	<0.054	<0.061	2.1	<0.053	<0.063	<0.061	NM	NM	<0.058	<0.058	NM	NM	0.086	0.14	NM
Trichloroethene	mg/kg	0.0023	10	29	46	NM	NM	<0.053	<0.064	<0.058	<0.06	<0.053	<0.059	<0.054	<0.061	<0.057	<0.053	<0.063	<0.061	NM	NM	<0.058	<0.058	NM	NM	<0.072	<0.093	NM
Xylene (Total)	mg/kg	5.4	NE	45	130	NM	NM	<0.16	<0.19	<0.18	<0.18	2.3	<0.18	<0.16	<0.18	2.9	<0.16	<0.38	<0.36	NM	NM	<0.17	<0.17	NM	NM	<0.21	<0.28	NM

Notes:

A full list of abbreviations is included in the table glossery

Table 2
Soil Analytical Results

Phase II Environmental Site Assessment
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

				Borings are ordered by Area:		I-35 Low-Level Bridge Demolition																						
Boring ID	Units	2014 Screening SLV	20xTCLP level	Tier 1 Residential SRV	Tier 2 Industrial SRV	GP-159	GP-159	GP-159	GP-162	GP-162	GP-162	GP-162	GP-162	GP-163	GP-163	GP-163	GP-163	GP-167	GP-168	GP-168	GP-172	GP-172	GP-172	GP-172	GP-173	GP-173	GP-173	GP-173
Field Sample ID						GP-159-1.5	GP-159-4	GP-159-8	GP-162-2	GP-162-6.5	GP-162-0.5	GP-162-1.5	GP-162-2	GP-163-3	GP-163-9	GP-163-0.5	GP-163-1.5	GP-167-1.5	GP-168-3	GP-168-7	GP-172-0.5	GP-172-1.5	GP-172-3	GP-172-6.5	GP-173-0.5	GP-173-1.5	GP-173-3	GP-173-6
Laboratory ID						10452519005	10452519001	10452519002	10446535011	10446535012	10446918001	10446918002	10447462006	10446535008	10446535009	10446918003	10446918004	10446750007	10446750008	10446750009	10473051008	10473051009	10473051010	10473051011	10473308009	10473308010	10473308011	10473308012
Sample Date						10/18/2018	10/18/2018	10/18/2018	9/6/2018	9/6/2018	9/10/2018	9/10/2018	9/12/2018	9/6/2018	9/6/2018	9/10/2018	9/10/2018	9/7/2018	9/7/2018	9/7/2018	5/1/2019	5/1/2019	5/1/2019	5/1/2019	5/2/2019	5/2/2019	5/2/2019	5/2/2019
DRO and GRO																												
Diesel Range Organics	mg/kg	The MPCA Unregulated Fill Criteria for DRO and GRO is <100 mg/kg				NM	10.6	NM	237 (T6)	<8.6	NM	NM	NM	30.9 (T6)	12.9 (T6)	NM	NM	33.6 (T6)	<9.7 (T6)	<10.8 (T6)	NM	NM	<8.8	<10.2	NM	NM	<9.5	<8.9
Gasoline Range Organics	mg/kg					NM	<12.1	<18.4	NM	<13.1	NM	NM	<19.3	<12.5	<13.3	NM	NM	<11.6	<11.9	<13.8	NM	NM	<11.2	<12.7	NM	NM	<3	<2.8
WDRO C10-C28 Silica Gel	mg/kg					NM	NM	<13.2	56.1 (T6)	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Metals																												
Antimony	mg/kg	5.4	NE	12	100	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Arsenic	mg/kg	5.8	100	9	20	NM	2.2 (M1)	2.3	<1.7	2.2	NM	NM	NM	5.9	2.1	NM	NM	6.7	2.2	1.9	4.4	2.0	2.0	1.8	3.6	4.4	2.0	2.2
Barium	mg/kg	1700	2000	1100	18000	NM	72.9	69.4	40.7	40.3	NM	NM	NM	149	35	NM	NM	56.1	41	44	68.2	34.3	28.1	24.7	279	77.4	30.5	35.4
Beryllium	mg/kg	2.7	NE	55	230	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium	mg/kg	8.8	20	25	200	NM	<0.17	<0.25	0.30	<0.19	NM	NM	NM	0.58	<0.17	NM	NM	0.21	<0.17	<0.19	<0.16	<0.15	<0.16	<0.18	<0.16	0.28	<0.17	<0.16
Chromium	mg/kg	36	100	87	650	NM	20.5	28.1	8.7	17.5	NM	NM	NM	15.9	15.7	NM	NM	13.3	15.9	19	15.2	12.1	12.2	9.8	20.3	30.2	13.6	17.3
Copper	mg/kg	700	NE	100	9000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Lead	mg/kg	2700	100	300	700	70.1	5.8 (M1)	4.3	10.7	4.1	36.6 (M1)	65	NM	104	24.7	101	140	104	4.8	3.9	61.3	19.1	4.9	2.6	290	131	5.4	6.7
Mercury	mg/kg	3.3	4	0.5	1.5	NM	0.028	<0.031	0.079	<0.025	NM	NM	NM	0.19	0.038	NM	NM	0.16	0.024	<0.025	0.085	<0.02	<0.023	<0.022	<0.021	0.16	<0.022	<0.022
Nickel	mg/kg	180	NE	560	2500	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Selenium	mg/kg	2.6	20	160	1300	NM	<1.1 (M1)	<1.6	<1.7	<1.2	NM	NM	NM	<1.1	<1.2	NM	NM	<1.1	<1.1	<1.3	<1	<0.98	<1.1	<2.4 (D3)	<1.1	<1.2	<1.1	<1.1
Silver	mg/kg	7.9	100	160	1300	NM	<0.55	<0.82	<0.87	<0.62	NM	NM	NM	<0.57	<0.58	NM	NM	<0.55	<0.55	<0.63	<0.52	<0.49	<0.53	<0.6	<0.54	<0.58	<0.56	<0.54
Zinc	mg/kg	3000	NE	8700	75000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TCLP Metals																												
Lead TCLP	mg/L	5 mg/L TCLP Lead hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<0.5	NM	NM	NM
Mercury TCLP	mg/L	0.2 mg/L TCLP Mercury hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium TCLP	mg/L	1.0 mg/L TCLP Cadmium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Chromium TCLP	mg/L	5.0 mg/L TCLP Chromium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
PCBs																												
PCBs (Polychlorinated Biphenyls)	mg/kg	NE	NE	1.2	8	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Herbicides and Pesticides																												
2,4-D	mg/kg	0.5	200	0.5	0.5	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Triclopyr	mg/kg	0.3	NE	0.3	0.3	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Semi-VOCs																												
1-Methylnaphthalene	mg/kg	NE	NE	NE	NE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2,4-Dinitrotoluene	mg/kg	0.013	2.6	50	355	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2-Methylnaphthalene	mg/kg	NE	NE	100	369	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Acenaphthene	mg/kg	81	NE	1200	5260	NM	<0.012	<0.018	<0.093	<0.013	NM	NM	NM	0.089	0.013	NM	NM	0.015	<0.012	<0.013	NM	NM	<0.012	<0.013	NM	NM	<0.012	<0.011
Acenaphthylene	mg/kg	NE	NE	NE	NE	NM	<0.012	<0.018	<0.093	<0.013	NM	NM	NM	<0.06	<0.012	NM	NM	0.037	<0.012	<0.013	NM	NM	<0.012	<0.013	NM	NM	<0.012	<0.011
Anthracene	mg/kg	1300	NE	7880	45400	NM	<0.012	<0.018	<0.093	<0.013	NM	NM	NM	0.29	0.034	NM	NM	0.062	<0.012	<0.013	NM	NM	<0.012	<0.013	NM	NM	0.014	<0.011
Benz(a)anthracene	mg/kg	NE	NE	NE	NE	NM	<0.012	<0.018	0.18	<0.013	NM	NM	NM	0.54	0.17	NM	NM	0.19	<0.012	<0.013	NM	NM	<0.012	<0.013	NM	NM	0.025	0.026
Benzo(a)pyrene	mg/kg	1.4	NE	2	3	NM	<0.012	<0.018	0.21	<0.013	NM	NM	NM	0.48	0.16	NM	NM	0.20	<0.012	<0.013	NM	NM	<0.012	<0.013	NM	NM	0.020	0.021
Benzo(b)fluoranthene	mg/kg	NE	NE	NE	NE	NM	<0.012	<0.018	0.28	<0.013	NM	NM	NM	0.62	0.20	NM	NM	0.29	<0.012	<0.013	NM	NM	<0.012	<0.013	NM	NM	0.032	0.027 (R1)
Benzo(g,h,i)perylene	mg/kg	NE	NE	NE	NE	NM	<0.012	<0.018	0.13	<0.013	NM	NM	NM	0.32	0.091	NM	NM	0.14	<0.012	<0.013	NM	NM	<0.012	<0.013	NM	NM	0.015	<0.011
Benzo(k)fluoranthene	mg/kg	NE	NE	NE	NE	NM	<0.012	<0.018	0.095	<0.013	NM	NM	NM	0.18	0.067	NM	NM	0.093	<0.012	<0.013	NM	NM	<0.012	<0.013	NM	NM	<0.012	<0.011
Carbazole	mg/kg	NE	NE	700	1310	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Chrysene	mg/kg	NE	NE	NE	NE	NM	<0.012	<0.018	0.16	<0.013	NM	NM	NM	0.44	0.14	NM	NM	0.19	<0.012	<0.013	NM	NM	<0.012	<0.013	NM	NM	0.019	0.02
Dibenz(a,h)anthracene	mg/kg	NE	NE	NE	NE	NM	<0.012	<0.018	<0.093	<0.013	NM	NM	NM	<0.06	0.02	NM	NM	<0.012	<0.012	<0.013	NM	NM	<0.012	<0.013	NM	NM	<0.012	<0.011
Dibenzofuran	mg/kg	NE	NE	104	810	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Fluoranthene	mg/kg	670	NE	1080	6800	NM	<0.012	<0.018	0.40	<0.013	NM	NM	NM	0.92	0.30	NM	NM	0.31	<0.012	<0.013	NM	NM	<0.012	<0.013	NM	NM	0.046	0.042 (M1,R1)
Fluorene	mg/kg	110	NE	850	4120	NM	<0.012	<0.018	<0.093	<0.013	NM	NM	NM	0.095	0.013	NM	NM	0.018	<0.012	<0.013	NM	NM	<0.012	<0.013	NM	NM	<0.012	<0.011
Indeno(1,2,3-cd)pyrene	mg/kg	NE	NE	NE	NE	NM	<0.012	<0.018	0.11	<0.013	NM	NM	NM	0.25	0.082	NM	NM	0.12	<0.012	<0.013	NM	NM	<0.012	<0.013	NM	NM	<0.012	<0.011
Naphthalene	mg/kg	NE	NE	NE	NE	NM	<0.012 (R1)	<0.018	<0.093	<0.013	NM	NM	NM	0.062	<0.012	NM	NM	0.081	<0.012	<0.013	NM	NM	<0.012	<0.013	NM	NM	<0.012	<0.011
Phenanthrene	mg/kg	NE	NE	NE	NE	NM	<0.012	<0.018	0.20	<0.013	NM	NM	NM	0.92	0.18	NM	NM	0.23	<0.012	<0.013	NM	NM	<0.012	<0.013	NM	NM	0.043	0.026
Pyrene	mg/kg	440	NE	890	5800	NM	<0.012	<0.018	0.32	<0.013	NM	NM	NM	0.94	0.33	NM	NM	0.26	<0.012	<0.013	NM	NM	<0.012	<0.013	NM	NM	0.039	0.04
BaP Equivalents																												
Benzo(a)pyrene Equivalents	mg/kg	1.4	NE	2	3	NM	<0	<0	0.28	<0	NM	NM	NM	0.64	0.22	NM	NM	0.27	<0	<0	NM	NM	<0	<0	NM	NM	0.026	0.027
VOCs																												
1,2,4-Trimethylbenzene	mg/kg	2.7	NE	8	25	NM	<0.056	<0.087	NM	<0.065	NM	NM	<0.097	<0.059	<0.064	NM	NM	0.064	<0.059	<0.069	NM	NM	<0.061	<0.063	NM	NM	<0.058	<0.059
1,3,5-Trimethylbenzene	mg/kg	2.7	NE	3	10	NM	<0.056	<0.087	NM	<0.065	NM	NM	<0.097	<0.059	<0.064	NM	NM	<0.057	<0.059	<0.069	NM	NM	<0.061	<0.063	NM	NM	<0.058	<0.059
Benzene	mg/kg	0.017	10	6	10	NM	<0.023	<0.035	NM	<0.026	NM	NM	<0.039	<0.024	<0.025	NM	NM	<0.023	<0.024	<0.028	NM	NM	<0.024	<0.025	NM	NM	<0.023	<0.023
Chlorobenzene	mg/kg	1.2	2000	11	32	NM	<0.056	<0.087	NM	<0.065	NM	NM	<0.097	<0.059	<0.064	NM	NM	<0.057	<0.059	<0.069	NM	NM	<0.061	<0.063	NM	NM	<0.058	<0.059
Diethyl Ether	mg/kg	0.51	NE	NE	NE	NM	<0.23	<0.35	NM	<0.26	NM	NM	<0.39	<0.24	<0.25	NM	NM	<0.23	<0.24	<0.28	NM	NM	<0.24	<0.25	NM	NM	<0.23	<0.23
Ethylbenzene	mg/kg	1.1	NE	200	200	NM	<0.056	<0.087	NM	<0.065	NM	NM	<0.097	<0.059	<0.064	NM	NM	<0.057	<0.059	<0.069	NM	NM	<0.061	<0.063	NM	NM	<0.058	<0.059
Isopropylbenzene	mg/kg	9.5	NE	30	87	NM	<0.056	<0.087	NM	<0.065	NM	NM	<0.097	<0.059	<0.064	NM	NM	<0.057	<0.059	<0.069	NM	NM	<0.061	<0.063	NM	NM	<0.058	<0.059
Naphthalene	mg/kg	4.5	NE	10	28	NM	<0.23	<0.35	NM	<0.26	NM	NM	<0.39	<0.24	<0.25	NM	NM	<0.23	<0.24	<0.28	NM	NM	<0.24	<0.25	NM	NM	<0.23	<0.23
n-Butylbenzene	mg/kg	NE	NE	30	92	NM	<0.056	<0.087	NM	<0.065	NM	NM	<0.097	<0.059	<0.064	NM	NM	<0.057	<0.059	<0.069	NM	NM	<0.061	<0.063	NM	NM	<0.058	<0.059
n-Propylbenzene	mg/kg	NE	NE	30	93	NM	<0.056	<0.087	NM	<0.065	NM	NM	<0.097	<0.059	<0.064	NM	NM	<0.057	<0.059	<0.069	NM	NM	<0.061	<0.063	NM	NM	<0.058	<0.059
p-Isopropyltoluene	mg/kg	NE	NE	NE	NE	NM	<0.056	<0.087	NM	<0.065	NM	NM	<0.097	<0.059	<0.064	NM	NM	<0.057	<0.059	<0.069	NM	NM	<0.061	<0.063	NM	NM	<0.058	<0.059
sec-Butylbenzene	mg/kg	NE	NE	25	70	NM	<0.056	<0.087	NM	<0.065	NM	NM	<0.097	<0.059	<0.064	NM	NM	<0.057	<0.059	<0.069	NM	NM	<0.061	<0.063	NM	NM	<0.058	<0.059
tert-Butylbenzene	mg/kg	NE	NE	30	90	NM	<0.056	<0.087	NM	<0.065	NM	NM	<0.097	<0.059	<0.064	NM	NM	<0.057	<0.059	<0.069	NM	NM	<0.061	<0.063	NM	NM	<0.058	<0.059
Tetrachloroethene	mg/kg	0.042	14	72	131	NM	<0.056	<0.087	NM	<0.26	NM	NM	<0.097	<0.24	<0.25	NM	NM	<0.23	<0.24	<0.28	NM	NM	<0.061	<0.063	NM	NM	<0.058	<0.059
Toluene	mg/kg	2.5	NE	107	305	NM	<0.056	<0.087	NM	<0.065	NM	NM	0.14	<0.059	0.089	NM	NM	0.085	<0.059	<0.069	NM	NM	<0.061	<0.063	NM	NM	<0.058	<0.059
Trichloroethene	mg/kg	0.0023	10	29	46	NM	<0.056	<0.087	NM	<0.065	NM	NM	<0.097	<0.059	<0.064	NM	NM	<0.057	<0.059	<0.069	NM	NM	<0.061	<0.063	NM	NM	<0.058	<0.059
Xylene (Total)	mg/kg	5.4	NE	45	130	NM	<0.17	<0.26	NM	<0.19	NM	NM	<0.29	<0.18	<0.19	NM	NM	<0.17	<0.18	<0.21	NM	NM	<0.18	<0.19	NM	NM	<0.17	<0.18

Notes:

A full list of abbreviations is included in the table glossery

Table 2
Soil Analytical Results

Phase II Environmental Site Assessment
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

				Borings are ordered by Area:		I-35 Low-Level Bridge Demolition			I-35 Low-Level Bridge Demolition																			
Boring ID	Units	2014 Screening SLV	20xTCLP level	Tier 1 Residential SRV	Tier 2 Industrial SRV	GP-173	SS-402	SS-403	GP-194	GP-194	GP-198	GP-198	GP-198	GP-198	GP-201	GP-201	GP-202	GP-202	GP-202	GP-202	GP-205	GP-205	GP-205	GP-205	GP-206	GP-206	GP-290	GP-290
Field Sample ID						GP-173-14	SS-402-1	SS-403-1	GP-194-3	GP-194-11	GP-198-0.5	GP-198-1.5	GP-198-5.5	GP-198-10	GP-201-1.5	GP-201-7.5	GP-202-0.5	GP-202-1.5	GP-202-3	GP-202-7	GP-205-0.5	GP-205-1.5	GP-205-3	GP-205-9	GP-206-3	GP-206-10	GP-290-3	GP-290-8
Laboratory ID						10473308013	10482563001	10482563002	10452340001	10452340002	10473870001	10473870002	10473870003	10473870004	10474106001	10474106002	10473594011	10473594012	10473594013	10473594014	10473594006	10473594007	10473594008	10473594009	10473490023	10473490024	10473490020	10473490021
Sample Date						5/2/2019	7/10/2019	7/10/2019	10/17/2018	10/17/2018	5/6/2019	5/6/2019	5/6/2019	5/6/2019	5/7/2019	5/7/2019	5/6/2019	5/6/2019	5/6/2019	5/6/2019	5/6/2019	5/6/2019	5/6/2019	5/6/2019	5/3/2019	5/3/2019	5/3/2019	5/3/2019
DRO and GRO																												
Diesel Range Organics	mg/kg	The MPCA Unregulated Fill Criteria for DRO and GRO is <100 mg/kg				NM	NM	NM	<8.4	NM	NM	NM	17.1 (T6)	NM	NM	<9.6	NM	NM	<9.5	<9.5	NM	NM	10.0 (T6)	NM	<9	12.1	283 (T6)	<9.5
Gasoline Range Organics	mg/kg					<4	NM	<11.1	<10.4	<12.8	NM	NM	<3.8	<3.6	<6	<5.8	NM	NM	<2.9	<3	NM	NM	<2.9	<3.5	<2.9	<2.8	<2.9	<3
WDRO C10-C28 Silica Gel	mg/kg					<13	NM	<9	NM	<9.6	NM	NM	NM	46.1 (T6)	<9.6	NM	NM	NM	NM	NM	NM	NM	NM	79.1 (T6)	NM	NM	NM	NM
Metals																												
Antimony	mg/kg	5.4	NE	12	100	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Arsenic	mg/kg	5.8	100	9	20	3.2	1.8	2.3	1.1	1.5	1.4	1.3	3.2	2.6	2.0	1.8	1.8	2.0	<1.1	<5.8 (D3)	1.4	<1.1	2.3	2.9	1.3	2.2	1.3	1.4
Barium	mg/kg	1700	2000	1100	18000	73.6	17.4	45.8	11.2	15.1	18.9	8.4	36	49.7	83	35.6	34	40	20.3	30.6	22	10.4	42.6	45	12	38.2	8.7	11.5
Beryllium	mg/kg	2.7	NE	55	230	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium	mg/kg	8.8	20	25	200	<0.24	<0.17	<0.16	<0.15	<0.17	<0.17	<0.16	<0.23	<0.21	<0.17	<0.17	<0.16	<0.17	<0.16	<0.87 (D3)	0.18	<0.16	<0.17	<0.21	<0.16	<0.16	<0.16	<0.17
Chromium	mg/kg	36	100	87	650	23.4	7.2	17.4	5.4	7.7	6.6	5.5	10.5	16.7	12.5	16.2	10.1	9.3	4.7	11.4	10.9	5.5	12.8	16.2	6.6	9.9	5.3	6.4
Copper	mg/kg	700	NE	100	9000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Lead	mg/kg	2700	100	300	700	12.6	6.0	13.7	0.95	2.2	24.8	13.8	3.0	6.6	8.9	3.4	13.6	13.9	4.1	3.3	47.1	2.8	10.6	29.4	4.3	17.8	1.5	1.7
Mercury	mg/kg	3.3	4	0.5	1.5	0.39	<0.021	<0.02	<0.018	<0.023	<0.022	<0.02	0.03	0.062	<0.023	<0.023	<0.021	0.026	<0.022	<0.023	<0.021	<0.022	0.029	0.19	<0.022	<0.02	<0.022	<0.022
Nickel	mg/kg	180	NE	560	2500	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Selenium	mg/kg	2.6	20	160	1300	<1.6	<1.1	<1.1	<1	<1.2	<1.1	<1.1	<1.5	<1.4	<1.1	<1.1	<1.1	<1.1	<1.1	<5.8 (D3)	<1.1	<1.1	<1.1	<1.4	<1.1	<1.1	<1.1	<1.1
Silver	mg/kg	7.9	100	160	1300	<0.79	<0.55	<0.54	<0.51	<0.58	<0.56	<0.54	<0.75	<0.71	<0.56	<0.56	<0.54	<0.56	<0.55	<2.9 (D3)	<0.54	<0.55	<0.56	<0.69	<0.53	<0.53	<0.53	<0.56
Zinc	mg/kg	3000	NE	8700	75000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TCLP Metals																												
Lead TCLP	mg/L	5 mg/L TCLP Lead hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Mercury TCLP	mg/L	0.2 mg/L TCLP Mercury hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium TCLP	mg/L	1.0 mg/L TCLP Cadmium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Chromium TCLP	mg/L	5.0 mg/L TCLP Chromium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
PCBs																												
PCBs (Polychlorinated Biphenyls)	mg/kg	NE	NE	1.2	8	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Herbicides and Pesticides																												
2,4-D	mg/kg	0.5	200	0.5	0.5	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Triclopyr	mg/kg	0.3	NE	0.3	0.3	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Semi-VOCs																												
1-Methylnaphthalene	mg/kg	NE	NE	NE	NE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2,4-Dinitrotoluene	mg/kg	0.013	2.6	50	355	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2-Methylnaphthalene	mg/kg	NE	NE	100	369	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Acenaphthene	mg/kg	81	NE	1200	5260	<0.016	<0.011	<0.011	<0.01	<0.013	NM	NM	<0.015	<0.014	<0.012	<0.012	NM	NM	<0.012	0.024	NM	NM	<0.011	0.03	<0.011	<0.011	<0.011	<0.012
Acenaphthylene	mg/kg	NE	NE	NE	NE	<0.016	<0.011	<0.011	<0.01	<0.013	NM	NM	<0.015	<0.014	<0.012	<0.012	NM	NM	<0.012	<0.012	NM	NM	<0.011	<0.014	<0.011	<0.011	<0.011	<0.012
Anthracene	mg/kg	1300	NE	7880	45400	<0.016	<0.011	<0.011	<0.01	<0.013	NM	NM	<0.015	<0.014	<0.012	<0.012	NM	NM	<0.012	0.068	NM	NM	0.020	0.095	<0.011	0.020	<0.011	<0.012
Benz(a)anthracene	mg/kg	NE	NE	NE	NE	0.018	0.030	0.019	<0.01	<0.013	NM	NM	<0.015	0.023	0.035	<0.012	NM	NM	0.041	0.13	NM	NM	0.058	0.32	<0.011	0.060	<0.011	<0.012
Benzo(a)pyrene	mg/kg	1.4	NE	2	3	0.02	0.035	0.020	<0.01	<0.013	NM	NM	<0.015	0.020	0.029	<0.012	NM	NM	0.032	0.091	NM	NM	0.048	0.27	<0.011	0.056	<0.011	<0.012
Benzo(b)fluoranthene	mg/kg	NE	NE	NE	NE	0.025	0.055	0.032	<0.01	<0.013	NM	NM	<0.015	0.028	0.044 (M1)	<0.012	NM	NM	0.043	0.11	NM	NM	0.059	0.34	<0.011	0.084	<0.011	<0.012
Benzo(g,h,i)perylene	mg/kg	NE	NE	NE	NE	0.018	0.031	0.016	<0.01	<0.013	NM	NM	<0.015	<0.014	0.023	<0.012	NM	NM	0.023	0.043	NM	NM	0.031	0.16	<0.011	0.049	<0.011	<0.012
Benzo(k)fluoranthene	mg/kg	NE	NE	NE	NE	<0.016	0.020	0.011	<0.01	<0.013	NM	NM	<0.015	<0.014	0.018	<0.012	NM	NM	0.021	0.053	NM	NM	0.031	0.16	<0.011	0.037	<0.011	<0.012
Carbazole	mg/kg	NE	NE	700	1310	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Chrysene	mg/kg	NE	NE	NE	NE	0.021	0.035	0.021	<0.01	<0.013	NM	NM	<0.015	0.026	0.030	<0.012	NM	NM	0.039	0.10	NM	NM	0.050	0.30	<0.011	0.065	<0.011	<0.012
Dibenz(a,h)anthracene	mg/kg	NE	NE	NE	NE	<0.016	<0.011	<0.011	<0.01	<0.013	NM	NM	<0.015	<0.014	<0.012	<0.012	NM	NM	<0.012	0.014	NM	NM	<0.011	0.042	<0.011	0.014	<0.011	<0.012
Dibenzofuran	mg/kg	NE	NE	104	810	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Fluoranthene	mg/kg	670	NE	1080	6800	0.046	0.053	0.039	<0.01	<0.013	NM	NM	<0.015	0.044	0.063 (M1)	<0.012	NM	NM	0.065	0.24	NM	NM	0.10	0.62	<0.011	0.12	<0.011	<0.012
Fluorene	mg/kg	110	NE	850	4120	<0.016	<0.011	<0.011	<0.01	<0.013	NM	NM	<0.015	<0.014	<0.012	<0.012	NM	NM	<0.012	0.034	NM	NM	<0.011	0.036	<0.011	<0.011	<0.011	<0.012
Indeno(1,2,3-cd)pyrene	mg/kg	NE	NE	NE	NE	<0.016	0.024	0.013	<0.01	<0.013	NM	NM	<0.015	<0.014	0.018	<0.012	NM	NM	0.020	0.039	NM	NM	0.027	0.14	<0.011	0.041	<0.011	<0.012
Naphthalene	mg/kg	NE	NE	NE	NE	<0.016	<0.011	<0.011	<0.01 (M1)	<0.013	NM	NM	<0.015	<0.014	0.012	<0.012	NM	NM	0.012	0.038	NM	NM	<0.011	0.019	<0.011	0.014	<0.011	<0.012
Phenanthrene	mg/kg	NE	NE	NE	NE	0.027	0.036	0.020	<0.01	<0.013	NM	NM	<0.015	0.017	0.047	<0.012	NM	NM	0.040	0.24	NM	NM	0.057	0.37	<0.011	0.083	<0.011	<0.012
Pyrene	mg/kg	440	NE	890	5800	0.041	0.05	0.036	<0.01	<0.013	NM	NM	<0.015	0.044	0.054 (M1)	<0.012	NM	NM	0.057	0.18	NM	NM	0.088	0.56	<0.011	0.11	<0.011	<0.012
BaP Equivalents																												
Benzo(a)pyrene Equivalents	mg/kg	1.4	NE	2	3	0.025	0.048	0.028	<0	<0	NM	NM	<0	0.025	0.041	<0	NM	NM	0.045	0.13	NM	NM	0.066	0.39	<0	0.087	<0	<0
VOCs																												
1,2,4-Trimethylbenzene	mg/kg	2.7	NE	8	25	<0.08	NM	<0.057	<0.056	<0.062	NM	NM	<0.076	<0.072	<0.059	<0.06	NM	NM	<0.06	<0.059	NM	NM	<0.058	<0.069	<0.058	<0.057	<0.059	<0.059
1,3,5-Trimethylbenzene	mg/kg	2.7	NE	3	10	<0.08	NM	<0.057	<0.056	<0.062	NM	NM	<0.076	<0.072	<0.059	<0.06	NM	NM	<0.06	<0.059	NM	NM	<0.058	<0.069	<0.058	<0.057	<0.059	<0.059
Benzene	mg/kg	0.017	10	6	10	<0.032	NM	<0.023	<0.022	<0.025	NM	NM	<0.03	<0.029	<0.024	<0.024	NM	NM	<0.024	<0.024	NM	NM	<0.023	<0.028	<0.023	<0.023	<0.024	<0.024
Chlorobenzene	mg/kg	1.2	2000	11	32	<0.08	NM	<0.057	<0.056	<0.062	NM	NM	<0.076	<0.072	<0.059	<0.06	NM	NM	<0.06	<0.059	NM	NM	<0.058	<0.069	<0.058	<0.057	<0.059	<0.059
Diethyl Ether	mg/kg	0.51	NE	NE	NE	<0.32	NM	<0.23	<0.22	<0.25	NM	NM	<0.3	<0.29	<0.24	<0.24	NM	NM	<0.24	<0.24	NM	NM	<0.23	<0.28	<0.23	<0.23	<0.24	<0.24
Ethylbenzene	mg/kg	1.1	NE	200	200	<0.08	NM	<0.057	<0.056	<0.062	NM	NM	<0.076	<0.072	<0.059	<0.06	NM	NM	<0.06	<0.059	NM	NM	<0.058	<0.069	<0.058	<0.057	<0.059	<0.059
Isopropylbenzene	mg/kg	9.5	NE	30	87	<0.08	NM	<0.057	<0.056	<0.062	NM	NM	<0.076	<0.072	<0.059	<0.06	NM	NM	<0.06	<0.059	NM	NM	<0.058	<0.069	<0.058	<0.057	<0.059	<0.059
Naphthalene	mg/kg	4.5	NE	10	28	<0.32	NM	<0.23	<0.22	<0.25	NM	NM	<0.3	<0.29	<0.24	<0.24	NM	NM	<0.24	<0.24	NM	NM	<0.23	<0.28	<0.23	<0.23	<0.24	<0.24
n-Butylbenzene	mg/kg	NE	NE	30	92	<0.08	NM	<0.057	<0.056	<0.062	NM	NM	<0.076	<0.072	<0.059	<0.06	NM	NM	<0.06	<0.059	NM	NM	<0.058	<0.069	<0.058	<0.057	<0.059	<0.059
n-Propylbenzene	mg/kg	NE	NE	30	93	<0.08	NM	<0.057	<0.056	<0.062	NM	NM	<0.076	<0.072	<0.059	<0.06	NM	NM	<0.06	<0.059	NM	NM	<0.058	<0.069	<0.058	<0.057	<0.059	<0.059
p-Isopropyltoluene	mg/kg	NE	NE	NE	NE	<0.08	NM	<0.057	<0.056	<0.062	NM	NM	<0.076	<0.072	<0.059	<0.06	NM	NM	<0.06	<0.059	NM	NM	<0.058	<0.069	<0.058	<0.057	<0.059	<0.059
sec-Butylbenzene	mg/kg	NE	NE	25	70	<0.08	NM	<0.057	<0.056	<0.062	NM	NM	<0.076	<0.072	<0.059	<0.06	NM	NM	<0.06	<0.059	NM	NM	<0.058	<0.069	<0.058	<0.057	<0.059	<0.059
tert-Butylbenzene	mg/kg	NE	NE	30	90	<0.08	NM	<0.057	<0.056	<0.062	NM	NM	<0.076	<0.072	<0.059	<0.06	NM	NM	<0.06	<0.059	NM	NM	<0.058	<0.069	<0.058	<0.057	<0.059	<0.059
Tetrachloroethene	mg/kg	0.042	14	72	131	<0.08	NM	<0.057	<0.056	<0.062	NM	NM	<0.076	<0.072	<0.059	<0.06	NM	NM	<0.06	<0.059	NM	NM	<0.058	<0.069	<0.058	<0.057	<0.059	<0.059
Toluene	mg/kg	2.5	NE	107	305	<0.08	NM	<0.057	<0.056	<0.062	NM	NM	<0.076	<0.072	<0.059	<0.06	NM	NM	<0.06	<0.059	NM	NM	<0.058	0.092	<0.058	<0.057	<0.059	<0.059
Trichloroethene	mg/kg	0.0023	10	29	46	<0.08	NM	<0.057	<0.056	<0.062	NM	NM	<0.076	<0.072	<0.059	<0.06	NM	NM	<0.06	<0.059	NM	NM	<0.058	<0.069	<0.058	<0.057	<0.059	<0.059
Xylene (Total)	mg/kg	5.4	NE	45	130	<0.24	NM	<0.17	<0.17	<0.19	NM	NM	<0.23	<0.22	<0.18	<0.18	NM	NM	<0.18	<0.18	NM	NM	<0.17	<0.21	<0.17	<0.17	<0.18	<0.18

Notes:

A full list of abbreviations is included in the table glossery

Table 2
Soil Analytical Results

Phase II Environmental Site Assessment
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

				Borings are ordered by Area:		I-35 Low-Level Bridge Demolition															I-35 Low-Level Bridge Demolition							
Boring ID	Units	2014 Screening SLV	20xTCLP level	Tier 1 Residential SRV	Tier 2 Industrial SRV	GP-292	GP-292	GP-208	GP-208	GP-223	GP-223	GP-223	GP-223	GP-222	GP-222	GP-222	GP-221	GP-221	GP-221	GP-221	GP-210	GP-210	GP-209	GP-209	GP-209	GP-209	GP-220	GP-220
Field Sample ID						GP-292-3	GP-292-10	GP-208-2	GP-208-7	GP-223-0.5	GP-223-1.5	GP-223-2.5	GP-223-7	GP-222-0.5	GP-222-1.5	GP-222-2.5	GP-221-0.5	GP-221-1.5	GP-221-4	GP-221-11.5	GP-210-0.5	GP-210-1.5	GP-209-1.5	GP-209-3	GP-209-05	GP-209-14	GP-220-0.5	GP-220-1.5
Laboratory ID						10473490011	10473490012	10473490016	10473490017	10473308025	10473308026	10473308027	10473308028	10473308020	10473308024	10473308021	10473308015	10473308016	10473308017	10473308018	10473308007	10473308008	10473308003	10473308004	10473308002	10473308005	10475884015	10475884016
Sample Date						5/3/2019	5/3/2019	5/3/2019	5/3/2019	5/2/2019	5/2/2019	5/2/2019	5/2/2019	5/2/2019	5/2/2019	5/2/2019	5/2/2019	5/2/2019	5/2/2019	5/2/2019	5/1/2019	5/1/2019	5/1/2019	5/1/2019	5/1/2019	5/1/2019	5/21/2019	5/21/2019
DRO and GRO																												
Diesel Range Organics	mg/kg	The MPCA Unregulated Fill Criteria for DRO and GRO is <100 mg/kg				<10.1	NM	<10.2	<10.4	NM	NM	<9.9	<9.5	NM	NM	<9.4	NM	NM	<10	127 (T7,T6)	NM	40.9 (T6)	NM	<9.2	NM	NM	NM	NM
Gasoline Range Organics	mg/kg					<3	<4.4	<3.1	<3.3	NM	NM	<3.2	<2.9	NM	NM	<2.9	NM	NM	<3.1	5.80 (G+)	NM	5.40	NM	<2.9	NM	<3.6	NM	NM
WDRO C10-C28 Silica Gel	mg/kg					NM	77.1 (T6)	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<11.2	NM	NM
Metals																												
Antimony	mg/kg	5.4	NE	12	100	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Arsenic	mg/kg	5.8	100	9	20	2.0	6.3	1.5	3.2	2.9	3.1	2.5	2.1	2.1	2.4	1.5	2.3	1.7	2.2	2.2	2.9	2.7	3.3	2.6	<5.6 (D3)	2.3	2.1	1.9
Barium	mg/kg	1700	2000	1100	18000	31	82.4	25.6	79.6	46.6	69.8	41.4	24	33	63.1	18.9	30.7	19.5	31.6	27.5	72.9	62.5	131	50.4	58.9 (M1)	43.7	52.9	29.6
Beryllium	mg/kg	2.7	NE	55	230	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium	mg/kg	8.8	20	25	200	<0.17	0.38	<0.17	<0.19	0.19	<0.2	<0.18	<0.17	<0.15	<0.17	<0.17	<0.16	<0.18	<0.18	<0.17	<0.16	0.2	<0.18	<0.17	<0.85 (D3)	<0.2	<0.16	0.16
Chromium	mg/kg	36	100	87	650	9.1	18.4	14.5	25.6	20.8	20.1	12.4	11	13.9	7.8	6.3	14.1	8.1	16.9	9.8	18.6	19.3	31.5	23.8	23	14.4	13	11.8
Copper	mg/kg	700	NE	100	9000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Lead	mg/kg	2700	100	300	700	8.9	129	3.8	5.2	48.7	15.7	11.1	4.8	26.2	38.7	2.9	5.7	2.3	2.7	35.3	27.4	29.4	8.8	16.9	25.5	17.4	341	6.9
Mercury	mg/kg	3.3	4	0.5	1.5	<0.021	0.64	<0.022	<0.025	0.036	<0.027	<0.022	<0.023	<0.019	0.03	<0.023	<0.021	<0.024	<0.022	0.17	0.14	0.065	0.026	0.062	0.023	0.067	NM	NM
Nickel	mg/kg	180	NE	560	2500	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Selenium	mg/kg	2.6	20	160	1300	<1.1	<1.7	<1.1	<1.3	<1.2	<1.3	<1.2	<1.1	<1	<1.1	<1.1	<1.1	<1.2	<1.2	<1.1	<1.1	<1.1	<1.2	<1.1	<8.6 (D3)	<1.3	<1.1	<1.1
Silver	mg/kg	7.9	100	160	1300	<0.56	<0.84	<0.57	<0.63	<0.58	<0.67	<0.61	<0.57	<0.5	<0.56	<0.57	<0.54	<0.59	<0.61	<0.57	<0.55	<0.55	<0.6	<0.56	<2.8 (D3)	<0.67	<0.53	<0.54
Zinc	mg/kg	3000	NE	8700	75000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TCLP Metals																												
Lead TCLP	mg/L	5 mg/L TCLP Lead hazardous limit				NM	<0.5	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	79.1	NM
Mercury TCLP	mg/L	0.2 mg/L TCLP Mercury hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium TCLP	mg/L	1.0 mg/L TCLP Cadmium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Chromium TCLP	mg/L	5.0 mg/L TCLP Chromium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
PCBs																												
PCBs (Polychlorinated Biphenyls)	mg/kg	NE	NE	1.2	8	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	BRL	NM	NM	NM	NM	NM	NM	NM	NM
Herbicides and Pesticides																												
2,4-D	mg/kg	0.5	200	0.5	0.5	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Triclopyr	mg/kg	0.3	NE	0.3	0.3	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Semi-VOCs																												
1-Methylnaphthalene	mg/kg	NE	NE	NE	NE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<0.41	NM	NM	NM	0.54	NM	NM	NM	NM
2,4-Dinitrotoluene	mg/kg	0.013	2.6	50	355	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<0.41	NM	NM	NM	<0.38	NM	NM	NM	NM
2-Methylnaphthalene	mg/kg	NE	NE	100	369	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<0.41	NM	NM	NM	0.78	NM	NM	NM	NM
Acenaphthene	mg/kg	81	NE	1200	5260	0.048	0.38	<0.012	<0.013	NM	NM	<0.012	<0.012	NM	NM	<0.012	NM	NM	<0.012	<0.41	NM	0.050	NM	<0.38	NM	<0.014	NM	NM
Acenaphthylene	mg/kg	NE	NE	NE	NE	0.014	0.075	<0.012	<0.013	NM	NM	<0.012	<0.012	NM	NM	<0.012	NM	NM	<0.012	<0.41	NM	0.047	NM	<0.38	NM	<0.014	NM	NM
Anthracene	mg/kg	1300	NE	7880	45400	0.078	0.75	<0.012	<0.013	NM	NM	<0.012	<0.012	NM	NM	<0.012	NM	NM	<0.012	<0.41	NM	0.10	NM	<0.38	NM	<0.014	NM	NM
Benz(a)anthracene	mg/kg	NE	NE	NE	NE	0.17	3.2	<0.012	<0.013	NM	NM	<0.012	<0.012	NM	NM	<0.012	NM	NM	<0.012	<0.41	NM	0.33	NM	<0.38	NM	0.016	NM	NM
Benzo(a)pyrene	mg/kg	1.4	NE	2	3	0.14	2.1	<0.012	<0.013	NM	NM	<0.012	<0.012	NM	NM	0.014	NM	NM	<0.012	<0.41	NM	0.24	NM	<0.38	NM	0.017	NM	NM
Benzo(b)fluoranthene	mg/kg	NE	NE	NE	NE	0.19	3.2	<0.012	<0.013	NM	NM	0.013	<0.012	NM	NM	0.017	NM	NM	<0.012	<0.41	NM	0.46	NM	<0.38	NM	0.026	NM	NM
Benzo(g,h,i)perylene	mg/kg	NE	NE	NE	NE	0.097	1.6	<0.012	<0.013	NM	NM	<0.012	<0.012	NM	NM	<0.012	NM	NM	<0.012	<0.41	NM	0.21	NM	<0.38	NM	<0.014	NM	NM
Benzo(k)fluoranthene	mg/kg	NE	NE	NE	NE	0.081	1.2	<0.012	<0.013	NM	NM	<0.012	<0.012	NM	NM	<0.012	NM	NM	<0.012	<0.41	NM	0.21	NM	<0.38	NM	<0.014	NM	NM
Carbazole	mg/kg	NE	NE	700	1310	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<0.41	NM	NM	NM	<0.38	NM	NM	NM	NM
Chrysene	mg/kg	NE	NE	NE	NE	0.15	2.5	<0.012	<0.013	NM	NM	0.014	<0.012	NM	NM	0.012	NM	NM	<0.012	<0.41	NM	0.31	NM	<0.38	NM	0.015	NM	NM
Dibenz(a,h)anthracene	mg/kg	NE	NE	NE	NE	0.029	0.41	<0.012	<0.013	NM	NM	<0.012	<0.012	NM	NM	<0.012	NM	NM	<0.012	<0.41	NM	0.056	NM	<0.38	NM	<0.014	NM	NM
Dibenzofuran	mg/kg	NE	NE	104	810	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<0.41	NM	NM	NM	<0.38	NM	NM	NM	NM
Fluoranthene	mg/kg	670	NE	1080	6800	0.38	5.5	<0.012	<0.013	NM	NM	0.027	<0.012	NM	NM	0.021	NM	NM	<0.012	<0.41	NM	0.70	NM	0.79	NM	0.029	NM	NM
Fluorene	mg/kg	110	NE	850	4120	0.044	0.38	<0.012	<0.013	NM	NM	<0.012	<0.012	NM	NM	<0.012	NM	NM	<0.012	<0.41	NM	0.048	NM	<0.38	NM	<0.014	NM	NM
Indeno(1,2,3-cd)pyrene	mg/kg	NE	NE	NE	NE	0.089	1.2	<0.012	<0.013	NM	NM	<0.012	<0.012	NM	NM	<0.012	NM	NM	<0.012	<0.41	NM	0.18	NM	<0.38	NM	<0.014	NM	NM
Naphthalene	mg/kg	NE	NE	NE	NE	0.016	0.18	<0.012	<0.013	NM	NM	0.046	<0.012	NM	NM	<0.012	NM	NM	<0.012	<0.41	NM	0.045	NM	1.7	NM	<0.014	NM	NM
Phenanthrene	mg/kg	NE	NE	NE	NE	0.36	3.6	<0.012	<0.013	NM	NM	0.037	<0.012	NM	NM	<0.012	NM	NM	<0.012	<0.41	NM	0.51	NM	0.68	NM	0.018	NM	NM
Pyrene	mg/kg	440	NE	890	5800	0.33	5.7	<0.012	<0.013	NM	NM	0.022	<0.012	NM	NM	0.018	NM	NM	<0.012	0.48	NM	0.59	NM	0.66	NM	0.029	NM	NM
BaP Equivalents																												
Benzo(a)pyrene Equivalents	mg/kg	1.4	NE	2	3	0.21	3.2	<0	<0	NM	NM	0.0014	<0	NM	NM	0.016	NM	NM	<0	<0	NM	0.39	NM	<0	NM	0.021	NM	NM
VOCs																												
1,2,4-Trimethylbenzene	mg/kg	2.7	NE	8	25	<0.063	<0.085	<0.065	<0.067	NM	NM	0.19	<0.059	NM	NM	<0.061	NM	NM	<0.061	<0.06	NM	<0.059	NM	<0.059	NM	<0.072	NM	NM
1,3,5-Trimethylbenzene	mg/kg	2.7	NE	3	10	<0.063	<0.085	<0.065	<0.067	NM	NM	0.074	<0.059	NM	NM	<0.061	NM	NM	<0.061	<0.06	NM	<0.059	NM	<0.059	NM	<0.072	NM	NM
Benzene	mg/kg	0.017	10	6	10	<0.025	<0.034	<0.026	<0.027	NM	NM	<0.025	<0.023	NM	NM	<0.024	NM	NM	<0.024	<0.024	NM	<0.024	NM	<0.024	NM	<0.029	NM	NM
Chlorobenzene	mg/kg	1.2	2000	11	32	<0.063	<0.085	<0.065	<0.067	NM	NM	<0.063	<0.059	NM	NM	<0.061	NM	NM	<0.061	<0.06	NM	<0.059	NM	<0.059	NM	<0.072	NM	NM
Diethyl Ether	mg/kg	0.51	NE	NE	NE	<0.25	<0.34	<0.26	<0.27	NM	NM	<0.25	<0.23	NM	NM	<0.24	NM	NM	<0.24	<0.24	NM	<0.24	NM	<0.24	NM	<0.29	NM	NM
Ethylbenzene	mg/kg	1.1	NE	200	200	<0.063	<0.085	<0.065	<0.067	NM	NM	<0.063	<0.059	NM	NM	<0.061	NM	NM	<0.061	<0.06	NM	<0.059	NM	<0.059	NM	<0.072	NM	NM
Isopropylbenzene	mg/kg	9.5	NE	30	87	<0.063	<0.085	<0.065	<0.067	NM	NM	<0.063	<0.059	NM	NM	<0.061	NM	NM	<0.061	<0.06	NM	<0.059	NM	<0.059	NM	<0.072	NM	NM
Naphthalene	mg/kg	4.5	NE	10	28	<0.25	<0.34	<0.26	<0.27	NM	NM	<0.25	<0.23	NM	NM	<0.24	NM	NM	<0.24	<0.24	NM	<0.24	NM	0.40	NM	<0.29	NM	NM
n-Butylbenzene	mg/kg	NE	NE	30	92	<0.063	<0.085	<0.065	<0.067	NM	NM	<0.063	<0.059	NM	NM	<0.061	NM	NM	<0.061	<0.06	NM	<0.059	NM	<0.059	NM	<0.072	NM	NM
n-Propylbenzene	mg/kg	NE	NE	30	93	<0.063	<0.085	<0.065	<0.067	NM	NM	<0.063	<0.059	NM	NM	<0.061	NM	NM	<0.061	<0.06	NM	<0.059	NM	<0.059	NM	<0.072	NM	NM
p-Isopropyltoluene	mg/kg	NE	NE	NE	NE	<0.063	<0.085	<0.065	<0.067	NM	NM	<0.063	<0.059	NM	NM	<0.061	NM	NM	<0.061	<0.06	NM	<0.059	NM	<0.059	NM	<0.072	NM	NM
sec-Butylbenzene	mg/kg	NE	NE	25	70	<0.063	<0.085	<0.065	<0.067	NM	NM	<0.063	<0.059	NM	NM	<0.061	NM	NM	<0.061	<0.06	NM	<0.059	NM	<0.059	NM	<0.072	NM	NM
tert-Butylbenzene	mg/kg	NE	NE	30	90	<0.063	<0.085	<0.065	<0.067	NM	NM	<0.063	<0.059	NM	NM	<0.061	NM	NM	<0.061	<0.06	NM	<0.059	NM	<0.059	NM	<0.072	NM	NM
Tetrachloroethene	mg/kg	0.042	14	72	131	<0.063	<0.085	<0.065	<0.067	NM	NM	<0.063	<0.059	NM	NM	<0.061	NM	NM	<0.061	<0.06	NM	<0.059	NM	<0.059	NM	<0.072	NM	NM
Toluene	mg/kg	2.5	NE	107	305	<0.063	0.10	<0.065	<0.067	NM	NM	0.14	<0.059	NM	NM	<0.061	NM	NM	<0.061	0.094	NM	<0.059	NM	<0.059	NM	<0.072	NM	NM
Trichloroethene	mg/kg	0.0023	10	29	46	<0.063	<0.085	<0.065	<0.067	NM	NM	<0.063	<0.059	NM	NM	<0.061	NM	NM	<0.061	<0.06	NM	<0.059	NM	<0.059	NM	<0.072	NM	NM
Xylene (Total)	mg/kg	5.4	NE	45	130	<0.19	<0.25	<0.2	<0.2	NM	NM	0.34	<0.18	NM	NM	<0.18	NM	NM	<0.18	<0.18	NM	<0.18	NM	<0.18	NM	<0.22	NM	NM

Notes:

A full list of abbreviations is included in the table glossery

Table 2
Soil Analytical Results

Phase II Environmental Site Assessment
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

Borings are ordered by Area:						I-35 Low-Level Bridge Demolition																						
Boring ID	Units	2014 Screening SLV	20xTCLP level	Tier 1 Residential SRV	Tier 2 Industrial SRV	GP-220	GP-220	GP-220	GP-220	GP-220	GP-212	GP-212	GP-212	GP-212	GP-212	GP-212	GP-212	GP-213	GP-213	GP-213	GP-213	GP-213	GP-213	GP-174	GP-174	GP-175	GP-175	GP-175
Field Sample ID						GP-220-2	GP-220-8	GP-220-11.5	GP-220-0.5	GP-220-1.5	GP-212-0.5	GP-212-1.5	GP-212-3	GP-212-7	GP-212-15	GP-212-0.5	GP-212-1.5	GP-213-0.5	GP-213-1.5	GP-213-3	GP-213-7.5	GP-213-0.5	GP-213-1.5	GP-174-1	GP-174-4	GP-175-1	GP-175-3	GP-175-0.5
Laboratory ID						10475884017	10475884018	10475884019	10479785009	10479785010	10475884010	10475884011	10475884012	10475884013	10475884014	10479785005	10479785006	10475884004	10475884005	10475884006	10475884007	10479785007	10479785008	10446750002	10446750001	10446535020	10446535021	10446750027
Sample Date						5/21/2019	5/21/2019	5/21/2019	6/17/2019	6/17/2019	5/21/2019	5/21/2019	5/21/2019	5/21/2019	5/21/2019	6/17/2019	6/17/2019	5/21/2019	5/21/2019	5/21/2019	5/21/2019	6/17/2019	6/17/2019	9/6/2018	9/6/2018	9/6/2018	9/6/2018	9/7/2018
DRO and GRO																												
Diesel Range Organics	mg/kg	The MPCA Unregulated Fill Criteria for DRO and GRO is <100 mg/kg				53.3 (T7,T6)	<10.5	NM	NM	NM	NM	NM	<8.9	83.8 (T7,T6)	NM	NM	NM	NM	NM	**446 (T7)**	65.9 (T7,T6)	NM	NM	58.5 (T6)	35.2 (T6)	28.2 (T6)	<9.3	NM
Gasoline Range Organics	mg/kg					<11.2	<13.1	<15.6	NM	NM	NM	NM	48.4 (G-,G+)	**254 (G-,G+)**	<13.9	NM	NM	NM	NM	**1280 (G-)**	139 (G-,G+)	NM	NM	<12.4	<11.4	<13.4	<11.5	NM
WDRO C10-C28 Silica Gel	mg/kg					NM	NM	<11.6	NM	NM	NM	NM	NM	NM	<11.7	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Metals																												
Antimony	mg/kg	5.4	NE	12	100	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Arsenic	mg/kg	5.8	100	9	20	3.1	3.2	2.8	NM	NM	1.9	2.1	2.1	3.1	*<6.9 (D3)*	NM	NM	2.2	2.0	2.9	*<6.8 (D3)*	NM	NM	<5.7 (D3)	<5.3 (D3)	*7.5*	1.4	NM
Barium	mg/kg	1700	2000	1100	18000	48	131	71.6	NM	NM	33.8	41.7	36.3	75.9	175	NM	NM	40	37.4	63.2	153	NM	NM	295	32.9	275	19	NM
Beryllium	mg/kg	2.7	NE	55	230	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium	mg/kg	8.8	20	25	200	<0.16	<0.19	<0.21	NM	NM	<0.16	<0.16	<0.16	<0.22	<1 (D3)	NM	NM	<0.16	<0.16	0.19	<1 (D3)	NM	NM	<0.86 (D3)	<0.8 (D3)	0.30	<0.16	NM
Chromium	mg/kg	36	100	87	650	12	33.5	21.5	NM	NM	11.4	16.4	13.6	22.1	*37*	NM	NM	12.6	15.6	13.9	*37.7*	NM	NM	13.8	21.9	10.6	9.5	NM
Copper	mg/kg	700	NE	100	9000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Lead	mg/kg	2700	100	300	700	23.1	8.9	16.9	NM	NM	4.0	3.5	3.8	26.7	9.0	NM	NM	11	4.3	47.7	8.5	NM	NM	35.9	18.2	92.8	8.9	157
Mercury	mg/kg	3.3	4	0.5	1.5	0.6	<0.0263	0.0548	0.053	<0.02	NM	NM	<0.0223	0.143	<0.0285	<0.021	<0.02	NM	NM	0.0416	0.115	0.032	<0.021	0.044	<0.02	0.087	<0.02	NM
Nickel	mg/kg	180	NE	560	2500	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Selenium	mg/kg	2.6	20	160	1300	<1.1	<1.2	<1.4	NM	NM	<1.1	<1	<1.1	<1.5	*<6.9 (D3)*	NM	NM	<1.1	<1	<1.1	*<6.8 (D3)*	NM	NM	*<5.7 (D3)*	*<5.3 (D3)*	<1.3	<1	NM
Silver	mg/kg	7.9	100	160	1300	<0.53	<0.62	<0.69	NM	NM	<0.53	<0.52	<0.53	<0.73	<3.5 (D3)	NM	NM	<0.55	<0.52	<0.53	<3.4 (D3)	NM	NM	<2.9 (D3)	<2.7 (D3)	<0.65	<0.52	NM
Zinc	mg/kg	3000	NE	8700	75000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TCLP Metals																												
Lead TCLP	mg/L	5 mg/L TCLP Lead hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Mercury TCLP	mg/L	0.2 mg/L TCLP Mercury hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium TCLP	mg/L	1.0 mg/L TCLP Cadmium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Chromium TCLP	mg/L	5.0 mg/L TCLP Chromium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
PCBs																												
PCBs (Polychlorinated Biphenyls)	mg/kg	NE	NE	1.2	8	NM	NM	NM	NM	NM	NM	NM	BRL	BRL	NM	NM	NM	NM	NM	BRL	BRL	NM	NM	NM	NM	NM	NM	NM
Herbicides and Pesticides																												
2,4-D	mg/kg	0.5	200	0.5	0.5	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Triclopyr	mg/kg	0.3	NE	0.3	0.3	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Semi-VOCs																												
1-Methylnaphthalene	mg/kg	NE	NE	NE	NE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2,4-Dinitrotoluene	mg/kg	0.013	2.6	50	355	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2-Methylnaphthalene	mg/kg	NE	NE	100	369	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Acenaphthene	mg/kg	81	NE	1200	5260	0.0274	<0.00789	<0.0114	NM	NM	NM	NM	<0.00668	0.0196	<0.00854	NM	NM	NM	NM	0.0452	<0.00843	NM	NM	0.040 (M1)	<0.011	0.082	<0.011	NM
Acenaphthylene	mg/kg	NE	NE	NE	NE	<0.00723	<0.00789	<0.0114	NM	NM	NM	NM	<0.00668	0.0193	<0.00854	NM	NM	NM	NM	<0.00658	<0.00843	NM	NM	0.022 (M1,R1)	<0.011	0.072	<0.011	NM
Anthracene	mg/kg	1300	NE	7880	45400	0.0703	<0.00789	<0.0114	NM	NM	NM	NM	<0.00668	0.0325	<0.00854	NM	NM	NM	NM	0.0484	<0.00843	NM	NM	0.12 (M1)	0.034	0.31	<0.011	NM
Benz(a)anthracene	mg/kg	NE	NE	NE	NE	0.217	<0.00789	<0.0114	NM	NM	NM	NM	0.0121	0.0697	<0.00854	NM	NM	NM	NM	0.148	<0.00843	NM	NM	0.32 (M1)	0.090	0.44	<0.011	NM
Benzo(a)pyrene	mg/kg	1.4	NE	2	3	0.205	<0.00789	<0.0114	NM	NM	NM	NM	0.0104	0.0605	<0.00854	NM	NM	NM	NM	0.125	<0.00843	NM	NM	0.3 (M1)	0.088	0.40	<0.011	NM
Benzo(b)fluoranthene	mg/kg	NE	NE	NE	NE	0.262	<0.00789	<0.0114	NM	NM	NM	NM	0.0149	0.087	<0.00854	NM	NM	NM	NM	0.196	<0.00843	NM	NM	0.47 (M1)	0.13	0.56	<0.011	NM
Benzo(g,h,i)perylene	mg/kg	NE	NE	NE	NE	0.146	<0.00789	<0.0114	NM	NM	NM	NM	0.00802	0.0678	<0.00854	NM	NM	NM	NM	0.124	<0.00843	NM	NM	0.19 (M1)	0.072	0.31	<0.011	NM
Benzo(k)fluoranthene	mg/kg	NE	NE	NE	NE	0.0774	<0.00789	<0.0114	NM	NM	NM	NM	<0.00668	0.0246	<0.00854	NM	NM	NM	NM	0.0663	<0.00843	NM	NM	0.13	0.046	0.20	<0.011	NM
Carbazole	mg/kg	NE	NE	700	1310	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Chrysene	mg/kg	NE	NE	NE	NE	0.168	<0.00789	<0.0114	NM	NM	NM	NM	0.0126	0.0653	<0.00854	NM	NM	NM	NM	0.143	<0.00843	NM	NM	0.33 (M1)	0.10	0.38	<0.011	NM
Dibenz(a,h)anthracene	mg/kg	NE	NE	NE	NE	0.0336	<0.00789	<0.0114	NM	NM	NM	NM	<0.00668	0.0131	<0.00854	NM	NM	NM	NM	0.0285	<0.00843	NM	NM	0.051	<0.011	0.071	<0.011	NM
Dibenzofuran	mg/kg	NE	NE	104	810	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Fluoranthene	mg/kg	670	NE	1080	6800	0.358	<0.00789	<0.0114	NM	NM	NM	NM	0.0235	0.153	<0.00854	NM	NM	NM	NM	0.353	<0.00843	NM	NM	0.79 (M1)	0.17	0.84	<0.011	NM
Fluorene	mg/kg	110	NE	850	4120	0.0375	<0.00789	<0.0114	NM	NM	NM	NM	<0.00668	0.0232	<0.00854	NM	NM	NM	NM	0.0592	<0.00843	NM	NM	0.045 (M1)	0.015	0.099	<0.011	NM
Indeno(1,2,3-cd)pyrene	mg/kg	NE	NE	NE	NE	0.115	<0.00789	<0.0114	NM	NM	NM	NM	<0.00668	0.0485	<0.00854	NM	NM	NM	NM	0.0845	<0.00843	NM	NM	0.16 (M1)	0.056	0.25	<0.011	NM
Naphthalene	mg/kg	NE	NE	NE	NE	0.212	<0.0263	<0.038	NM	NM	NM	NM	<0.0223	0.164	<0.0285	NM	NM	NM	NM	1.57	0.0701	NM	NM	0.04 (M1,R1)	0.096	0.41	<0.011	NM
Phenanthrene	mg/kg	NE	NE	NE	NE	0.275	<0.00789	<0.0114	NM	NM	NM	NM	0.0179	0.147	<0.00854	NM	NM	NM	NM	0.314	<0.00843	NM	NM	0.47 (M1)	0.18	0.86	<0.011	NM
Pyrene	mg/kg	440	NE	890	5800	0.294	<0.00789	<0.0114	NM	NM	NM	NM	0.0227	0.131	<0.00854	NM	NM	NM	NM	0.282	<0.00843	NM	NM	0.58 (M1)	0.13	0.67	<0.011	NM
BaP Equivalents																												
Benzo(a)pyrene Equivalents	mg/kg	1.4	NE	2	3	0.293	<0	<0	NM	NM	NM	NM	0.0132	0.0915	<0	NM	NM	NM	NM	0.192	<0	NM	NM	0.44 (M1)	0.12	0.59	<0	NM
VOCs																												
1,2,4-Trimethylbenzene	mg/kg	2.7	NE	8	25	<0.055	<0.063	<0.076	NM	NM	NM	NM	<0.055	0.54	<0.071	NM	NM	NM	NM	***44.3 (M1)***	0.87	NM	NM	0.23	<0.055	<0.069	<0.055	NM
1,3,5-Trimethylbenzene	mg/kg	2.7	NE	3	10	<0.055	<0.063	<0.076	NM	NM	NM	NM	<0.055	0.25	<0.071	NM	NM	NM	NM	***13.9 (M1)***	0.19	NM	NM	<0.06	<0.055	<0.069	<0.055	NM
Benzene	mg/kg	0.017	10	6	10	*<0.022*	*<0.025*	*<0.03*	NM	NM	NM	NM	*<0.022*	*0.044*	*<0.029*	NM	NM	NM	NM	*0.25 (M1,R1)*	*2.0*	NM	NM	*0.11*	*<0.022*	*<0.028*	*<0.022*	NM
Chlorobenzene	mg/kg	1.2	2000	11	32	<0.055	<0.063	<0.076	NM	NM	NM	NM	<0.055	<0.072	<0.071	NM	NM	NM	NM	<0.057	<0.068	NM	NM	<0.06	<0.055	<0.069	<0.055	NM
Diethyl Ether	mg/kg	0.51	NE	NE	NE	<0.22	<0.25	<0.3	NM	NM	NM	NM	<0.22	<0.29	<0.29	NM	NM	NM	NM	<0.23	<0.27	NM	NM	<0.24	<0.22	<0.28	<0.22	NM
Ethylbenzene	mg/kg	1.1	NE	200	200	<0.055	<0.063	<0.076	NM	NM	NM	NM	<0.055	0.19	<0.071	NM	NM	NM	NM	*10.3 (M1)*	0.58	NM	NM	0.13	<0.055	<0.069	<0.055	NM
Isopropylbenzene	mg/kg	9.5	NE	30	87	<0.055	<0.063	<0.076	NM	NM	NM	NM	<0.055	0.11	<0.071	NM	NM	NM	NM	2.6 (M1)	0.31	NM	NM	0.076	<0.055	<0.069	<0.055	NM
Naphthalene	mg/kg	4.5	NE	10	28	<0.22	<0.25	<0.3	NM	NM	NM	NM	<0.22	0.34	<0.29	NM	NM	NM	NM	*4.7 (M1)*	<0.27	NM	NM	0.38	<0.22	<0.28	<0.22	NM
n-Butylbenzene	mg/kg	NE	NE	30	92	<0.055	<0.063	<0.076	NM	NM	NM	NM	<0.055	0.19	<0.071	NM	NM	NM	NM	3.9 (M1)	0.21	NM	NM	<0.06	<0.055	<0.069	<0.055	NM
n-Propylbenzene	mg/kg	NE	NE	30	93	<0.055	<0.063	<0.076	NM	NM	NM	NM	<0.055	0.20	<0.071	NM	NM	NM	NM	5.8 (M1)	0.79	NM	NM	0.087	<0.055	<0.069	<0.055	NM
p-Isopropyltoluene	mg/kg	NE	NE	NE	NE	<0.055	<0.063	<0.076	NM	NM	NM	NM	<0.055	0.28	<0.071	NM	NM	NM	NM	1.9 (M1)	0.19	NM	NM	<0.06	<0.055	<0.069	<0.055	NM
sec-Butylbenzene	mg/kg	NE	NE	25	70	<0.055	<0.063	<0.076	NM	NM	NM	NM	<0.055	0.11	<0.071	NM	NM	NM	NM	1.3 (M1)	0.12	NM	NM	<0.06	<0.055	<0.069	<0.055	NM
tert-Butylbenzene	mg/kg	NE	NE	30	90	<0.055	<0.063	<0.076	NM	NM	NM	NM	<0.055	<0.072	<0.071	NM	NM	NM	NM	0.075	<0.068	NM	NM	<0.06	<0.055	<0.069	<0.055	NM
Tetrachloroethene	mg/kg	0.042	14	72	131	*<0.055*	*<0.063*	*<0.076*	NM	NM	NM	NM	*<0.055*	*<0.072*	*<0.071*	NM	NM	NM	NM	*<0.057*	*<0.068*	NM	NM	*<0.24*	*<0.22*	*<0.28*	*<0.22*	NM
Toluene	mg/kg	2.5	NE	107	305	<0.055	<0.063	<0.076	NM	NM	NM	NM	<0.055	0.14	<0.071	NM	NM	NM	NM	0.41 (M1)	0.47	NM	NM	0.56	<0.055	0.072	<0.055	NM
Trichloroethene	mg/kg	0.0023	10	29	46	*<0.055*	*<0.063*	*<0.076*	NM	NM	NM	NM	*<0.055*	*<0.072*	*<0.071*	NM	NM	NM	NM	*<0.057*	*<0.068*	NM	NM	*<0.06*	*<0.055*	*<0.069*	*<0.055*	NM
Xylene (Total)	mg/kg	5.4	NE	45	130	<0.17	<0.19	<0.23	NM	NM	NM	NM	<0.16	0.62	<0.21	NM	NM	NM	NM	*39.1 (MS)*	3.5	NM	NM	0.85	<0.17	<0.21	<0.17	NM

Notes:

A full list of abbreviations is included in the table glossery

Table 2
Soil Analytical Results

Phase II Environmental Site Assessment
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

				Borings are ordered by Area:		I-35 Low-Level Bridge Demolition																						
Boring ID	Units	*2014 Screening SLV*	20xTCLP level	Tier 1 Residential SRV	**Tier 2 Industrial SRV**	GP-175	GP-175	GP-169	GP-169	GP-169	GP-169	GP-170	GP-170	GP-170	GP-170	GP-166	GP-166	GP-166	GP-176	GP-176	GP-176	GP-176	GP-177	GP-177	GP-177	GP-177	GP-177	GP-180
Field Sample ID						GP-175-1.5	GP-175-14.5	GP-169-3	GP-169-7.5	GP-169-0.5	GP-169-1.5	GP-170-0.5	GP-170-1.5	GP-170-6	GP-170-15	GP-166-0.5	GP-166-1.75	GP-166-15	GP-176-0.5	GP-176-1.5	GP-176-7	GP-176-15	GP-177-0.5	GP-177-1.5	GP-177-3	GP-177-6	GP-177-13	GP-180-2.5
Laboratory ID						10446750028	10446750029	10446535018	10446535019	10446918005	10446918006	10446918011	10446918012	10446918013	10446918014	10446918021	10446918022	10446918023	10446918016	10446918017	10446918018	10446918019	10446750017	10446750018	10446750019	10446750020	10446750021	10446535016
Sample Date						9/7/2018	9/7/2018	9/6/2018	9/6/2018	9/10/2018	9/10/2018	9/10/2018	9/10/2018	9/10/2018	9/10/2018	9/10/2018	9/10/2018	9/10/2018	9/10/2018	9/10/2018	9/10/2018	9/10/2018	9/7/2018	9/7/2018	9/7/2018	9/7/2018	9/7/2018	9/6/2018
DRO and GRO																												
Diesel Range Organics	mg/kg	The MPCA Unregulated Fill Criteria for DRO and GRO is <100 mg/kg				NM	33.6 (T6)	<9.5	<9.8	NM	NM	NM	34.6 (T7,T6)	<10.7	18.7 (T7,T6)	NM	65.1 (T7,T6)	<11	NM	688 (T7,T6)	21.4 (T7,T6)	<12	NM	NM	224 (T6)	64.5 (T6)	30.4 (T6)	<8.8
Gasoline Range Organics	mg/kg					NM	<23.4	<12.5	<13.1	NM	NM	NM	<26.6	<13.5	<19.7	NM	<19.1	<13.3	NM	<62.5 (2M)	<16.1	<15.9	NM	NM	<18.3	<22.1	<15.1	<11.1
WDRO C10-C28 Silica Gel	mg/kg					NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	280 (T6,1M)	NM	NM	NM	NM	NM	NM	NM	NM
Metals																												
Antimony	mg/kg	5.4	NE	12	100	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Arsenic	mg/kg	5.8	100	9	20	NM	2.8	<1.1	<1.2	NM	NM	NM	<2.5	2.7	3.6	NM	<1.8	NM	NM	14.5	3.4	4.5	NM	NM	2.4	6.0	2.2	2.3
Barium	mg/kg	1700	2000	1100	18000	NM	76.9	6.7	6.6	NM	NM	NM	18.9	137	106	NM	145	NM	NM	167	83.7	108	NM	NM	73.2	332	67	36.4
Beryllium	mg/kg	2.7	NE	55	230	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium	mg/kg	8.8	20	25	200	NM	<0.31	<0.17	<0.18	NM	NM	NM	<0.38	<0.2	<0.3	NM	0.41	NM	NM	0.76	<0.23	<0.43	NM	NM	<0.26	0.7	<0.2	<0.31 (D3)
Chromium	mg/kg	36	100	87	650	NM	22.8	3.7	3.6	NM	NM	NM	4.1	34.9	33.1	NM	5.9	NM	NM	12.3	26.9	33.5	NM	NM	18.6	22.9	21.6	16.3
Copper	mg/kg	700	NE	100	9000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Lead	mg/kg	2700	100	300	700	24.6	4.1	1.5	1.4	216	42.2	211	5.9	6.7	6.8	111	113	7.0	341	86.4	24.7	8.0	162	212	13.2	238	4.2	4.1
Mercury	mg/kg	3.3	4	0.5	1.5	NM	0.063	<0.021	<0.02	NM	NM	NM	0.055	<0.024	0.054	NM	<0.031	0.035	NM	0.17	0.036	0.043	NM	NM	0.062	0.1	<0.025	<0.019
Nickel	mg/kg	180	NE	560	2500	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Selenium	mg/kg	2.6	20	160	1300	NM	<2.1	<1.1	<1.2	NM	NM	NM	<2.5	<1.3	<2	NM	<1.8	NM	NM	4.4	<1.5	<2.9	NM	NM	<1.7	<2.1	<1.4	<2.1 (D3)
Silver	mg/kg	7.9	100	160	1300	NM	<1	<0.57	<0.6	NM	NM	NM	<1.3	<0.66	<1	NM	<0.9	NM	NM	<2.1	<0.77	<1.4	NM	NM	<0.86	<1.1	<0.68	<1 (D3)
Zinc	mg/kg	3000	NE	8700	75000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TCLP Metals																												
Lead TCLP	mg/L	5 mg/L TCLP Lead hazardous limit				NM	NM	NM	NM	<0.5	NM	NM	NM	NM	NM	NM	NM	NM	0.65	NM	NM	NM	NM	NM	NM	NM	NM	NM
Mercury TCLP	mg/L	0.2 mg/L TCLP Mercury hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium TCLP	mg/L	1.0 mg/L TCLP Cadmium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Chromium TCLP	mg/L	5.0 mg/L TCLP Chromium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
PCBs																												
PCBs (Polychlorinated Biphenyls)	mg/kg	NE	NE	1.2	8	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	BRL	NM	NM	NM	NM	NM	NM	NM	NM
Herbicides and Pesticides																												
2,4-D	mg/kg	0.5	200	0.5	0.5	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Triclopyr	mg/kg	0.3	NE	0.3	0.3	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Semi-VOCs																												
1-Methylnaphthalene	mg/kg	NE	NE	NE	NE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2,4-Dinitrotoluene	mg/kg	0.013	2.6	50	355	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2-Methylnaphthalene	mg/kg	NE	NE	100	369	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Acenaphthene	mg/kg	81	NE	1200	5260	NM	<0.022	<0.012	<0.012	NM	NM	NM	<0.026	<0.014	<0.02	NM	0.066	<0.013	NM	<0.045	<0.015	<0.015	NM	NM	<0.018	<0.022	<0.014	<0.011
Acenaphthylene	mg/kg	NE	NE	NE	NE	NM	<0.022	<0.012	<0.012	NM	NM	NM	<0.026	<0.014	<0.02	NM	0.048	<0.013	NM	<0.045	<0.015	<0.015	NM	NM	<0.018	<0.022	<0.014	<0.011
Anthracene	mg/kg	1300	NE	7880	45400	NM	<0.022	<0.012	<0.012	NM	NM	NM	<0.026	<0.014	<0.02	NM	0.32 (M1)	<0.013	NM	0.070	<0.015	<0.015	NM	NM	<0.018	0.037	<0.014	<0.011
Benz(a)anthracene	mg/kg	NE	NE	NE	NE	NM	<0.022	<0.012	<0.012	NM	NM	NM	0.072	<0.014	<0.02	NM	0.91 (M1)	<0.013	NM	0.28	<0.015	<0.015	NM	NM	0.034	0.10	<0.014	<0.011
Benzo(a)pyrene	mg/kg	1.4	NE	2	3	NM	<0.022	<0.012	<0.012	NM	NM	NM	0.084	<0.014	<0.02	NM	0.82 (M1)	<0.013	NM	0.32	0.015 (M1,R	<0.015	NM	NM	0.042	0.11	<0.014	<0.011
Benzo(b)fluoranthene	mg/kg	NE	NE	NE	NE	NM	<0.022	<0.012	<0.012	NM	NM	NM	0.11	<0.014	<0.02	NM	1.0 (M1)	<0.013	NM	0.40	<0.015	<0.015	NM	NM	0.060	0.14	<0.014	<0.011
Benzo(g,h,i)perylene	mg/kg	NE	NE	NE	NE	NM	<0.022	<0.012	<0.012	NM	NM	NM	0.052	<0.014	<0.02	NM	0.47 (M1)	<0.013	NM	0.18	<0.015	<0.015	NM	NM	0.033	0.068	<0.014	<0.011
Benzo(k)fluoranthene	mg/kg	NE	NE	NE	NE	NM	<0.022	<0.012	<0.012	NM	NM	NM	0.045	<0.014	<0.02	NM	0.36 (M1)	<0.013	NM	0.17	<0.015	<0.015	NM	NM	0.024	0.056	<0.014	<0.011
Carbazole	mg/kg	NE	NE	700	1310	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Chrysene	mg/kg	NE	NE	NE	NE	NM	<0.022	<0.012	<0.012	NM	NM	NM	0.062	<0.014	<0.02	NM	0.82 (M1)	<0.013	NM	0.23	<0.015	<0.015	NM	NM	0.034	0.096	<0.014	<0.011
Dibenz(a,h)anthracene	mg/kg	NE	NE	NE	NE	NM	<0.022	<0.012	<0.012	NM	NM	NM	<0.026	<0.014	<0.02	NM	0.14	<0.013	NM	0.050	<0.015	<0.015	NM	NM	<0.018	<0.022	<0.014	<0.011
Dibenzofuran	mg/kg	NE	NE	104	810	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Fluoranthene	mg/kg	670	NE	1080	6800	NM	<0.022	<0.012	<0.012	NM	NM	NM	0.14	<0.014	<0.02	NM	2.0 (M1)	<0.013	NM	0.56	0.015 (M1,R	<0.015	NM	NM	0.067	0.21	<0.014	<0.011
Fluorene	mg/kg	110	NE	850	4120	NM	<0.022	<0.012	<0.012	NM	NM	NM	<0.026	<0.014	<0.02	NM	0.10	<0.013	NM	<0.045	<0.015	<0.015	NM	NM	<0.018	<0.022	<0.014	<0.011
Indeno(1,2,3-cd)pyrene	mg/kg	NE	NE	NE	NE	NM	<0.022	<0.012	<0.012	NM	NM	NM	0.041	<0.014	<0.02	NM	0.44 (M1)	<0.013	NM	0.15	<0.015	<0.015	NM	NM	0.028	0.056	<0.014	<0.011
Naphthalene	mg/kg	NE	NE	NE	NE	NM	<0.022	<0.012	<0.012	NM	NM	NM	<0.026	<0.014	<0.02	NM	0.038	<0.013	NM	0.084	0.015 (M1,R	<0.015	NM	NM	<0.018	<0.022	<0.014	<0.011
Phenanthrene	mg/kg	NE	NE	NE	NE	NM	<0.022	<0.012	<0.012	NM	NM	NM	0.047	<0.014	<0.02	NM	1.2 (M1)	<0.013	NM	0.28	0.015 (M1,R	<0.015	NM	NM	0.032	0.13	<0.014	<0.011
Pyrene	mg/kg	440	NE	890	5800	NM	<0.022	<0.012	<0.012	NM	NM	NM	0.10	<0.014	<0.02	NM	1.5 (M1)	<0.013	NM	0.42	0.015 (M1,R	<0.015	NM	NM	0.053	0.17	<0.014	<0.011
BaP Equivalents																												
Benzo(a)pyrene Equivalents	mg/kg	1.4	NE	2	3	NM	<0	<0	<0	NM	NM	NM	0.11	<0	<0	NM	1.2 (M1)	<0	NM	0.45	<0	<0	NM	NM	0.057	0.15	<0	<0
VOCs																												
1,2,4-Trimethylbenzene	mg/kg	2.7	NE	8	25	NM	<0.11	<0.061	<0.062	NM	NM	NM	<0.13	<0.069	<0.11	NM	<0.096	<0.066	NM	<0.23	<0.077	<0.076	NM	NM	<0.093	<0.11	<0.075	<0.058
1,3,5-Trimethylbenzene	mg/kg	2.7	NE	3	10	NM	<0.11	<0.061	<0.062	NM	NM	NM	<0.13	<0.069	<0.11	NM	<0.096	<0.066	NM	<0.23	<0.077	<0.076	NM	NM	<0.093	<0.11	<0.075	<0.058
Benzene	mg/kg	0.017	10	6	10	NM	<0.044	<0.025	<0.025	NM	NM	NM	<0.053	<0.028	<0.042	NM	<0.038	<0.026	NM	<0.09	<0.031	<0.03	NM	NM	<0.037	<0.045	<0.03	<0.023
Chlorobenzene	mg/kg	1.2	2000	11	32	NM	<0.11	<0.061	<0.062	NM	NM	NM	<0.13	<0.069	<0.11	NM	<0.096	<0.066	NM	<0.23	<0.077	<0.076	NM	NM	<0.093	<0.11	<0.075	<0.058
Diethyl Ether	mg/kg	0.51	NE	NE	NE	NM	<0.44	<0.25	<0.25	NM	NM	NM	<0.53	<0.28	<0.42	NM	<0.38	<0.26	NM	<0.9	<0.31	<0.3	NM	NM	<0.37	<0.45	<0.3	<0.23
Ethylbenzene	mg/kg	1.1	NE	200	200	NM	<0.11	<0.061	<0.062	NM	NM	NM	<0.13	<0.069	<0.11	NM	<0.096	<0.066	NM	<0.23	<0.077	<0.076	NM	NM	<0.093	<0.11	<0.075	<0.058
Isopropylbenzene	mg/kg	9.5	NE	30	87	NM	<0.11	<0.061	<0.062	NM	NM	NM	<0.13	<0.069	<0.11	NM	<0.096	<0.066	NM	<0.23	<0.077	<0.076	NM	NM	<0.093	<0.11	<0.075	<0.058
Naphthalene	mg/kg	4.5	NE	10	28	NM	<0.44	<0.25	<0.25	NM	NM	NM	<0.53	<0.28	<0.42	NM	<0.38	<0.26	NM	<0.9	<0.31	<0.3	NM	NM	<0.37	<0.45	<0.3	<0.23
n-Butylbenzene	mg/kg	NE	NE	30	92	NM	<0.11	<0.061	<0.062	NM	NM	NM	<0.13	<0.069	<0.11	NM	<0.096	<0.066	NM	<0.23	<0.077	<0.076	NM	NM	<0.093	<0.11	<0.075	<0.058
n-Propylbenzene	mg/kg	NE	NE	30	93	NM	<0.11	<0.061	<0.062	NM	NM	NM	<0.13	<0.069	<0.11	NM	<0.096	<0.066	NM	<0.23	<0.077	<0.076	NM	NM	<0.093	<0.11	<0.075	<0.058
p-Isopropyltoluene	mg/kg	NE	NE	NE	NE	NM	<0.11	<0.061	<0.062	NM	NM	NM	<0.13	<0.069	<0.11	NM	<0.096	<0.066	NM	<0.23	<0.077	<0.076	NM	NM	0.11	<0.11	<0.075	<0.058
sec-Butylbenzene	mg/kg	NE	NE	25	70	NM	<0.11	<0.061	<0.062	NM	NM	NM	<0.13	<0.069	<0.11	NM	<0.096	<0.066	NM	<0.23	<0.077	<0.076	NM	NM	<0.093	<0.11	<0.075	<0.058
tert-Butylbenzene	mg/kg	NE	NE	30	90	NM	<0.11	<0.061	<0.062	NM	NM	NM	<0.13	<0.069	<0.11	NM	<0.096	<0.066	NM	<0.23	<0.077	<0.076	NM	NM	<0.093	<0.11	<0.075	<0.058
Tetrachloroethene	mg/kg	0.042	14	72	131	NM	<0.44	<0.25	<0.25	NM	NM	NM	<0.13	<0.069	<0.11	NM	<0.096	<0.066	NM	<0.23	<0.077	<0.076	NM	NM	<0.37	<0.45	<0.3	<0.23
Toluene	mg/kg	2.5	NE	107	305	NM	<0.11	<0.061	<0.062	NM	NM	NM	<0.13	<0.069	<0.11	NM	<0.096	<0.066	NM	0.44	0.25	<0.076	NM	NM	0.24	<0.11	<0.075	<0.058
Trichloroethene	mg/kg	0.0023	10	29	46	NM	<0.11	<0.061	<0.062	NM	NM	NM	<0.13	<0.069	<0.11	NM	<0.096	<0.066	NM	<0.23	<0.077	<0.076	NM	NM	<0.093	<0.11	<0.075	<0.058
Xylene (Total)	mg/kg	5.4	NE	45	130	NM	<0.33	<0.18	<0.19	NM	NM	NM	<0.4	<0.21	<0.32	NM	<0.29	<0.2	NM	<0.68	<0.23	<0.23	NM	NM	<0.28	<0.33	<0.22	<0.17

Notes:

A full list of abbreviations is included in the table glossery

Table 2
Soil Analytical Results

Phase II Environmental Site Assessment
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

				Borings are ordered by Area:		I-35 Low-Level Bridge Demolition																						
Boring ID	Units	2014 Screening SLV	20xTCLP level	Tier 1 Residential SRV	Tier 2 Industrial SRV	GP-180	GP-180	GP-180	GP-179	GP-179	GP-179	GP-179	GP-216	GP-216	GP-216	GP-216	GP-181	GP-181	GP-181	GP-215	GP-215	GP-215	GP-215	GP-214	GP-214	GP-214	GP-214	GP-218
Field Sample ID						GP-180-6	GP-180-0.5	GP-180-1.5	GP-179-0.5	GP-179-1.5	GP-179-8.5	GP-179-15	GP-216-0.5	GP-216-1.5	GP-216-5	GP-216-15	GP-181-6	GP-181-0.5	GP-181-1.5	GP-215-0.5	GP-215-1.5	GP-215-6	GP-215-15	GP-214-0.5	GP-214-1.5	GP-214-7	GP-214-16	GP-218-0.5
Laboratory ID						10446535017	10446918007	10446918008	10447109001	10447109002	10447109003	10447109004	10447109006	10447109007	10447109008	10447109009	10446535014	10446918009	10446918010	10447109016	10447109017	10447109018	10447109019	10447109011	10447109012	10447109013	10447109014	10447291017
Sample Date						9/6/2018	9/10/2018	9/10/2018	9/10/2018	9/10/2018	9/10/2018	9/10/2018	9/10/2018	9/10/2018	9/10/2018	9/10/2018	9/6/2018	9/10/2018	9/10/2018	9/11/2018	9/11/2018	9/11/2018	9/11/2018	9/11/2018	9/11/2018	9/11/2018	9/11/2018	9/12/2018
DRO and GRO																												
Diesel Range Organics	mg/kg	The MPCA Unregulated Fill Criteria for DRO and GRO is <100 mg/kg				<9.1	NM	NM	NM	703 (T6)	<20	<10.7	NM	NM	54.0 (T7,T6)	<26.2	30.6 (T6)	NM	NM	NM	NM	<9.7	<10.4	NM	<9.7	<9.7	<10.4	NM
Gasoline Range Organics	mg/kg					<11.1	NM	NM	NM	<16.4	<24.7	<13.2	NM	NM	<11.8	<32.6	<12.1	NM	NM	NM	NM	<12.3	<13.5	NM	<12.7	<12.2	<13.1	NM
WDRO C10-C28 Silica Gel	mg/kg					NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Metals																												
Antimony	mg/kg	5.4	NE	12	100	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Arsenic	mg/kg	5.8	100	9	20	2.6	NM	NM	NM	5.3	5.5	2.9	NM	NM	2.8	3.5	2.1	NM	NM	NM	NM	<1.1	2.9	NM	2.6	<1.2	3.3	NM
Barium	mg/kg	1700	2000	1100	18000	29	NM	NM	NM	115	515	83.1	NM	NM	60.5	70.2	37.2	NM	NM	NM	NM	6.8	137	NM	73.3	10.2	145	NM
Beryllium	mg/kg	2.7	NE	55	230	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium	mg/kg	8.8	20	25	200	<0.16	NM	NM	NM	0.73	0.39	<0.19	NM	NM	<0.17	<0.45	<0.16	NM	NM	NM	NM	<0.17	<0.18	NM	<0.17	<0.17	<0.18	NM
Chromium	mg/kg	36	100	87	650	15.3	NM	NM	NM	24.7	44.7	26.7	NM	NM	18.3	17.7	15.5	NM	NM	NM	NM	3.8	31	NM	19	4.2	32.4	NM
Copper	mg/kg	700	NE	100	9000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Lead	mg/kg	2700	100	300	700	3.2	75.5	69.1	225 (M1,R1)	76	99.4	5.4	12.3	9.5	26.8	2.8	39	229	434	91.8	17	1.7	7.3	60.3	6.2	1.2	7.1	116
Mercury	mg/kg	3.3	4	0.5	1.5	<0.019	NM	NM	NM	466	0.44	<0.024	NM	NM	0.33	0.09	<0.021	NM	NM	NM	NM	<0.023	<0.022	NM	<0.024	<0.024	<0.027	NM
Nickel	mg/kg	180	NE	560	2500	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Selenium	mg/kg	2.6	20	160	1300	<1.1	NM	NM	NM	<1.5	<2.4	<1.2	NM	NM	<1.1	<5	<1.1	NM	NM	NM	NM	<1.1	<1.2	NM	<1.1	<1.2	<1.2	NM
Silver	mg/kg	7.9	100	160	1300	<0.54	NM	NM	NM	<0.77	<1.2	<0.62	NM	NM	<0.57	<1.5	<0.55	NM	NM	NM	NM	<0.57	<0.6	NM	<0.57	<0.58	<0.61	NM
Zinc	mg/kg	3000	NE	8700	75000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TCLP Metals																												
Lead TCLP	mg/L	5 mg/L TCLP Lead hazardous limit				NM	NM	NM	0.8	0.19	NM	NM	NM	NM	NM	NM	NM	NM	<0.05	NM	NM	NM	NM	NM	NM	NM	NM	NM
Mercury TCLP	mg/L	0.2 mg/L TCLP Mercury hazardous limit				NM	NM	NM	NM	0.00096 (H2)	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium TCLP	mg/L	1.0 mg/L TCLP Cadmium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Chromium TCLP	mg/L	5.0 mg/L TCLP Chromium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
PCBs																												
PCBs (Polychlorinated Biphenyls)	mg/kg	NE	NE	1.2	8	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Herbicides and Pesticides																												
2,4-D	mg/kg	0.5	200	0.5	0.5	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Triclopyr	mg/kg	0.3	NE	0.3	0.3	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Semi-VOCs																												
1-Methylnaphthalene	mg/kg	NE	NE	NE	NE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2,4-Dinitrotoluene	mg/kg	0.013	2.6	50	355	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2-Methylnaphthalene	mg/kg	NE	NE	100	369	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Acenaphthene	mg/kg	81	NE	1200	5260	<0.011	NM	NM	NM	10.9 (M6,R1)	<0.025	<0.013	NM	NM	0.03	<0.032	0.13	NM	NM	NM	NM	<0.012	<0.013	NM	<0.012	<0.012	<0.013	NM
Acenaphthylene	mg/kg	NE	NE	NE	NE	<0.011	NM	NM	NM	0.37 (M6)	<0.025	<0.013	NM	NM	0.019	<0.032	<0.06	NM	NM	NM	NM	<0.012	<0.013	NM	<0.012	<0.012	<0.013	NM
Anthracene	mg/kg	1300	NE	7880	45400	<0.011	NM	NM	NM	25 (M6,R1)	<0.025	<0.013	NM	NM	0.13	<0.032	0.070	NM	NM	NM	NM	0.018	<0.013	NM	<0.012	<0.012	<0.013	NM
Benz(a)anthracene	mg/kg	NE	NE	NE	NE	<0.011	NM	NM	NM	28.5 (M6,R1)	0.025	<0.013	NM	NM	0.40	<0.032	0.11	NM	NM	NM	NM	0.024	<0.013	NM	<0.012	<0.012	<0.013	NM
Benzo(a)pyrene	mg/kg	1.4	NE	2	3	<0.011	NM	NM	NM	22.2 (M6,R1)	<0.025	<0.013	NM	NM	0.39	<0.032	0.14	NM	NM	NM	NM	0.022	<0.013	NM	<0.012	<0.012	<0.013	NM
Benzo(b)fluoranthene	mg/kg	NE	NE	NE	NE	<0.011	NM	NM	NM	29 (M6,R1)	0.032	<0.013	NM	NM	0.45	<0.032	0.22	NM	NM	NM	NM	0.030	<0.013	NM	<0.012	<0.012	<0.013	NM
Benzo(g,h,i)perylene	mg/kg	NE	NE	NE	NE	<0.011	NM	NM	NM	9.6 (M6,R1)	<0.025	<0.013	NM	NM	0.18	<0.032	0.099	NM	NM	NM	NM	<0.012	<0.013	NM	<0.012	<0.012	<0.013	NM
Benzo(k)fluoranthene	mg/kg	NE	NE	NE	NE	<0.011	NM	NM	NM	11.2 (M6,R1)	<0.025	<0.013	NM	NM	0.21	<0.032	0.078	NM	NM	NM	NM	<0.012	<0.013	NM	<0.012	<0.012	<0.013	NM
Carbazole	mg/kg	NE	NE	700	1310	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Chrysene	mg/kg	NE	NE	NE	NE	<0.011	NM	NM	NM	21.6 (M6,R1)	<0.025	<0.013	NM	NM	0.33	<0.032	0.12	NM	NM	NM	NM	0.230	<0.013	NM	<0.012	<0.012	<0.013	NM
Dibenz(a,h)anthracene	mg/kg	NE	NE	NE	NE	<0.011	NM	NM	NM	2.3 (R1,M6)	<0.025	<0.013	NM	NM	<0.012	<0.032	<0.06	NM	NM	NM	NM	<0.012	<0.013	NM	<0.012	<0.012	<0.013	NM
Dibenzofuran	mg/kg	NE	NE	104	810	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Fluoranthene	mg/kg	670	NE	1080	6800	<0.011	NM	NM	NM	65.9 (M6,R1)	0.065	<0.013	NM	NM	0.88	<0.032	0.24	NM	NM	NM	NM	0.063	<0.013	NM	<0.012	<0.012	<0.013	NM
Fluorene	mg/kg	110	NE	850	4120	<0.011	NM	NM	NM	14.6 (M6,R1)	<0.025	<0.013	NM	NM	0.049	<0.032	<0.06	NM	NM	NM	NM	<0.012	<0.013	NM	<0.012	<0.012	<0.013	NM
Indeno(1,2,3-cd)pyrene	mg/kg	NE	NE	NE	NE	<0.011	NM	NM	NM	8.7 (M6,R1)	<0.025	<0.013	NM	NM	0.16	<0.032	0.081	NM	NM	NM	NM	<0.012	<0.013	NM	<0.012	<0.012	<0.013	NM
Naphthalene	mg/kg	NE	NE	NE	NE	<0.011	NM	NM	NM	4.8 (M6,R1)	<0.025	<0.013	NM	NM	0.018	<0.032	0.066	NM	NM	NM	NM	<0.012	<0.013	NM	<0.012	<0.012	<0.013	NM
Phenanthrene	mg/kg	NE	NE	NE	NE	<0.011	NM	NM	NM	78 (M6,R1)	0.056	<0.013	NM	NM	0.48	<0.032	0.16	NM	NM	NM	NM	0.059	<0.013	NM	<0.012	<0.012	<0.013	NM
Pyrene	mg/kg	440	NE	890	5800	<0.011	NM	NM	NM	50.5 (M6,R1)	0.050	<0.013	NM	NM	0.68	<0.032	0.23	NM	NM	NM	NM	0.044	<0.013	NM	<0.012	<0.012	<0.013	NM
BaP Equivalents																												
Benzo(a)pyrene Equivalents	mg/kg	1.4	NE	2	3	<0	NM	NM	NM	31.4 (M6,R1)	0.0057	<0	NM	NM	0.52	<0	0.19	NM	NM	NM	NM	0.028	<0	NM	<0	<0	<0	NM
VOCs																												
1,2,4-Trimethylbenzene	mg/kg	2.7	NE	8	25	<0.058	NM	NM	NM	<0.081	<0.14	<0.071	NM	NM	<0.063	<0.16	<0.062	NM	NM	NM	NM	<0.061	<0.067	NM	<0.058	<0.065	<0.068	NM
1,3,5-Trimethylbenzene	mg/kg	2.7	NE	3	10	<0.058	NM	NM	NM	<0.081	<0.14	<0.071	NM	NM	<0.063	<0.16	<0.062	NM	NM	NM	NM	<0.061	<0.067	NM	<0.058	<0.065	<0.068	NM
Benzene	mg/kg	0.017	10	6	10	<0.023	NM	NM	NM	<0.032	<0.055	<0.028	NM	NM	<0.025	<0.063	<0.025	NM	NM	NM	NM	<0.024	<0.027	NM	<0.023	<0.026	<0.027	NM
Chlorobenzene	mg/kg	1.2	2000	11	32	<0.058	NM	NM	NM	<0.081	<0.14	<0.071	NM	NM	<0.063	<0.16	<0.062	NM	NM	NM	NM	<0.061	<0.067	NM	<0.058	<0.065	<0.068	NM
Diethyl Ether	mg/kg	0.51	NE	NE	NE	<0.23	NM	NM	NM	<0.32	<0.55	<0.28	NM	NM	<0.25	<0.63	<0.25	NM	NM	NM	NM	<0.24	<0.27	NM	<0.23	<0.26	<0.27	NM
Ethylbenzene	mg/kg	1.1	NE	200	200	<0.058	NM	NM	NM	<0.081	<0.14	<0.071	NM	NM	<0.063	<0.16	<0.062	NM	NM	NM	NM	<0.061	<0.067	NM	<0.058	<0.065	<0.068	NM
Isopropylbenzene	mg/kg	9.5	NE	30	87	<0.058	NM	NM	NM	<0.081	<0.14	<0.071	NM	NM	<0.063	<0.16	<0.062	NM	NM	NM	NM	<0.061	<0.067	NM	<0.058	<0.065	<0.068	NM
Naphthalene	mg/kg	4.5	NE	10	28	<0.23	NM	NM	NM	<0.32	<0.55	<0.28	NM	NM	<0.25	<0.63	<0.25	NM	NM	NM	NM	<0.24	<0.27	NM	<0.23	<0.26	<0.27	NM
n-Butylbenzene	mg/kg	NE	NE	30	92	<0.058	NM	NM	NM	<0.081	<0.14	<0.071	NM	NM	<0.063	<0.16	<0.062	NM	NM	NM	NM	<0.061	<0.067	NM	<0.058	<0.065	<0.068	NM
n-Propylbenzene	mg/kg	NE	NE	30	93	<0.058	NM	NM	NM	<0.081	<0.14	<0.071	NM	NM	<0.063	<0.16	<0.062	NM	NM	NM	NM	<0.061	<0.067	NM	<0.058	<0.065	<0.068	NM
p-Isopropyltoluene	mg/kg	NE	NE	NE	NE	<0.058	NM	NM	NM	<0.081	<0.14	<0.071	NM	NM	<0.063	<0.16	<0.062	NM	NM	NM	NM	<0.061	<0.067	NM	<0.058	<0.065	<0.068	NM
sec-Butylbenzene	mg/kg	NE	NE	25	70	<0.058	NM	NM	NM	<0.081	<0.14	<0.071	NM	NM	<0.063	<0.16	<0.062	NM	NM	NM	NM	<0.061	<0.067	NM	<0.058	<0.065	<0.068	NM
tert-Butylbenzene	mg/kg	NE	NE	30	90	<0.058	NM	NM	NM	<0.081	<0.14	<0.071	NM	NM	<0.063	<0.16	<0.062	NM	NM	NM	NM	<0.061	<0.067	NM	<0.058	<0.065	<0.068	NM
Tetrachloroethene	mg/kg	0.042	14	72	131	<0.23	NM	NM	NM	<0.081	<0.14	<0.071	NM	NM	<0.063	<0.16	<0.25	NM	NM	NM	NM	<0.061	<0.067	NM	<0.058	<0.065	<0.068	NM
Toluene	mg/kg	2.5	NE	107	305	<0.058	NM	NM	NM	<0.081	<0.14	<0.071	NM	NM	<0.063	<0.16	<0.062	NM	NM	NM	NM	<0.061	<0.067	NM	<0.058	<0.065	<0.068	NM
Trichloroethene	mg/kg	0.0023	10	29	46	<0.058	NM	NM	NM	<0.081	<0.14	<0.071	NM	NM	<0.063	<0.16	<0.062	NM	NM	NM	NM	<0.061	<0.067	NM	<0.058	<0.065	<0.068	NM
Xylene (Total)	mg/kg	5.4	NE	45	130	<0.18	NM	NM	NM	<0.24	<0.41	<0.21	NM	NM	<0.19	<0.47	<0.19	NM	NM	NM	NM	<0.18	<0.2	NM	<0.17	<0.2	<0.21	NM

Notes:

A full list of abbreviations is included in the table glossary

Table 2
Soil Analytical Results

Phase II Environmental Site Assessment
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

				Borings are ordered by Area:		I-35 Low-Level Bridge Demolition																						
Boring ID	Units	*2014 Screening SLV*	20xTCLP level	Tier 1 Residential SRV	**Tier 2 Industrial SRV**	GP-218	GP-218	GP-218	GP-219	GP-219	GP-219	GP-219	GP-234	GP-234	GP-234	GP-234	GP-233	GP-233	GP-233	GP-233	GP-237	GP-237	GP-238	GP-238	GP-240	GP-240	GP-241	GP-241
Field Sample ID						GP-218-1.5	GP-218-10	GP-218-15	GP-219-0.5	GP-219-1.5	GP-219-4	GP-219-15	GP-234-0.5	GP-234-1.5	GP-234-5	GP-234-15	GP-233-0.5	GP-233-1.5	GP-233-4.5	GP-233-12	GP-237-2	GP-237-10	GP-238-2.5	GP-238-4.5	GP-240-2	GP-240-10	GP-241-4	GP-241-15
Laboratory ID						10447291018	10447291015	10447291016	10447109021	10447109022	10447109023	10447109024	10447109031	10447109032	10447109033	10447109034	10447109026	10447109027	10447109028	10447109029	10447291011	10447291012	10447291005	10447291006	10447462001	10447462002	10447291008	10447291009
Sample Date						9/12/2018	9/12/2018	9/12/2018	9/11/2018	9/11/2018	9/11/2018	9/11/2018	9/11/2018	9/11/2018	9/11/2018	9/11/2018	9/11/2018	9/11/2018	9/11/2018	9/11/2018	9/12/2018	9/12/2018	9/12/2018	9/12/2018	9/12/2018	9/12/2018	9/12/2018	9/12/2018
DRO and GRO																												
Diesel Range Organics	mg/kg	The MPCA Unregulated Fill Criteria for DRO and GRO is <100 mg/kg				279 (T6)	79.4 (T7,T6)	<10.3	NM	NM	30.8 (T7,T6)	<10.1	NM	NM	56.4 (T7,T6)	<10.6	NM	NM	<9	<10.5	79.4 (T7,T6)	<10.3	31.0 (T7,T6)	<9.2	72.8 (T7,T6)	<12.1	<9.4	<10.3
Gasoline Range Organics	mg/kg					<11.5	<26.4	<14	NM	NM	<13.8	<13.7	NM	NM	<45.9	<14.9	NM	NM	<11.6	<13.4	<14.1	<13.1	<12.5	<11.7	<12.3	<15.3	<12.8	<14.8
WDRO C10-C28 Silica Gel	mg/kg					189 (T6)	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Metals																												
Antimony	mg/kg	5.4	NE	12	100	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Arsenic	mg/kg	5.8	100	9	20	3.7	9.2	3.1	NM	NM	4.4	2.4	NM	NM	<4.2	2.2	NM	NM	1.4	3.0	5.7	4	4.7	2.5	5.4	2.7	1.9	3.4
Barium	mg/kg	1700	2000	1100	18000	77.6	110	130	NM	NM	60.6	76.8	NM	NM	117	66	NM	NM	19	147	56.5	124	86.3	22.5	54.5	186	23.5	131
Beryllium	mg/kg	2.7	NE	55	230	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium	mg/kg	8.8	20	25	200	<0.16	2.6	<0.18	NM	NM	0.36	<0.19	NM	NM	<0.63	<0.19	NM	NM	<0.17	<0.2	<0.19	<0.18	<0.17	<0.18	<0.16	<0.21	<0.17	<0.18
Chromium	mg/kg	36	100	87	650	20.9	12.2	29.8	NM	NM	8.8	21.8	NM	NM	11.1	16.8	NM	NM	10	30.3	9.7	34.6	22.2	13.4	13.8	38.7	8.5	28.8
Copper	mg/kg	700	NE	100	9000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Lead	mg/kg	2700	100	300	700	27	461	6.6	65	22.5	20.8	4.6	113	151	160	4.1	423	5.5	2.3	6.3	210	8.4	56.4	10.4	68.3	11.2	12.2	6.2
Mercury	mg/kg	3.3	4	0.5	1.5	0.083	0.38	<0.021	NM	NM	1.2	<0.022	NM	NM	0.4	<0.024	NM	NM	<0.022	<0.025	0.41	0.022	6.8	<0.024	0.15	0.039	<0.021	<0.024
Nickel	mg/kg	180	NE	560	2500	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Selenium	mg/kg	2.6	20	160	1300	<1.1	<2.3	<1.2	NM	NM	<1.2	<1.2	NM	NM	<4.2	<1.3	NM	NM	<1.1	<1.3	<1.2	<1.2	<1.2	<1.2	<1.1	<1.4	<1.2	<1.2
Silver	mg/kg	7.9	100	160	1300	<0.55	<1.2	<0.6	NM	NM	<0.62	<0.62	NM	NM	<2.1	<0.64	NM	NM	<0.56	<0.65	<0.62	<0.61	<0.58	<0.6	<0.53	<0.7	<0.58	<0.6
Zinc	mg/kg	3000	NE	8700	75000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TCLP Metals																												
Lead TCLP	mg/L	5 mg/L TCLP Lead hazardous limit				NM	<0.05	NM	NM	NM	NM	NM	NM	NM	NM	NM	0.16	NM	NM	NM	0.099	NM	NM	NM	NM	NM	NM	NM
Mercury TCLP	mg/L	0.2 mg/L TCLP Mercury hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<0.0006	NM	NM	NM	NM	NM
Cadmium TCLP	mg/L	1.0 mg/L TCLP Cadmium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Chromium TCLP	mg/L	5.0 mg/L TCLP Chromium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
PCBs																												
PCBs (Polychlorinated Biphenyls)	mg/kg	NE	NE	1.2	8	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	BRL	NM	NM	NM	NM	NM	NM	NM
Herbicides and Pesticides																												
2,4-D	mg/kg	0.5	200	0.5	0.5	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Triclopyr	mg/kg	0.3	NE	0.3	0.3	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Semi-VOCs																												
1-Methylnaphthalene	mg/kg	NE	NE	NE	NE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2,4-Dinitrotoluene	mg/kg	0.013	2.6	50	355	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
2-Methylnaphthalene	mg/kg	NE	NE	100	369	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Acenaphthene	mg/kg	81	NE	1200	5260	<0.12	<0.023	<0.013	NM	NM	<0.013	<0.013	NM	NM	<0.045	<0.014	NM	NM	<0.012	<0.013	12.8	<0.013	<0.012	<0.012	0.014	<0.015	0.082	<0.013
Acenaphthylene	mg/kg	NE	NE	NE	NE	<0.12	<0.023	<0.013	NM	NM	<0.013	<0.013	NM	NM	<0.045	<0.014	NM	NM	<0.012	<0.013	<1.3	<0.013	<0.012	<0.012	<0.011	<0.015	0.013	<0.013
Anthracene	mg/kg	1300	NE	7880	45400	0.31	0.034	<0.013	NM	NM	<0.013	<0.013	NM	NM	<0.045	<0.014	NM	NM	<0.012	<0.013	18.2	<0.013	0.046	<0.012	0.090	<0.015	0.25	<0.013
Benz(a)anthracene	mg/kg	NE	NE	NE	NE	0.84	0.074	<0.013	NM	NM	0.014	<0.013	NM	NM	0.053	<0.014	NM	NM	<0.012	<0.013	22.3	<0.013	0.25	0.051	0.32	<0.015	0.57	<0.013
Benzo(a)pyrene	mg/kg	1.4	NE	2	3	0.75	0.073	<0.013	NM	NM	0.014	<0.013	NM	NM	<0.045	<0.014	NM	NM	<0.012	<0.013	15.7	<0.013	0.22	0.058	0.28	<0.015	0.40	<0.013
Benzo(b)fluoranthene	mg/kg	NE	NE	NE	NE	0.91	0.10	<0.013	NM	NM	0.018	<0.013	NM	NM	0.062	<0.014	NM	NM	<0.012	<0.013	19.6	<0.013	0.29	0.076	0.37	<0.015	0.60	<0.013
Benzo(g,h,i)perylene	mg/kg	NE	NE	NE	NE	0.43	0.045	<0.013	NM	NM	<0.013	<0.013	NM	NM	<0.045	<0.014	NM	NM	<0.012	<0.013	6.7	<0.013	0.15	0.039	0.20	<0.015	0.24	<0.013
Benzo(k)fluoranthene	mg/kg	NE	NE	NE	NE	0.35	0.035	<0.013	NM	NM	<0.013	<0.013	NM	NM	<0.045	<0.014	NM	NM	<0.012	<0.013	6.6	<0.013	0.11	0.032	0.13	<0.015	0.19	<0.013
Carbazole	mg/kg	NE	NE	700	1310	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Chrysene	mg/kg	NE	NE	NE	NE	0.60	0.059	<0.013	NM	NM	<0.013	<0.013	NM	NM	0.046	<0.014	NM	NM	<0.012	<0.013	14.2	<0.013	0.19	0.043	0.27	<0.015	0.42	<0.013
Dibenz(a,h)anthracene	mg/kg	NE	NE	NE	NE	0.12	<0.023	<0.013	NM	NM	<0.013	<0.013	NM	NM	<0.045	<0.014	NM	NM	<0.012	<0.013	2.6	<0.013	0.044	<0.012	0.056	<0.015	0.083	<0.013
Dibenzofuran	mg/kg	NE	NE	104	810	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Fluoranthene	mg/kg	670	NE	1080	6800	1.4	0.15	<0.013	NM	NM	<0.013	<0.013	NM	NM	0.11	<0.014	NM	NM	<0.012	<0.013	39.9	0.024	0.28	0.077	0.53	<0.015	1.1	<0.013
Fluorene	mg/kg	110	NE	850	4120	0.12	0.031	<0.013	NM	NM	<0.013	<0.013	NM	NM	<0.045	<0.014	NM	NM	<0.012	<0.013	14	<0.013	<0.012	<0.012	0.016	<0.015	0.097	<0.013
Indeno(1,2,3-cd)pyrene	mg/kg	NE	NE	NE	NE	0.39	0.047	<0.013	NM	NM	<0.013	<0.013	NM	NM	<0.045	<0.014	NM	NM	<0.012	<0.013	7.1	<0.013	0.13	0.034	0.15	<0.015	0.23	<0.013
Naphthalene	mg/kg	NE	NE	NE	NE	<0.12	0.027	<0.013	NM	NM	0.047	<0.013	NM	NM	<0.045	<0.014	NM	NM	<0.012	<0.013	16.6	<0.013	<0.012	<0.012	0.026	<0.015	0.025	<0.013
Phenanthrene	mg/kg	NE	NE	NE	NE	1.1	0.15	<0.013	NM	NM	0.034	<0.013	NM	NM	0.11	<0.014	NM	NM	<0.012	<0.013	35.7	0.019	0.13	0.033	0.25	<0.015	0.96	<0.013
Pyrene	mg/kg	440	NE	890	5800	1.4	0.11	<0.013	NM	NM	<0.013	<0.013	NM	NM	0.086	<0.014	NM	NM	<0.012	<0.013	34.3	0.02	0.32	0.074	0.52	<0.015	0.90	<0.013
BaP Equivalents																												
Benzo(a)pyrene Equivalents	mg/kg	1.4	NE	2	3	1.1	0.099	<0	NM	NM	0.017	<0	NM	NM	0.012	<0	NM	NM	<0	<0	22.9	<0	0.32	0.078	0.41	<0	0.61	<0
VOCs																												
1,2,4-Trimethylbenzene	mg/kg	2.7	NE	8	25	<0.058	<0.12	<0.07	NM	NM	<0.071	<0.066	NM	NM	<0.22	<0.069	NM	NM	<0.059	<0.063	0.079	<0.064	0.089	<0.062	0.087	<0.075	<0.061	<0.062
1,3,5-Trimethylbenzene	mg/kg	2.7	NE	3	10	<0.058	<0.12	<0.07	NM	NM	<0.071	<0.066	NM	NM	<0.22	<0.069	NM	NM	<0.059	<0.063	<0.067	<0.064	<0.065	<0.062	<0.057	<0.075	<0.061	<0.062
Benzene	mg/kg	0.017	10	6	10	<0.023	<0.05	<0.028	NM	NM	<0.029	<0.026	NM	NM	<0.086	<0.028	NM	NM	<0.024	<0.025	<0.027	<0.026	<0.026	<0.025	<0.023	<0.03	<0.024	<0.025
Chlorobenzene	mg/kg	1.2	2000	11	32	<0.058	<0.12	<0.07	NM	NM	<0.071	<0.066	NM	NM	<0.22	<0.069	NM	NM	<0.059	<0.063	<0.067	<0.064	<0.065	<0.062	<0.057	<0.075	<0.061	<0.062
Diethyl Ether	mg/kg	0.51	NE	NE	NE	<0.23	<0.5	<0.28	NM	NM	<0.29	<0.26	NM	NM	<0.86	<0.28	NM	NM	<0.24	<0.25	<0.27	<0.26	<0.26	<0.25	<0.23	<0.3	<0.24	<0.25
Ethylbenzene	mg/kg	1.1	NE	200	200	<0.058	<0.12	<0.07	NM	NM	<0.071	<0.066	NM	NM	<0.22	<0.069	NM	NM	<0.059	<0.063	<0.067	<0.064	<0.065	<0.062	<0.057	<0.075	<0.061	<0.062
Isopropylbenzene	mg/kg	9.5	NE	30	87	<0.058	<0.12	<0.07	NM	NM	<0.071	<0.066	NM	NM	<0.22	<0.069	NM	NM	<0.059	<0.063	<0.067	<0.064	<0.065	<0.062	<0.057	<0.075	<0.061	<0.062
Naphthalene	mg/kg	4.5	NE	10	28	<0.23	<0.5	<0.28	NM	NM	<0.29	<0.26	NM	NM	<0.86	<0.28	NM	NM	<0.24	<0.25	0.93	<0.26	<0.26	<0.25	<0.23	<0.3	<0.24	<0.25
n-Butylbenzene	mg/kg	NE	NE	30	92	<0.058	<0.12	<0.07	NM	NM	<0.071	<0.066	NM	NM	<0.22	<0.069	NM	NM	<0.059	<0.063	<0.067	<0.064	<0.065	<0.062	<0.057	<0.075	<0.061	<0.062
n-Propylbenzene	mg/kg	NE	NE	30	93	<0.058	<0.12	<0.07	NM	NM	<0.071	<0.066	NM	NM	<0.22	<0.069	NM	NM	<0.059	<0.063	<0.067	<0.064	<0.065	<0.062	<0.057	<0.075	<0.061	<0.062
p-Isopropyltoluene	mg/kg	NE	NE	NE	NE	<0.058	<0.12	<0.07	NM	NM	<0.071	<0.066	NM	NM	<0.22	<0.069	NM	NM	<0.059	<0.063	0.085	<0.064	<0.065	<0.062	<0.057	<0.075	<0.061	<0.062
sec-Butylbenzene	mg/kg	NE	NE	25	70	<0.058	<0.12	<0.07	NM	NM	<0.071	<0.066	NM	NM	<0.22	<0.069	NM	NM	<0.059	<0.063	<0.067	<0.064	<0.065	<0.062	<0.057	<0.075	<0.061	<0.062
tert-Butylbenzene	mg/kg	NE	NE	30	90	<0.058	<0.12	<0.07	NM	NM	<0.071	<0.066	NM	NM	<0.22	<0.069	NM	NM	<0.059	<0.063	<0.067	<0.064	<0.065	<0.062	<0.057	<0.075	<0.061	<0.062
Tetrachloroethene	mg/kg	0.042	14	72	131	<0.058	<0.12	<0.07	NM	NM	<0.071	<0.066	NM	NM	<0.22	<0.069	NM	NM	<0.059	<0.063	<0.067	<0.064	<0.065	<0.062	<0.057	<0.075	<0.061	<0.062
Toluene	mg/kg	2.5	NE	107	305	<0.058	<0.12	<0.07	NM	NM	<0.071	<0.066	NM	NM	<0.22	<0.069	NM	NM	<0.059	<0.063	<0.067	<0.064	0.087	<0.062	0.066	<0.075	<0.061	<0.062
Trichloroethene	mg/kg	0.0023	10	29	46	<0.058	<0.12	<0.07	NM	NM	<0.071	<0.066	NM	NM	<0.22	<0.069	NM	NM	<0.059	<0.063	<0.067	<0.064	<0.065	<0.062	<0.057	<0.075	<0.061	<0.062
Xylene (Total)	mg/kg	5.4	NE	45	130	<0.17	<0.37	<0.21	NM	NM	<0.21	<0.2	NM	NM	<0.65	<0.21	NM	NM	<0.18	<0.19	<0.2	<0.19	<0.19	<0.19	<0.17	<0.22	<0.18	<0.19

Notes:

A full list of abbreviations is included in the table glossery

Table 2
Soil Analytical Results

Phase II Environmental Site Assessment
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

				Borings are ordered by Area:		I-35 Low-Level Bridge Demolition																						
Boring ID	Units	*2014 Screening SLV*	20xTCLP level	Tier 1 Residential SRV	**Tier 2 Industrial SRV**	GP-245	GP-245	GP-232	GP-232	GP-232	GP-232	GP-232	GP-232	GP-232	GP-230	GP-230	GP-230	GP-230	GP-231	GP-231	GP-231	GP-231	GP-231	GP-231	GP-231	GP-242	GP-242	GP-242
Field Sample ID						GP-245-1.75	GP-245-10	GP-232-0.5	GP-232-1.5	GP-232-3	GP-232-6	GP-232-15	GP-232-0.5	GP-232-1.5	GP-230-0.5	GP-230-1.5	GP-230-3	GP-230-13.5	GP-231-0.5	GP-231-1.5	GP-231-3	GP-231-7.5	GP-231-15	GP-231-0.5	GP-231-1.5	GP-242-3.5	GP-242-10	GP-242-14
Laboratory ID						10447462004	10447462005	10475884021	10475884022	10475884023	10475884024	10475884026	10479785003	10479785004	10475884027	10475884028	10475884029	10475884030	10476121001	10476121002	10476121003	10476121005	10476121025	10479785001	10479785002	10447922022	10447922023	10447922024
Sample Date						9/12/2018	9/12/2018	5/21/2019	5/21/2019	5/21/2019	5/21/2019	5/21/2019	6/17/2019	6/17/2019	5/21/2019	5/21/2019	5/21/2019	5/21/2019	5/21/2019	5/21/2019	5/21/2019	5/21/2019	5/21/2019	6/17/2019	6/17/2019	9/18/2018	9/18/2018	9/18/2018
DRO and GRO																												
Diesel Range Organics	mg/kg	The MPCA Unregulated Fill Criteria for DRO and GRO is <100 mg/kg				24.7 (T7,T6)	<10.4	NM	NM	10.5 (T6)	<10.9	NM	NM	NM	NM	NM	<10.2	NM	NM	NM	NM	NM	NM	NM	NM	14.9 (T6)	<9.1	<10.4
Gasoline Range Organics	mg/kg					<12.5 (R1)	<13.2	NM	NM	<11.6	<13.8	<14.3	NM	NM	NM	NM	<12.3	<69.6 (3M)	NM	NM	<10.8 (G+)	<12.7	<12.6	NM	NM	<14	<14.2	<14.1
WDRO C10-C28 Silica Gel	mg/kg					NM	NM	NM	NM	NM	NM	<11.5	NM	NM	NM	NM	NM	84.3 (T7,T6)	NM	NM	<9	26.5 (T6)	<10.6	NM	NM	NM	NM	NM
Metals																												
Antimony	mg/kg	5.4	NE	12	100	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Arsenic	mg/kg	5.8	100	9	20	3.7	<6 (D3)	2.0	1.7	2.1	<6.4 (D3)	4.6	NM	NM	2.5	1.9	2.2	<5.2	<5.3 (D3)	6.4	2.8	3.0	3.5	NM	NM	3.6	<1.2	1.9
Barium	mg/kg	1700	2000	1100	18000	96.9	190	37.1	30.3	36.1	179	157	NM	NM	133	31.6	32.1	56.8	54.9 (M1)	120	25.9	88.4	123	NM	NM	25.9	8.8	105
Beryllium	mg/kg	2.7	NE	55	230	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium	mg/kg	8.8	20	25	200	<0.17	<0.91 (D3)	<0.17	<0.15	<0.15	<0.96 (D3)	<0.4 (D3)	NM	NM	<0.34 (D3)	<0.16	<0.19	<0.78	<0.79 (D3)	0.42	<0.16	<0.18	<0.2	NM	NM	<0.18	<0.18	<0.19
Chromium	mg/kg	36	100	87	650	23.9	43.6	13.6	10.1	17.9	44.9	37.5	NM	NM	8.3	13.3	12.6	10.2	26.8	14.6	14.1	23.6	33.9	NM	NM	8.2	3.6	32.7
Copper	mg/kg	700	NE	100	9000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Lead	mg/kg	2700	100	300	700	14.8	9.2	7.7	8.1	2.9	9.0	9.4	NM	NM	13.9	2.7	17.4	2.9	155	56.2	21.4	5.7	5.8	NM	NM	43.1	1.1	7.4
Mercury	mg/kg	3.3	4	0.5	1.5	<0.022	<0.023	NM	NM	<0.0235	<0.0277	0.0311	0.033	<0.022	0.031	<0.02	0.0329	<0.11	NM	NM	0.199	<0.0253	<0.0254	0.078	0.11	0.031	<0.023	0.027
Nickel	mg/kg	180	NE	560	2500	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Selenium	mg/kg	2.6	20	160	1300	<1.1	<6 (D3)	<1.1	<1	<1	<6.4 (D3)	<2.7 (D3,M1)	NM	NM	<2.3 (D3)	<1	<1.2	<5.2	<5.3 (D3)	<1.1	<1.1	<1.2	<1.3	NM	NM	<1.2	<1.2	<1.3
Silver	mg/kg	7.9	100	160	1300	<0.56	<3 (D3)	<0.56	<0.51	<0.52	<3.2 (D3)	<1.3 (D3)	NM	NM	<1.1 (D3)	<0.52	<0.62	<2.6	<2.6 (D3)	<0.55	<0.55	<0.6	<0.65	NM	NM	<0.59	<0.59	<0.64
Zinc	mg/kg	3000	NE	8700	75000	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
TCLP Metals																												
Lead TCLP	mg/L	5 mg/L TCLP Lead hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<0.5	NM	NM	NM	NM	NM	NM	NM	NM	NM
Mercury TCLP	mg/L	0.2 mg/L TCLP Mercury hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium TCLP	mg/L	1.0 mg/L TCLP Cadmium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Chromium TCLP	mg/L	5.0 mg/L TCLP Chromium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
PCBs																												
PCBs (Polychlorinated Biphenyls)	mg/kg	NE	NE	1.2	8	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Herbicides and Pesticides																												
2,4-D	mg/kg	0.5	200	0.5	0.5	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Triclopyr	mg/kg	0.3	NE	0.3	0.3	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Semi-VOCs																												
1-Methylnaphthalene	mg/kg	NE	NE	NE	NE	NM	NM	NM	NM	<0.0391	NM	NM	NM	NM	NM	NM	<0.0373	<1.75	NM	NM	0.112	<0.0422	<0.0423	NM	NM	NM	NM	NM
2,4-Dinitrotoluene	mg/kg	0.013	2.6	50	355	NM	NM	NM	NM	<0.391	NM	NM	NM	NM	NM	NM	<0.373	<17.5	NM	NM	<0.408	<0.422	<0.423	NM	NM	NM	NM	NM
2-Methylnaphthalene	mg/kg	NE	NE	100	369	NM	NM	NM	NM	<0.0391	NM	NM	NM	NM	NM	NM	<0.0373	<1.75	NM	NM	0.152	<0.0422	<0.0423	NM	NM	NM	NM	NM
Acenaphthene	mg/kg	81	NE	1200	5260	<0.012	<0.013	NM	NM	<0.0391	<0.0083	<0.00856	NM	NM	NM	NM	<0.0373	<1.75	NM	NM	0.116	<0.0422	<0.0423	NM	NM	0.058	<0.012	<0.013
Acenaphthylene	mg/kg	NE	NE	NE	NE	<0.012	<0.013	NM	NM	<0.0391	<0.0083	<0.00856	NM	NM	NM	NM	<0.0373	<1.75	NM	NM	0.0458	<0.0422	<0.0423	NM	NM	0.025	<0.012	<0.013
Anthracene	mg/kg	1300	NE	7880	45400	0.022	<0.013	NM	NM	<0.0391	<0.0083	<0.00856	NM	NM	NM	NM	<0.0373	<1.75	NM	NM	0.267	<0.0422	<0.0423	NM	NM	0.088	<0.012	<0.013
Benz(a)anthracene	mg/kg	NE	NE	NE	NE	0.054	<0.013	NM	NM	<0.0391	<0.0083	<0.00856	NM	NM	NM	NM	<0.0373	<1.75	NM	NM	0.386	<0.0422	<0.0423	NM	NM	0.26	<0.012	<0.013
Benzo(a)pyrene	mg/kg	1.4	NE	2	3	0.061	<0.013	NM	NM	0.0466	<0.0083	<0.00856	NM	NM	NM	NM	<0.0373	<1.75	NM	NM	0.282	<0.0422	<0.0423	NM	NM	0.24	<0.012	<0.013
Benzo(b)fluoranthene	mg/kg	NE	NE	NE	NE	0.070	<0.013	NM	NM	<0.0391	<0.0083	<0.00856	NM	NM	NM	NM	<0.0373	<1.75	NM	NM	0.371	<0.0422	<0.0423	NM	NM	0.34	<0.012	<0.013
Benzo(g,h,i)perylene	mg/kg	NE	NE	NE	NE	0.035	<0.013	NM	NM	<0.0391	<0.0083	<0.00856	NM	NM	NM	NM	<0.0373	<1.75	NM	NM	0.153	<0.0422	<0.0423	NM	NM	0.15	<0.012	<0.013
Benzo(k)fluoranthene	mg/kg	NE	NE	NE	NE	0.033	<0.013	NM	NM	<0.0391	<0.0083	<0.00856	NM	NM	NM	NM	<0.0373	<1.75	NM	NM	0.132	<0.0422	<0.0423	NM	NM	0.11	<0.012	<0.013
Carbazole	mg/kg	NE	NE	700	1310	NM	NM	NM	NM	<0.391	NM	NM	NM	NM	NM	NM	<0.373	<17.5	NM	NM	<0.408	<0.422	<0.423	NM	NM	NM	NM	NM
Chrysene	mg/kg	NE	NE	NE	NE	0.047	<0.013	NM	NM	<0.0391	<0.0083	<0.00856	NM	NM	NM	NM	<0.0373	<1.75	NM	NM	0.334	<0.0422	<0.0423	NM	NM	0.21	<0.012	<0.013
Dibenz(a,h)anthracene	mg/kg	NE	NE	NE	NE	<0.012	<0.013	NM	NM	<0.0391	<0.0083	<0.00856	NM	NM	NM	NM	<0.0373	<1.75	NM	NM	0.0462	<0.0422	<0.0423	NM	NM	0.056	<0.012	<0.013
Dibenzofuran	mg/kg	NE	NE	104	810	NM	NM	NM	NM	<0.391	NM	NM	NM	NM	NM	NM	<0.373	<17.5	NM	NM	<0.408	<0.422	<0.423	NM	NM	NM	NM	NM
Fluoranthene	mg/kg	670	NE	1080	6800	0.10	<0.013	NM	NM	<0.0391	<0.0083	<0.00856	NM	NM	NM	NM	<0.0373	<1.75	NM	NM	0.68	<0.0422	<0.0423	NM	NM	0.42	<0.012	<0.013
Fluorene	mg/kg	110	NE	850	4120	<0.012	<0.013	NM	NM	<0.0391	<0.0083	<0.00856	NM	NM	NM	NM	<0.0373	<1.75	NM	NM	0.142	<0.0422	<0.0423	NM	NM	0.043	<0.012	<0.013
Indeno(1,2,3-cd)pyrene	mg/kg	NE	NE	NE	NE	0.031	<0.013	NM	NM	<0.0391	<0.0083	<0.00856	NM	NM	NM	NM	<0.0373	<1.75	NM	NM	0.184	<0.0422	<0.0423	NM	NM	0.14	<0.012	<0.013
Naphthalene	mg/kg	NE	NE	NE	NE	<0.012	<0.013	NM	NM	<0.0391	<0.0277	<0.0285	NM	NM	NM	NM	<0.0373	<1.75	NM	NM	0.135	<0.0422	<0.0423	NM	NM	0.038	<0.012	<0.013
Phenanthrene	mg/kg	NE	NE	NE	NE	0.081	<0.013	NM	NM	<0.0391	<0.0083	<0.00856	NM	NM	NM	NM	<0.0373	<1.75	NM	NM	0.905	<0.0422	<0.0423	NM	NM	0.31	<0.012	<0.013
Pyrene	mg/kg	440	NE	890	5800	0.093	<0.013	NM	NM	<0.0391	<0.0083	<0.00856	NM	NM	NM	NM	<0.0373	<1.75	NM	NM	0.609	<0.0422	<0.0423	NM	NM	0.39	<0.012	<0.013
BaP Equivalents																												
Benzo(a)pyrene Equivalents	mg/kg	1.4	NE	2	3	0.080	<0	NM	NM	0.0466	<0	<0	NM	NM	NM	NM	<0	<0	NM	NM	0.419	<0	<0	NM	NM	0.36	<0	<0
VOCs																												
1,2,4-Trimethylbenzene	mg/kg	2.7	NE	8	25	<0.061	<0.069	NM	NM	<0.054	<0.072	<0.072	NM	NM	NM	NM	<0.061	<0.55	NM	NM	<0.056	<0.065	<0.067	NM	NM	<0.066	<0.064	<0.068
1,3,5-Trimethylbenzene	mg/kg	2.7	NE	3	10	<0.061	<0.069	NM	NM	<0.054	<0.072	<0.072	NM	NM	NM	NM	<0.061	<0.55	NM	NM	<0.056	<0.065	<0.067	NM	NM	<0.066	<0.064	<0.068
Benzene	mg/kg	0.017	10	6	10	<0.024	<0.027	NM	NM	0.053	<0.029	<0.029	NM	NM	NM	NM	<0.024	<0.22	NM	NM	<0.022	<0.026	<0.027	NM	NM	<0.027	<0.025	<0.027
Chlorobenzene	mg/kg	1.2	2000	11	32	<0.061	<0.069	NM	NM	<0.054	<0.072	<0.072	NM	NM	NM	NM	<0.061	<0.55	NM	NM	<0.056	<0.065	<0.067	NM	NM	<0.066	<0.064	<0.068
Diethyl Ether	mg/kg	0.51	NE	NE	NE	<0.24	<0.27	NM	NM	<0.22	<0.29	<0.29	NM	NM	NM	NM	<0.24	<2.2	NM	NM	<0.22	<0.26	<0.27	NM	NM	<0.27	<0.25	<0.27
Ethylbenzene	mg/kg	1.1	NE	200	200	<0.061	<0.069	NM	NM	<0.054	<0.072	<0.072	NM	NM	NM	NM	<0.061	<0.55	NM	NM	<0.056	<0.065	<0.067	NM	NM	<0.066	<0.064	<0.068
Isopropylbenzene	mg/kg	9.5	NE	30	87	<0.061	<0.069	NM	NM	<0.054	<0.072	<0.072	NM	NM	NM	NM	<0.061	<0.55	NM	NM	<0.056	<0.065	<0.067	NM	NM	<0.066	<0.064	<0.068
Naphthalene	mg/kg	4.5	NE	10	28	<0.24	<0.27	NM	NM	<0.22	<0.29	<0.29	NM	NM	NM	NM	<0.24	<2.2	NM	NM	<0.22	<0.26	<0.27	NM	NM	<0.27	<0.25	<0.27
n-Butylbenzene	mg/kg	NE	NE	30	92	<0.061	<0.069	NM	NM	<0.054 (L2)	<0.072 (L2)	<0.072 (L2)	NM	NM	NM	NM	<0.061 (L2)	<0.55 (L2)	NM	NM	<0.056 (L2)	<0.065 (L2)	<0.067 (L2)	NM	NM	<0.066	<0.064	<0.068
n-Propylbenzene	mg/kg	NE	NE	30	93	<0.061	<0.069	NM	NM	<0.054	<0.072	<0.072	NM	NM	NM	NM	<0.061	<0.55	NM	NM	<0.056	<0.065	<0.067	NM	NM	<0.066	<0.064	<0.068
p-Isopropyltoluene	mg/kg	NE	NE	NE	NE	<0.061	<0.069	NM	NM	<0.054	<0.072	<0.072	NM	NM	NM	NM	<0.061	<0.55	NM	NM	<0.056	<0.065	<0.067	NM	NM	<0.066	<0.064	<0.068
sec-Butylbenzene	mg/kg	NE	NE	25	70	<0.061	<0.069	NM	NM	<0.054	<0.072	<0.072	NM	NM	NM	NM	<0.061	<0.55	NM	NM	<0.056	<0.065	<0.067	NM	NM	<0.066	<0.064	<0.068
tert-Butylbenzene	mg/kg	NE	NE	30	90	<0.061	<0.069	NM	NM	<0.054	<0.072	<0.072	NM	NM	NM	NM	<0.061	<0.55	NM	NM	<0.056	<0.065	<0.067	NM	NM	<0.066	<0.064	<0.068
Tetrachloroethene	mg/kg	0.042	14	72	131	<0.061	<0.069	NM	NM	<0.054	<0.072	<0.072	NM	NM	NM	NM	<0.061	<0.55	NM	NM	<0.056	<0.065	<0.067	NM	NM	<0.066	<0.064	<0.068
Toluene	mg/kg	2.5	NE	107	305	<0.061	<0.069	NM	NM	0.089	<0.072	<0.072	NM	NM	NM	NM	<0.061	<0.55	NM	NM	<0.056	<0.065	<0.067	NM	NM	<0.066	<0.064	<0.068
Trichloroethene	mg/kg	0.0023	10	29	46	<0.061	<0.069	NM	NM	<0.054	<0.072	<0.072	NM	NM	NM	NM	<0.061	<0.55	NM	NM	<0.056	<0.065	<0.067	NM	NM	<0.066	<0.064	<0.068
Xylene (Total)	mg/kg	5.4	NE	45	130	<0.18	<0.21	NM	NM	<0.16	<0.22	<0.21	NM	NM	NM	NM	<0.18	<1.6	NM	NM	<0.17	<0.19	<0.2	NM	NM	<0.2	<0.19	<0.2

Notes:

A full list of abbreviations is included in the table glossery

Table 2
Soil Analytical Results

Phase II Environmental Site Assessment
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

					Borings are ordered by Area:	I-35 Low-Level Bridge Demolition								
Boring ID	Units	*2014 Screening SLV*	20xTCLP level	Tier 1 Residential SRV	**Tier 2 Industrial SRV**	GP-246	GP-246	GP-246	GP-248	GP-248	GP-248	GP-250	GP-250	GP-250
Field Sample ID						GP-246-2	GP-246-6.5	GP-246-15	GP-248-1	GP-248-3.5	GP-248-15	GP-250-3	GP-250-7.5	GP-250-15
Laboratory ID						10447955005	10447955006	10447955007	10447955001	10447955002	10447955003	10447955010	10447955011	10447955012
Sample Date						9/17/2018	9/17/2018	9/17/2018	9/17/2018	9/17/2018	9/17/2018	9/17/2018	9/17/2018	9/17/2018
DRO and GRO														
Diesel Range Organics	mg/kg	The MPCA Unregulated Fill Criteria for DRO and GRO is <100 mg/kg				NM	NM	<10.3	<8.2	<9.8	<10.2	24.7 (T7,T6)	83.1 (T7,T6)	<10.2
Gasoline Range Organics	mg/kg					<14.4	<20.8 (2M)	<15.5	<12.7	<12.2	<12.7	<18.7	<43.3	<13.1
WDRO C10-C28 Silica Gel	mg/kg					59.7 (T7,T6)	14.1	NM	NM	NM	NM	NM	NM	NM
Metals														
Antimony	mg/kg	5.4	NE	12	100	NM	NM	NM	NM	NM	NM	NM	NM	NM
Arsenic	mg/kg	5.8	100	9	20	*7.3*	2.3	3.2	1.6	1.3	2.8	3.2	4.1	2.9
Barium	mg/kg	1700	2000	1100	18000	91.8	156	150	30.8	21	142	102	198	145
Beryllium	mg/kg	2.7	NE	55	230	NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium	mg/kg	8.8	20	25	200	0.56	0.31	<0.2	<0.18	<0.18	<0.19	<0.25	<0.58	<0.19
Chromium	mg/kg	36	100	87	650	14.2	*37.5*	29.8	10.3	9.9	30.5	24.9	21.3	30.6
Copper	mg/kg	700	NE	100	9000	NM	NM	NM	NM	NM	NM	NM	NM	NM
Lead	mg/kg	2700	100	300	700	153	8.8	7.0	3.0	7.2	6.8	84.5	148	7.4
Mercury	mg/kg	3.3	4	0.5	1.5	0.18	0.063	<0.024	<0.023	<0.022	<0.024	0.71	0.33	0.023
Nickel	mg/kg	180	NE	560	2500	NM	NM	NM	NM	NM	NM	NM	NM	NM
Selenium	mg/kg	2.6	20	160	1300	<1.2	<1.6	<1.3	<1.2	<1.2	<1.2	<1.7	<3.9	<1.3
Silver	mg/kg	7.9	100	160	1300	<0.61	<0.8	<0.65	<0.58	<0.6	<0.62	<0.83	<1.9	<0.63
Zinc	mg/kg	3000	NE	8700	75000	NM	NM	NM	NM	NM	NM	NM	NM	NM
TCLP Metals														
Lead TCLP	mg/L	5 mg/L TCLP Lead hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM
Mercury TCLP	mg/L	0.2 mg/L TCLP Mercury hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM
Cadmium TCLP	mg/L	1.0 mg/L TCLP Cadmium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM
Chromium TCLP	mg/L	5.0 mg/L TCLP Chromium hazardous limit				NM	NM	NM	NM	NM	NM	NM	NM	NM
PCBs														
PCBs (Polychlorinated Biphenyls)	mg/kg	NE	NE	1.2	8	NM	NM	NM	NM	NM	NM	NM	NM	NM
Herbicides and Pesticides														
2,4-D	mg/kg	0.5	200	0.5	0.5	NM	NM	NM	NM	NM	NM	NM	NM	NM
Triclopyr	mg/kg	0.3	NE	0.3	0.3	NM	NM	NM	NM	NM	NM	NM	NM	NM
Semi-VOCs														
1-Methylnaphthalene	mg/kg	NE	NE	NE	NE	NM	NM	NM	NM	NM	NM	NM	NM	NM
2,4-Dinitrotoluene	mg/kg	0.013	2.6	50	355	NM	NM	NM	NM	NM	NM	NM	NM	NM
2-Methylnaphthalene	mg/kg	NE	NE	100	369	NM	NM	NM	NM	NM	NM	NM	NM	NM
Acenaphthene	mg/kg	81	NE	1200	5260	0.11	<0.017	<0.013	<0.013	<0.012	<0.012	2.7	<0.039	<0.013
Acenaphthylene	mg/kg	NE	NE	NE	NE	0.074	<0.017	<0.013	<0.013	<0.012	<0.012	0.2	<0.039	<0.013
Anthracene	mg/kg	1300	NE	7880	45400	0.37	<0.017	<0.013	<0.013	<0.012	<0.012	6.5	<0.039	<0.013
Benz(a)anthracene	mg/kg	NE	NE	NE	NE	1.2	<0.017	<0.013	<0.013	<0.012	<0.012	7.3	<0.039	<0.013
Benzo(a)pyrene	mg/kg	1.4	NE	2	3	1.2	<0.017	<0.013	<0.013	<0.012	<0.012	***6.2***	0.056	<0.013
Benzo(b)fluoranthene	mg/kg	NE	NE	NE	NE	1.4	<0.017	<0.013	<0.013	<0.012	<0.012	6.5	<0.039	<0.013
Benzo(g,h,i)perylene	mg/kg	NE	NE	NE	NE	0.75	<0.017	<0.013	<0.013	<0.012	<0.012	3.3	<0.039	<0.013
Benzo(k)fluoranthene	mg/kg	NE	NE	NE	NE	0.62	<0.017	<0.013	<0.013	<0.012	<0.012	2.5	<0.039	<0.013
Carbazole	mg/kg	NE	NE	700	1310	NM	NM	NM	NM	NM	NM	NM	NM	NM
Chrysene	mg/kg	NE	NE	NE	NE	1.1	<0.017	<0.013	<0.013	<0.012	<0.012	5.9	<0.039	<0.013
Dibenz(a,h)anthracene	mg/kg	NE	NE	NE	NE	0.26	<0.017	<0.013	<0.013	<0.012	<0.012	0.92	<0.039	<0.013
Dibenzofuran	mg/kg	NE	NE	104	810	NM	NM	NM	NM	NM	NM	NM	NM	NM
Fluoranthene	mg/kg	670	NE	1080	6800	2.3	<0.017	<0.013	<0.013	<0.012	<0.012	15.5	0.063	<0.013
Fluorene	mg/kg	110	NE	850	4120	0.12	<0.017	<0.013	<0.013	<0.012	<0.012	2.9	<0.039	<0.013
Indeno(1,2,3-cd)pyrene	mg/kg	NE	NE	NE	NE	0.69	<0.017	<0.013	<0.013	<0.012	<0.012	3.0	<0.039	<0.013
Naphthalene	mg/kg	NE	NE	NE	NE	0.19	<0.017	<0.013	<0.013	0.013	<0.012	2.6	<0.039	<0.013
Phenanthrene	mg/kg	NE	NE	NE	NE	1.2	<0.017	<0.013	<0.013	0.017	<0.012	18.1	0.05	<0.013
Pyrene	mg/kg	440	NE	890	5800	1.8	<0.017	<0.013	<0.013	<0.012	<0.012	14.4	0.055	<0.013
BaP Equivalents														
Benzo(a)pyrene Equivalents	mg/kg	1.4	NE	2	3	*1.7*	<0	<0	<0	<0	<0	***8.7***	0.056	<0
VOCs														
1,2,4-Trimethylbenzene	mg/kg	2.7	NE	8	25	0.072	<0.11	<0.068	<0.061	<0.063	<0.067	<0.091	<0.28	<0.065
1,3,5-Trimethylbenzene	mg/kg	2.7	NE	3	10	<0.067	<0.11	<0.068	<0.061	<0.063	<0.067	<0.091	<0.28	<0.065
Benzene	mg/kg	0.017	10	6	10	*<0.027*	*<0.043*	*<0.027*	*<0.024*	*<0.025*	*<0.027*	*<0.037*	*<0.11*	*<0.026*
Chlorobenzene	mg/kg	1.2	2000	11	32	<0.067	<0.11	<0.068	<0.061	<0.063	<0.067	<0.091	<0.28	<0.065
Diethyl Ether	mg/kg	0.51	NE	NE	NE	<0.27	<0.43	<0.27	<0.24	<0.25	<0.27	<0.37	*<1.1*	<0.26
Ethylbenzene	mg/kg	1.1	NE	200	200	<0.067	<0.11	<0.068	<0.061	<0.063	<0.067	<0.091	<0.28	<0.065
Isopropylbenzene	mg/kg	9.5	NE	30	87	<0.067	<0.11	<0.068	<0.061	<0.063	<0.067	<0.091	<0.28	<0.065
Naphthalene	mg/kg	4.5	NE	10	28	<0.27	<0.43	<0.27	<0.24	<0.25	<0.27	<0.37	<1.1	<0.26
n-Butylbenzene	mg/kg	NE	NE	30	92	<0.067	<0.11	<0.068	<0.061	<0.063	<0.067	<0.091	<0.28	<0.065
n-Propylbenzene	mg/kg	NE	NE	30	93	<0.067	<0.11	<0.068	<0.061	<0.063	<0.067	<0.091	<0.28	<0.065
p-Isopropyltoluene	mg/kg	NE	NE	NE	NE	<0.067	<0.11	<0.068	<0.061	<0.063	<0.067	<0.091	<0.28	<0.065
sec-Butylbenzene	mg/kg	NE	NE	25	70	<0.067	<0.11	<0.068	<0.061	<0.063	<0.067	<0.091	<0.28	<0.065
tert-Butylbenzene	mg/kg	NE	NE	30	90	<0.067	<0.11	<0.068	<0.061	<0.063	<0.067	<0.091	<0.28	<0.065
Tetrachloroethene	mg/kg	0.042	14	72	131	*<0.067*	*<0.11*	*<0.068*	*<0.061*	*<0.063*	*<0.067*	*<0.091*	*<0.28*	*<0.065*
Toluene	mg/kg	2.5	NE	107	305	<0.067	<0.11	<0.068	<0.061	<0.063	<0.067	<0.091	<0.28	<0.065
Trichloroethene	mg/kg	0.0023	10	29	46	*<0.067*	*<0.11*	*<0.068*	*<0.061*	*<0.063*	*<0.067*	*<0.091*	*<0.28*	*<0.065*
Xylene (Total)	mg/kg	5.4	NE	45	130	<0.2	<0.33	<0.2	<0.18	<0.19	<0.2	<0.27	<0.84	<0.19

Notes:

A full list of abbreviations is included in the table glossery

Appendix C

2019 Work Package 1 Phase II ESA Groundwater Analytical Results

Table 3
Groundwater Analytical Results
Phase II Environmental Site Assessment
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

			Borings are ordered by Area:	27th Ave W Bridge Replacement			I-35 Profile Correction		WLSSD (Parcel 215)		Miller Creek Replacement			22nd Ave and Coffee Creek Replacement												
Boring ID	Units	2019 MDH Drinking Water	NPDES	GP-102	GP-105	GP-104	GP-133	GP-134	GP-408	GP-409	GP-144	GP-147	GP-263	GP-037	GP-036	GP-152	GP-035	GP-414	GP-414	GP-032	GP-339	GP-031	GP-338	GP-030	GP-284	GP-285
Field Sample ID			surface waters designated as drinking water	GP-102-12.22W	GP-105-3.19W	GP-104-2.90W	GP-133-9.15W	GP-134-9.41W	GP-408-4.48W	GP-409-8.11W	GP-144-2.06W	GP-147-7.54W	GP-263-11.75W	GP-037-6.14W	GP-036-11.61W	GP-152-2.97W	GP-035-1.32W	GP-414-14W	GP-414-14.10W	GP-032-9.93W	GP-339-8.23W	GP-031-9.75W	GP-338-9.88W	GP-030-8.21W	GP-284-10.78W	GP-285-11.28W
Laboratory ID				10442788011	10484853020	10484853017	10452340009	10452340006	10484109003	10484109006	10452149005	10451966004	10452149001	10451751004	10451751008	10451751014	10451751011	10484416001	10484109014	10447922016	10474744010	10447922013	10474744013	10447922006	10474744006	10474487015
Sample Date				8/8/2018	7/25/2019	7/25/2019	10/18/2018	10/18/2018	7/22/2019	7/22/2019	10/17/2018	10/16/2018	10/16/2018	10/15/2018	10/15/2018	10/15/2018	10/15/2018	7/22/2019	7/22/2019	9/18/2018	5/13/2019	9/18/2018	5/13/2019	9/17/2018	5/13/2019	5/10/2019
DRO and GRO																										
Diesel Range Organics	ug/l	50	200	<125	155 (T6)	148 (T6)	NM	NM	138	NM	125	NM	NM	208	125	NM	NM	NM	NM	366	NM	723 (T6)	NM	1410 (T7,T6)	NM	271 (T6)
Gasoline Range Organics	ug/l	50	200	<125	<125	<125	<125	<125	<125	<125	<125	<125	<125	<125	<125	<125	<125	NM	<125 (L2)	<125	<125 (L2)	<125	<125 (L2)	<125	<125 (L2)	<125 (L2)
WDRO C10-C28 Silica Gel	ug/l	50	200	NM	NM	NM	<100	<98	NM	<98.2	NM	<98	442	NM	NM	138	<104	NM	<110	NM	2010 (T7,T6)	NM	473 (T6)	NM	235 (T6)	NM
Metals																										
Barium, Dissolved	ug/l	2000	NE	455	113	221	514	290	373	397	266	392	243	478	252	263	447	482	NM	235	164	153	134	207	58.6	199
Zinc, Dissolved	ug/l	2000	NE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<20	NM	<20	NM	42.4	25.8
PCBs																										
PCBs (Polychlorinated Biphenyls)	ug/l	0.04	NE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Herbicides and Pesticides																										
All Herbicides and Pesticides	ug/l	NE	NE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Semi-VOCs																										
Acenaphthene	ug/l	100	20	0.043	<0.04	1.2	<10.9 (L2)	<0.044	<0.041	<0.039	<11.6	<9.7	<9.7	<10 (L2)	<9.8 (L2)	<10 (L2)	<9.8 (L2)	<14.3	NM	<10.2	<10	<10.4	<10	<10.5	<10	<10.1
Acenaphthylene	ug/l	NE	NE	<0.041	<0.04	<0.046	<10.9 (L2)	<0.044	<0.041	<0.039	<11.6	<9.7	<9.7	<10 (L2)	<9.8 (L2)	<10 (L2)	<9.8 (L2)	<14.3	NM	<10.2	<10	<10.4	<10	<10.5	<10	<10.1
Anthracene	ug/l	600	0.035	0.084	<0.04	0.29	<10.9 (L2)	<0.044	<0.041	<0.039	<11.6	<9.7	<9.7	<10 (L2)	<9.8 (L2)	<10 (L2)	<9.8 (L2)	<14.3	NM	<10.2	<10	<10.4	<10	<10.5	<10	<10.1
Benz(a)anthracene	ug/l	NE	NE	0.35	<0.04	<0.046	<10.9 (L2)	<0.044	<0.041	<0.039	<11.6	<9.7	<9.7	<10 (L2)	<9.8 (L2)	<10 (L2)	<9.8 (L2)	<14.3	NM	<10.2	<10	<10.4	<10	<10.5	<10	<10.1
Benzo(a)pyrene	ug/l	0.1	NE	0.34	<0.04	<0.046	<10.9 (L2)	<0.044	<0.041	<0.039	<11.6	<9.7	<9.7	<10 (L2)	<9.8 (L2)	<10 (L2)	<9.8 (L2)	<14.3	NM	<10.2	<10	<10.4	<10	<10.5	<10	<10.1
Benzo(b)fluoranthene	ug/l	NE	NE	0.43	<0.04	<0.046	<10.9 (L2)	<0.044	<0.041	<0.039	<11.6	<9.7	<9.7	<10 (L2)	<9.8 (L2)	<10 (L2)	<9.8 (L2)	<14.3	NM	<10.2	<10	<10.4	<10	<10.5	<10	<10.1
Benzo(g,h,i)perylene	ug/l	NE	NE	0.23	<0.04	<0.046	<10.9 (L2)	<0.044	<0.041	<0.039	<11.6	<9.7	<9.7	<10 (L2)	<9.8 (L2)	<10 (L2)	<9.8 (L2)	<14.3	NM	<10.2	<10	<10.4	<10	<10.5	<10	<10.1
Benzo(k)fluoranthene	ug/l	NE	NE	0.17	<0.04	<0.046	<10.9 (L2)	<0.044	<0.041	<0.039	<11.6	<9.7	<9.7	<10 (L2)	<9.8 (L2)	<10 (L2)	<9.8 (L2)	<14.3	NM	<10.2	<10	<10.4	<10	<10.5	<10	<10.1
bis(2-Ethylhexyl)phthalate	ug/l	7	NE	NM	NM	NM	<10.9	NM	NM	NM	<11.6	<9.7	<9.7	<10	<9.8	<10	14.7 (1M)	<14.3	NM	<10.2	<10	<10.4	<10	<10.5	<10	<10.1
Chrysene	ug/l	NE	NE	0.3	<0.04	<0.046	<10.9 (L2)	<0.044	<0.041	<0.039	<11.6	<9.7	<9.7	<10 (L2)	<9.8 (L2)	<10 (L2)	<9.8 (L2)	<14.3	NM	<10.2	<10	<10.4	<10	<10.5	<10	<10.1
Dibenz(a,h)anthracene	ug/l	NE	NE	0.055	<0.04	<0.046	<10.9 (L2)	<0.044	<0.041	<0.039	<11.6	<9.7	<9.7	<10 (L2)	<9.8 (L2)	<10 (L2)	<9.8 (L2)	<14.3	NM	<10.2	<10	<10.4	<10	<10.5	<10	<10.1
Fluoranthene	ug/l	70	1.9	0.6	<0.04	0.16	<10.9 (L2)	<0.044	<0.041	<0.039	<11.6	<9.7	<9.7	<10 (L2)	<9.8 (L2)	<10 (L2)	<9.8 (L2)	<14.3	NM	<10.2	<10	<10.4	<10	<10.5	<10	<10.1
Fluorene	ug/l	80	NE	0.045	<0.04	0.78	<10.9 (L2)	<0.044	<0.041	<0.039	<11.6	<9.7	<9.7	<10 (L2)	<9.8 (L2)	<10 (L2)	<9.8 (L2)	<14.3	NM	<10.2	<10	<10.4	<10	<10.5	<10	<10.1
Indeno(1,2,3-cd)pyrene	ug/l	NE	NE	0.19	<0.04	<0.046	<10.9 (L2)	<0.044	<0.041	<0.039	<11.6	<9.7	<9.7	<10 (L2)	<9.8 (L2)	<10 (L2)	<9.8 (L2)	<14.3	NM	<10.2	<10	<10.4	<10	<10.5	<10	<10.1
Naphthalene	ug/l	NE	NE	0.041	<0.04	0.71	<10.9 (L2)	0.079	<0.041	<0.039	<11.6	<9.7	<9.7	<10 (L2)	<9.8 (L2)	<10 (L2)	<9.8 (L2)	<14.3 (L2)	NM	<10.2	<10	<10.4	<10	<10.5	<10	<10.1
Phenanthrene	ug/l	NE	3.6	0.26	<0.04	1.2	<10.9 (L2)	0.076	<0.041	<0.039	<11.6	<9.7	<9.7	<10 (L2)	<9.8 (L2)	<10 (L2)	<9.8 (L2)	<14.3	NM	<10.2	<10	<10.4	<10	<10.5	<10	<10.1
Pyrene	ug/l	50	NE	0.63	<0.04	0.094	<10.9 (L2)	<0.044	<0.041	<0.039	<11.6	<9.7	<9.7	<10 (L2)	<9.8 (L2)	<10 (L2)	<9.8 (L2)	<14.3	NM	<10.2	<10	<10.4	<10	<10.5	<10	<10.1
NPDES General Permit																										
PAHs - Carcinogenic	ug/l	NE	0.028	2.1	<0	<0	<0 (L2)	<0	<0	<0	<0	<0	<0	<0 (L2)	<0 (L2)	<0 (L2)	<0 (L2)	<0	NM	<0	<0	<0	<0	<0	<0	<0
PAHs - Non carcinogenic	ug/l	NE	0.28	1.6	<0	2.5	<0 (L2)	0.076	<0	<0	<0	<0	<0	<0 (L2)	<0 (L2)	<0 (L2)	<0 (L2)	<0	NM	<0	<0	<0	<0	<0	<0	<0
VOCs																										
1,2,4-Trimethylbenzene	ug/l	100	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NM	<1	<1	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/l	100	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NM	<1	<1	<1	<1	<1	<1	<1	<1
2-Butanone	ug/l	4000	90	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	NM	5.4	<5	<5	<5	<5	<5	<5	<5
Acetone	ug/l	4000	NE	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	NM	<20	<20	<20	<20	<20	<20	<20	<20
Benzene	ug/l	2	5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	2	<1	NM	<1	<1	<1	<1	<1	<1	1.7	<1
Bromodichloromethane	ug/l	3	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NM	<1	<1	<1	<1	<1	<1	<1	<1
Chloroethane	ug/l	NE	NE	<1	<4	<4	<1	<1	<1	<1	<4	<1	<1	<1	<1	<1	<1	NM	<1	<1	<1	<1	<1	<1	<1	<1
Chloroform	ug/l	20	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NM	<1	<1	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	ug/l	6	70	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NM	<1	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	ug/l	40	5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NM	<1	<1	<1	<1	<1	<1	<1	<1
Isopropylbenzene	ug/l	300	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NM	<1	<1	<1	<1	<1	<1	<1	<1
Naphthalene	ug/l	70	20	<4	<4	<4	<4	<4	<4	<4	9.7 (C8)	<4	<4	<4	<4	<4	<4	NM	<4	<4	<4	<4	<4	<4	<4	<4
n-Butylbenzene	ug/l	NE	NE	<1	<1	<1	<4	<4	<1	<1	<4 (L2)	<1	<4	<1	<1	<1	<1	NM	<1	<1	<1	<1	<1	<1	<1	<1
n-Propylbenzene	ug/l	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NM	<1	<1	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	ug/l	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1 (L2)	3.3	<1	<1	<1	<1	<1	NM	<1	3.1	3.6	22.1	<1	21.3	<1	<1
sec-Butylbenzene	ug/l	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NM	<1	<1	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	ug/l	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NM	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	ug/l	200	5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1.8	<1	NM	<1	<1	<1	<1	<1	<1	<1	<1
Trichloroethene	ug/l	0.4	5	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	NM	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Vinylchloride	ug/l	0.2	0.18	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	NM	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylene (Total)	ug/l	300	5	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	NM	<3	<3	<3	<3	<3	<3	<3	<3

Notes:

A full list of abbreviations is included in the table glossery

Table 3
Groundwater Analytical Results
Phase II Environmental Site Assessment
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

			Borings are ordered by Area:	22nd Ave and Coffee Creek Replacement																		Reconnect Michigan St to Lower Michigan St		Parcel 226		
Boring ID	Units	2019 MDH Drinking Water	NPDES surface waters designated as drinking water	GP-029	GP-286	GP-009	GP-276	GP-278	GP-277	GP-117	GP-008	GP-007	GP-274	GP-275	GP-006	GP-115	GP-005	GP-004	GP-003	GP-002	GP-001	GP-299	GP-299	GP-044	GP-045	GP-046
Field Sample ID				GP-029-9.18W	GP-286-10.53W	GP-009-11.76W	GP-276-12.82W	GP-278-8.05W	GP-277-6.42W	GP-117-10.88W	GP-008-18.5W	GP-007-9.95W	GP-274-13.14W	GP-275-1.59W	GP-006-4.90W	GP-115-2.36W	GP-005-8.72W	GP-004-6.06W	GP-003-8.13W	GP-002-10.15W	GP-001-14.30W	GP-299-3.85W	GP-299-3.85W	GP-044-9.70w	GP-045-7.87w	GP-046-9.5w
Laboratory ID				10447922003	10474744003	10445057003	10472647007	10472856005	10472856001	10445057009	10443754013	10443754006	10472647008	10472647004	10443754003	10446142008	10443754012	10445270005	10443754016	10445270011	10445270010	10474936005	10479612001	10448309013	10448309010	10448309007
Sample Date				9/17/2018	5/13/2019	8/27/2018	4/29/2019	4/29/2019	4/29/2019	8/27/2018	8/15/2018	8/15/2018	4/29/2019	4/29/2019	8/15/2018	9/4/2018	8/15/2018	8/28/2018	8/15/2018	8/28/2018	8/28/2018	5/14/2019	6/17/2019	9/20/2018	9/20/2018	9/20/2018
DRO and GRO																										
Diesel Range Organics	ug/l	50	200	153	NM	302 (T7,T6)	301 (T6)	127	<100	12500	770 (T7,T6)	221	314 (T6)	5900 (T7,T6)	168	188	473	676 (T7,T6)	1450 (T7,T6)	210 (T7)	<96.2	NM	NM	3510 (T6)	614	379
Gasoline Range Organics	ug/l	50	200	<100	<100 (G-)	<100	<100 (HS,pH)	<100 (HS,G-)	<100 (G-)	239 (G+)	<100 (pH)	<100 (pH)	<100 (HS,pH)	620 (HS,G-,G+	<100 (pH)	<100	<100	<100	3860 (pH)	<100	<100	NM	<100	<100	<100	<100
WDRO C10-C28 Silica Gel	ug/l	50	200	NM	256 (T6)	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<161	NM	NM	NM	NM
Metals																										
Barium, Dissolved	ug/l	2000	NE	72.1	115	NM	356	111	83.7	275	1320	124	NM	33	543	321	297	310	837	398	82	NM	NM	118	246	274
Zinc, Dissolved	ug/l	2000	NE	NM	<20	21.1	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
PCBs																										
PCBs (Polychlorinated Biphenyls)	ug/l	0.04	NE	NM	NM	NM	NM	NM	NM	BRL	NM	BRL	NM	NM	NM	NM	BRL	NM	NM	NM	NM	NM	NM	NM	NM	NM
Herbicides and Pesticides																										
All Herbicides and Pesticides	ug/l	NE	NE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	BRL	NM	NM	NM	NM	NM
Semi-VOCs																										
Acenaphthene	ug/l	100	20	<9.7	<10 (H2)	0.052	<0.06	<10	<0.045	11	NM	<0.038	NM	0.26	0.11	<0.044	0.45	<0.042	0.6	NM	<9.7	NM	NM	31.5	0.86	21.5
Acenaphthylene	ug/l	NE	NE	<9.7	<10 (H2)	<0.039	<0.06	<10	<0.045	2.1	NM	<0.038	NM	<0.048	0.046	<0.044	<0.041	<0.042	<0.041	NM	<9.7	NM	NM	2	0.36	2.7
Anthracene	ug/l	600	0.035	<9.7	<10 (H2)	<0.039	<0.06	<10	<0.045	7.8	NM	<0.038	NM	<0.048	0.21	<0.044	0.34	<0.042	0.9	NM	<9.7	NM	NM	90.6	2	46.5
Benz(a)anthracene	ug/l	NE	NE	<9.7	<10 (H2)	<0.039	<0.06	<10	<0.045	0.059	NM	<0.038	NM	<0.048	0.81	<0.044	0.1	<0.042	0.96	NM	<9.7	NM	NM	110	4.4	69.4
Benzo(a)pyrene	ug/l	0.1	NE	<9.7	<10 (H2)	<0.039	<0.06	<10	<0.045	<0.048	NM	<0.038	NM	<0.048	0.69	<0.044	0.064	<0.042	0.92	NM	<9.7	NM	NM	98.6	4.6	60.1
Benzo(b)fluoranthene	ug/l	NE	NE	<9.7	<10 (H2)	<0.039	<0.06	<10	<0.045	<0.048	NM	<0.038	NM	<0.048	1.1	<0.044	0.07	<0.042	1	NM	<9.7	NM	NM	121	5.2	68.7
Benzo(g,h,i)perylene	ug/l	NE	NE	<9.7	<10 (H2)	<0.039	<0.06	<10	<0.045	<0.048	NM	<0.038	NM	<0.048	0.51	<0.044	<0.041	<0.042	0.39	NM	<9.7	NM	NM	60.1	2.7	32.9
Benzo(k)fluoranthene	ug/l	NE	NE	<9.7	<10 (H2)	<0.039	<0.06	<10	<0.045	<0.048	NM	<0.038	NM	<0.048	0.4	<0.044	<0.041	<0.042	0.52	NM	<9.7	NM	NM	47.4	2.2	26.1
bis(2-Ethylhexyl)phthalate	ug/l	7	NE	<9.7	<10 (H2)	NM	NM	<10	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<9.7	NM	NM	NM	NM	NM
Chrysene	ug/l	NE	NE	<9.7	<10 (H2)	<0.039	<0.06	<10	<0.045	0.076	NM	0.041	NM	<0.048	0.73	<0.044	0.099	<0.042	0.91	NM	<9.7	NM	NM	98.1	4.1	58.4
Dibenz(a,h)anthracene	ug/l	NE	NE	<9.7	<10 (H2)	<0.039	<0.06	<10	<0.045	<0.048	NM	<0.038	NM	<0.048	0.11	<0.044	<0.041	<0.042	0.12	NM	<9.7	NM	NM	15	0.87	11
Fluoranthene	ug/l	70	1.9	<9.7	<10 (H2)	0.041	<0.06	<10	<0.045	1.2	NM	0.058	NM	<0.048	1.6	<0.044	0.75	<0.042	2.9	NM	<9.7	NM	NM	256	8.9	157
Fluorene	ug/l	80	NE	<9.7	<10 (H2)	<0.039	<0.06	<10	<0.045	19.6	NM	<0.038	NM	0.094	0.13	<0.044	0.4	<0.042	0.66	NM	<9.7	NM	NM	39.6	0.88	26.2
Indeno(1,2,3-cd)pyrene	ug/l	NE	NE	<9.7	<10 (H2)	<0.039	<0.06	<10	<0.045	<0.048	NM	<0.038	NM	<0.048	0.44	<0.044	<0.041	<0.042	0.37	NM	<9.7	NM	NM	49	2.6	29.3
Naphthalene	ug/l	NE	NE	<9.7	<10 (H2)	0.36	<0.06	<10	<0.045	2.4	NM	<0.038	NM	7.2	0.091	<0.044	0.42	0.048	21.6	NM	<9.7	NM	NM	21.7	0.45	14.3
Phenanthrene	ug/l	NE	3.6	<9.7	<10 (H2)	0.097	<0.06	<10	<0.045	72.5	NM	<0.038	NM	0.13	0.96	<0.044	1.4	0.055	2.6	NM	<9.7	NM	NM	244	5.5	154
Pyrene	ug/l	50	NE	<9.7	<10 (H2)	<0.039	<0.06	<10	<0.045	1.9	NM	0.081	NM	<0.048	1.3	<0.044	0.53	<0.042	2.2	NM	<9.7	NM	NM	191	7.2	119
NPDES General Permit																										
PAHs - Carcinogenic	ug/l	NE	0.028	<0	<0 (H2)	<0	<0	<0	<0	0.14	NM	0.041	NM	<0	4.8	<0	0.33	<0	5.2	NM	<0	NM	NM	599	27	356
PAHs - Non carcinogenic	ug/l	NE	0.28	<0	<0 (H2)	0.14	<0	<0	<0	105	NM	0.14	NM	0.22	4.2	<0	3.4	0.055	9.3	NM	<0	NM	NM	823	25	505
VOCs																										
1,2,4-Trimethylbenzene	ug/l	100	NE	<1	<1	<1 (M1)	<1	NM	NM	1.3	<1 (M1,R1)	<1	<1	308	<1	<1	1.6	1.6	218	<1	<1	<1	NM	<1	<1	<1
1,3,5-Trimethylbenzene	ug/l	100	NE	<1	<1	<1 (M1)	<1	NM	NM	2	<1 (M1,R1)	<1	<1	14.8	<1	<1	1	<1	58	<1	<1	<1	NM	<1	<1	<1
2-Butanone	ug/l	4000	90	<5	<5	<5 (M1)	<5	NM	NM	<5	9.6 (M1,R1)	<5	<5	7.9	<5	<5	<5	<5	<5	<5	<5	<5	NM	<5	<5	<5
Acetone	ug/l	4000	NE	<20	<20	<20 (M1)	<20	NM	NM	<20	52 (M1)	<20	<20	<20	<20	<20	<20	<20	44.6	<20	<20	<20	NM	<20	<20	<20
Benzene	ug/l	2	5	<1	<1	6.2 (M1)	<1	NM	NM	<1	<1 (M1,R1)	<1	<1	<1	<1	<1	<1	<1	36.5	<1	<1	<1	NM	<1	<1	<1
Bromodichloromethane	ug/l	3	NE	<1	<1	<1 (M1)	<1	NM	NM	<1	<1 (M1,R1)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NM	<1	<1	<1
Chloroethane	ug/l	NE	NE	<1	<1	<1 (M1)	<1	NM	NM	<1	<1 (M1,R1)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<4	NM	<1	<1	<1
Chloroform	ug/l	20	NE	<1	<1	<1 (M1)	<1	NM	NM	<1	<1 (M1,R1)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NM	<1	<1	<1
cis-1,2-Dichloroethene	ug/l	6	70	<1	<1	16.3 (M1)	<1	NM	NM	<4	<4 (M1,R1)	<4	<1	<1	<4	<1	<4	<4	<4	<4	<4	<1	NM	<1	<1	<1
Ethylbenzene	ug/l	40	5	<1	<1	<1 (M1)	<1	NM	NM	<1	<1 (M1,R1)	<1	<1	6.4	<1	<1	<1	<1	125	<1	<1	<1	NM	<1	<1	<1
Isopropylbenzene	ug/l	300	NE	<1	<1	<1 (M1)	<1	NM	NM	6	<1 (M1,R1)	<1	<1	6.9	<1	<1	1.5	<1	24.4	<1	<1	<1	NM	<1	<1	<1
Naphthalene	ug/l	70	20	<4	<4	<4 (M1)	<4	NM	NM	<4	<4 (M1,R1)	<4	<4	8.9	<4	<4	<4	<4	75.8	<4	<4	<4	NM	5.7	<4	11.4
n-Butylbenzene	ug/l	NE	NE	<1	<1	<1 (M1)	<1	NM	NM	1.4	<1 (M1,R1)	<1	<1	19.2	<1	<1	<1	<1	7.1	<1	<1	<1	NM	<1	<1	<1
n-Propylbenzene	ug/l	NE	NE	<1	<1	<1 (M1)	<1	NM	NM	5.9	<1 (M1,R1)	<1	<1	31	<1	<1	1.4	<1	31.2	<1	<1	<1	NM	<1	<1	<1
p-Isopropyltoluene	ug/l	NE	NE	<1	<1	<1 (M1)	<1	NM	NM	2.9	<1 (M1,R1)	<1	<1	4.5	<1	<1	4	<1	25.5	6.2	<1	<1	NM	<1	<1	<1
sec-Butylbenzene	ug/l	NE	NE	<1	<1	<1 (M1)	<1	NM	NM	7.1	<1 (M1,R1)	<1	<1	6.4	<1	<1	<1	<1	5	<1	<1	<1	NM	<1	<1	<1
tert-Butylbenzene	ug/l	NE	NE	<1	<1	<1 (M1)	<1	NM	NM	<1	<1 (M1,R1)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NM	<1	<1	<1
Toluene	ug/l	200	5	<1	<1	<1 (M1)	<1	NM	NM	<1	<1 (M1,R1)	<1	<1	<1	<1	<1	<1	<1	23	<1	<1	<1	NM	<1	<1	<1
Trichloroethene	ug/l	0.4	5	<0.4	<0.4	10 (M1)	<0.4	<0.4	<0.4	<0.4	<0.4 (M1,R1)	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	NM	<0.4	<0.4	<0.4
Vinylchloride	ug/l	0.2	0.18	<0.2	<0.2	0.22 (M1)	<0.2	NM	NM	<0.2	<0.2 (M1,R1)	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	NM	<0.2	<0.2	<0.2
Xylene (Total)	ug/l	300	5	<3	<3	<3 (MS)	<3	NM	NM	<3	<3 (RS,MS)	<3	<3	14	<3	<3	<3	<3	323	<3	<3	<3	NM	<3	<3	<3

Notes:

A full list of abbreviations is included in the table glossery

Table 3
Groundwater Analytical Results
Phase II Environmental Site Assessment
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

			Borings are ordered by Area:	Parcel 226B				Temporary Pavement for Staging Option 3												Lower Michigan Street						
Boring ID	Units	2019 MDH Drinking Water	NPDES surface waters designated as drinking water	GP-270	GP-051	GP-053	GP-054	GP-156	GP-341	GP-341	GP-164	GP-342	GP-165	GP-343	GP-344	GP-178	GP-345	GP-346	GP-303	GP-304	GP-235	GP-305	GP-306	GP-306	GP-307	GP-308
Field Sample ID				GP-270-6.98W	GP-051-6.44W	GP-053-5.81W	GP-054-6.43W	GP-156-12.00W	GP-341-5.08W	GP-341-22.5W	GP-164-8.97W	GP-342-4.61W	GP-165-7.43W	GP-343-3.80W	GP-344-3.49W	GP-178-4.34W	GP-345-4.73W	GP-346-4.82W	GP-303-3.74W	GP-304-3.94W	GP-235-2.52W	GP-305-3.90W	GP-306-4.18W	GP-306-4.18W	GP-307-3.24W	GP-308-3.51W
Laboratory ID				10446354015	10446354017	10446354016	10446354007	10446354023	10475634008	10475634022	10446535007	10475634013	10446535004	10475634019	10475884003	10446750016	10475634016	10475884037	10475384010	10474936010	10447291004	10474936013	10474936016	10479612002	10474936019	10475071003
Sample Date				9/5/2018	9/5/2018	9/5/2018	9/5/2018	9/5/2018	5/20/2019	5/20/2019	9/6/2018	5/20/2019	9/6/2018	5/20/2019	5/20/2019	9/7/2018	5/20/2019	5/20/2019	5/16/2019	5/14/2019	9/11/2018	5/14/2019	5/14/2019	6/17/2019	5/14/2019	5/15/2019
DRO and GRO																										
Diesel Range Organics	ug/l	50	200	724 (T6)	1340 (T6)	1980 (T6)	3050 (T6)	594	NM	NM	2160 (T6)	NM	2310 (T6)	152 (H5)	NM	2230 (T6)	NM	NM	NM	NM	242	NM	NM	NM	NM	NM
Gasoline Range Organics	ug/l	50	200	<100	<100	<100	<100	<100	<100	NM	<100	<100	<100	<100	<100	<100	<100	<100	<100 (HS,G-)	<100 (G-,M1,R1	<100	<100 (G-)	<100 (G-,pH)	NM	<100 (G-,G+,pH	<100 (G-)
WDRO C10-C28 Silica Gel	ug/l	50	200	NM	NM	NM	NM	NM	272 (T6)	NM	1010 (T7,T6)	150 (T6)	NM	NM	<104	NM	156 (T6)	615 (T7,T6)	<96.2	624 (T6)	NM	782 (T6)	38700 (T6)	NM	66600 (T6)	122 (T6)
Metals																										
Barium, Dissolved	ug/l	2000	NE	291	283	207	211	243	285	NM	306	221	451	86.5	70.4	557	127	149	335	369	334	128	112	NM	107	121
Zinc, Dissolved	ug/l	2000	NE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
PCBs																										
PCBs (Polychlorinated Biphenyls)	ug/l	0.04	NE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Herbicides and Pesticides																										
All Herbicides and Pesticides	ug/l	NE	NE	NM	BRL	BRL	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Semi-VOCs																										
Acenaphthene	ug/l	100	20	0.074	0.045	0.041	0.04	<0.039	<10.1	NM	<0.041	<10.1	0.071	<0.044	<1	0.25	<10	<1	<10	<10	0.055	0.14	NM	0.74	<10.5	<12.6
Acenaphthylene	ug/l	NE	NE	<0.039	<0.039	<0.039	<0.039	<0.039	<10.1	NM	<0.041	<10.1	<0.039	<0.044	<1	0.44	<10	<1	<10	<10	0.096	0.064	NM	<0.21	<10.5	<12.6
Anthracene	ug/l	600	0.035	<0.039	0.075	<0.039	<0.039	<0.039	<10.1	NM	<0.041	<10.1	0.15	<0.044	<1	0.98	<10	<1	<10	<10	0.19	0.17	NM	<0.21	<10.5	<12.6
Benz(a)anthracene	ug/l	NE	NE	<0.039	0.089	<0.039	<0.039	<0.039	<10.1	NM	<0.041	<10.1	0.27	0.046	<1	2	<10	<1	<10	<10	0.67	0.58	NM	1.5	<10.5	<12.6
Benzo(a)pyrene	ug/l	0.1	NE	<0.039	0.11	<0.039	<0.039	<0.039	<10.1	NM	<0.041	<10.1	0.3	<0.044	<1	2.3	<10	<1	<10	<10	0.72	0.63	NM	1.5	<10.5	<12.6
Benzo(b)fluoranthene	ug/l	NE	NE	<0.039	0.13	<0.039	<0.039	<0.039	<10.1	NM	<0.041 (L2)	<10.1	0.34	0.052	<1	3	<10	<1	<10	<10	0.96	0.82	NM	1.8	<10.5	<12.6
Benzo(g,h,i)perylene	ug/l	NE	NE	<0.039	0.084	<0.039	<0.039	<0.039	<10.1	NM	<0.041	<10.1	0.26	<0.044	<1	1.7	<10	<1	<10	<10	0.55	0.57	NM	1.1	<10.5	<12.6
Benzo(k)fluoranthene	ug/l	NE	NE	<0.039	0.089	<0.039	<0.039	<0.039	<10.1	NM	<0.041	<10.1	0.16	<0.044	<1	1.5	<10	<1	<10	<10	0.39	0.44	NM	0.73	<10.5	<12.6
bis(2-Ethylhexyl)phthalate	ug/l	7	NE	NM	NM	NM	NM	NM	<10.1	NM	NM	<10.1	NM	NM	<3	NM	<10	<3	<10	<10	NM	NM	NM	NM	<10.5	<12.6
Chrysene	ug/l	NE	NE	<0.039	0.14	<0.039	<0.039	<0.039	<10.1	NM	<0.041 (L2)	<10.1	0.26	<0.044	<1	2.2	<10	<1	<10	<10	0.68	0.65	NM	2.3	<10.5	<12.6
Dibenz(a,h)anthracene	ug/l	NE	NE	<0.039	<0.039	<0.039	<0.039	<0.039	<10.1	NM	<0.041	<10.1	0.065	<0.044	<1	0.34	<10	<1	<10	<10	0.14	0.11	NM	0.24	<10.5	<12.6
Fluoranthene	ug/l	70	1.9	0.053	0.24	0.048	0.047	<0.039	<10.1	NM	<0.041 (L2)	<10.1	0.59	0.072	<1	4.4	<10	<1	<10	<10	1.2	1	NM	<0.21	<10.5	<12.6
Fluorene	ug/l	80	NE	0.05	<0.039	<0.039	<0.039	<0.039	<10.1	NM	<0.041	<10.1	0.066	<0.044	<1	0.22	<10	<1	<10	<10	0.071	0.14	NM	<0.21	<10.5	<12.6
Indeno(1,2,3-cd)pyrene	ug/l	NE	NE	<0.039	0.067	<0.039	<0.039	<0.039	<10.1	NM	<0.041	<10.1	0.19	<0.044	<1	1.3	<10	<1	<10	<10	0.49	0.46	NM	0.6	<10.5	<12.6
Naphthalene	ug/l	NE	NE	<0.039	0.073	<0.039	0.06	<0.039	<10.1	NM	<0.041	<10.1	0.077	<0.044	<1	0.36	<10	<1	<10	<10	0.13	0.42	NM	0.23	<10.5	<12.6
Phenanthrene	ug/l	NE	3.6	0.04	0.16	<0.039	0.046	<0.039	<10.1	NM	<0.041	<10.1	0.44	0.052	<1	2.4	<10	<1	<10	<10	0.69 (B)	0.82	NM	1.3	<10.5	<12.6
Pyrene	ug/l	50	NE	0.04	0.19	<0.039	0.043	<0.039	<10.1	NM	<0.041	<10.1	0.48	0.079	<1	3.8	<10	<1	<10	<10	1.1	0.96	NM	6.1	<10.5	<12.6
NPDES General Permit																										
PAHs - Carcinogenic	ug/l	NE	0.028	<0	0.7	<0	<0	<0	<0	NM	<0	<0	1.8	0.10	<0	14	<0	<0	<0	<0	4.6	4.3	NM	9.8	<0	<0
PAHs - Non carcinogenic	ug/l	NE	0.28	0.183	0.7	0.048	0.14	<0	<0	NM	<0	<0	1.7	0.20	<0	12	<0	<0	<0	<0	3.3	3.2	NM	7.4	<0	<0
VOCs																										
1,2,4-Trimethylbenzene	ug/l	100	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NM	<1	<1
1,3,5-Trimethylbenzene	ug/l	100	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NM	<1	<1
2-Butanone	ug/l	4000	90	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	NM	<5	<5
Acetone	ug/l	4000	NE	<20	<20	<20	<20	<20	<20	<20	22.9	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	NM	<20	<20
Benzene	ug/l	2	5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NM	<1	<1
Bromodichloromethane	ug/l	3	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NM	<1	<1
Chloroethane	ug/l	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<4	<1	<4	<4	NM	<4	<1
Chloroform	ug/l	20	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NM	<1	<1
cis-1,2-Dichloroethene	ug/l	6	70	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NM	<1	<1
Ethylbenzene	ug/l	40	5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NM	<1	<1
Isopropylbenzene	ug/l	300	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NM	<1	<1
Naphthalene	ug/l	70	20	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	NM	<4	<4
n-Butylbenzene	ug/l	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NM	<1	<1
n-Propylbenzene	ug/l	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NM	<1	<1
p-Isopropyltoluene	ug/l	NE	NE	2	<1	54.6	24.2	<1	2.9	<1	2.7	<1	10.2	<1	1.7	<1	<1	2	<1	<1	<1	<1	<1	NM	<1	<1
sec-Butylbenzene	ug/l	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NM	<1	<1
tert-Butylbenzene	ug/l	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NM	<1	<1
Toluene	ug/l	200	5	<1	<1	<1	<1	<1	<1	<1	<1	<1	1.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NM	<1	<1
Trichloroethene	ug/l	0.4	5	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	NM	<0.4	<0.4
Vinylchloride	ug/l	0.2	0.18	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	NM	<0.2	<0.2
Xylene (Total)	ug/l	300	5	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	NM	<3	<3

Notes:

A full list of abbreviations is included in the table glossery

10/4/2019
MNTCO 145399
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Table 3
Groundwater Analytical Results
Phase II Environmental Site Assessment
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

			Borings are ordered by Area:	Lower Michigan Street																			W 1st St & Piedmont Ave	Michigan and Superior Street
Boring ID	Units	2019 MDH Drinking Water	NPDES	GP-310	GP-312	GP-253	GP-315	GP-254	GP-316	GP-317	GP-318	GP-318	GP-257	GP-319	GP-320	GP-261	GP-262b	GP-262b	GP-321	GP-322	GP-323	GP-361	GP-327	GP-080
Field Sample ID			surface waters designated as drinking water	GP-310-3.44W	GP-312-7.80W	GP-253-4.91W	GP-315-4.04W	GP-254-2.71W	GP-316-4.00W	GP-317-3.55W	GP-318-3.55W	GP-318-3.55W	GP-257-4.65W	GP-319-3.87W	GP-320-4.35W	GP-261-4.66W	GP-262b-6.88W	GP-262b-21.00W	GP-321-3.86W	GP-322-4.43W	GP-323-6.75W	GP-361-7.05W	GP-327-3.52W	GP-080-5.91W
Laboratory ID				10475384014	10475384019	10447650008	10475384024	10447650004	10475384027	10475071008	10475071011	10479612003	10447462017	10475071014	10475434003	10447462011	10447462009	10447462010	10475071019	10475384006	10475384007	10484416018	10474936027	10445985013
Sample Date				5/16/2019	5/16/2019	9/14/2018	5/16/2019	9/13/2018	5/16/2019	5/15/2019	5/15/2019	6/17/2019	9/13/2018	5/15/2019	5/16/2019	9/13/2018	9/13/2018	9/13/2018	5/15/2019	5/15/2019	5/15/2019	7/23/2019	5/13/2019	8/31/2018
DRO and GRO																								
Diesel Range Organics	ug/l	50	200	NM	319 (T7,T6,H5)	<98	NM	257 (T6)	460 (T7,T6,4M)	NM	NM	NM	568	NM	NM	1730	526 (T6)	NM	NM	220 (T6)	NM	NM	118 (T6)	<98
Gasoline Range Organics	ug/l	50	200	<100 (G-,pH)	<100 (G-)	<100	<100 (G-)	<100	<100 (G-)	<100 (G-)	NM	<100	<100	<100	<100 (HS,G-)	<100 (G+)	<100 (pH)	NM	<100 (HS)	<100 (G-,pH)	<100 (HS,G-)	<100	<100 (G-)	<100
WDRO C10-C28 Silica Gel	ug/l	50	200	513	NM	NM	108	NM	NM	631 (T6)	<104	NM	NM	103 (T6)	<96.2	NM	NM	NM	3660 (T6)	NM	271 (T6)	102	NM	NM
Metals																								
Barium, Dissolved	ug/l	2000	NE	631	402	252	640	1160	253	231	196	NM	707	231	197	446	366	NM	264	71.8	259	193	61.1	<10
Zinc, Dissolved	ug/l	2000	NE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
PCBs																								
PCBs (Polychlorinated Biphenyls)	ug/l	0.04	NE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Herbicides and Pesticides																								
All Herbicides and Pesticides	ug/l	NE	NE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Semi-VOCs																								
Acenaphthene	ug/l	100	20	<10	NM	<0.056	<10.1	<0.04	<10	<10.1	<10.1	NM	1.7	<10	<12.3	0.79	0.11	NM	<11.2	<11.4	<10.1	<9.7	<0.039	<0.039
Acenaphthylene	ug/l	NE	NE	<10	NM	<0.056	<10.1	<0.04	<10	<10.1	<10.1	NM	<0.041	<10	<12.3	0.13	<0.041	NM	<11.2	<11.4	<10.1	<9.7	0.046	<0.039
Anthracene	ug/l	600	0.035	<10	NM	<0.056	<10.1	<0.04	<10	<10.1	<10.1	NM	0.21	<10	<12.3	0.4	0.066	NM	<11.2	<11.4	<10.1	<9.7	0.046	<0.039
Benz(a)anthracene	ug/l	NE	NE	<10	NM	0.07	<10.1	0.18	<10	<10.1	<10.1	NM	0.056	<10	<12.3	0.18	0.11	NM	<11.2	<11.4	<10.1	<9.7	0.15	<0.039
Benzo(a)pyrene	ug/l	0.1	NE	<10	NM	0.081	<10.1	0.2	<10	<10.1	<10.1	NM	<0.041	<10	<12.3	0.13	0.11	NM	<11.2	<11.4	<10.1	<9.7	0.2	<0.039
Benzo(b)fluoranthene	ug/l	NE	NE	<10	NM	0.093	<10.1	0.25	<10	<10.1	<10.1	NM	<0.041	<10	<12.3	0.14	0.11	NM	<11.2	<11.4	<10.1	<9.7	0.27	<0.039
Benzo(g,h,i)perylene	ug/l	NE	NE	<10	NM	0.061	<10.1	0.14	<10	<10.1	<10.1	NM	<0.041	<10	<12.3	0.073	0.072	NM	<11.2	<11.4	<10.1	<9.7	0.24	<0.039
Benzo(k)fluoranthene	ug/l	NE	NE	<10	NM	<0.056	<10.1	0.1	<10	<10.1	<10.1	NM	<0.041	<10	<12.3	0.1	0.085	NM	<11.2	<11.4	<10.1	<9.7	0.11	<0.039
bis(2-Ethylhexyl)phthalate	ug/l	7	NE	<10	NM	NM	<10.1	NM	<10	<10.1	<10.1	NM	NM	<10	<12.3	NM	NM	NM	<11.2	<11.4	<10.1	<9.7	NM	NM
Chrysene	ug/l	NE	NE	<10	NM	0.076	<10.1	0.18	<10	<10.1	<10.1	NM	0.054	<10	<12.3	0.18	0.12	NM	<11.2	<11.4	<10.1	<9.7	0.15	<0.039
Dibenz(a,h)anthracene	ug/l	NE	NE	<10	NM	<0.056	<10.1	<0.04	<10	<10.1	<10.1	NM	<0.041	<10	<12.3	<0.044	<0.041	NM	<11.2	<11.4	<10.1	<9.7	<0.039	<0.039
Fluoranthene	ug/l	70	1.9	<10	NM	0.14	<10.1	0.25	<10	<10.1	<10.1	NM	0.3	<10	<12.3	0.54	0.27	NM	<11.2	<11.4	<10.1	<9.7	0.16	<0.039
Fluorene	ug/l	80	NE	<10	NM	<0.056	<10.1	<0.04	<10	<10.1	<10.1	NM	0.83	<10	<12.3	3.6	<0.041	NM	<11.2	<11.4	<10.1	<9.7	<0.039	<0.039
Indeno(1,2,3-cd)pyrene	ug/l	NE	NE	<10	NM	<0.056	<10.1	0.13	<10	<10.1	<10.1	NM	<0.041	<10	<12.3	0.058	0.054	NM	<11.2	<11.4	<10.1	<9.7	0.14	<0.039
Naphthalene	ug/l	NE	NE	<10	NM	<0.056	<10.1	0.048	<10	<10.1	<10.1	NM	0.37	<10	<12.3	0.88	<0.041	NM	<11.2	<11.4	<10.1	<9.7 (L2)	<0.039	<0.039
Phenanthrene	ug/l	NE	3.6	<10	NM	0.079	<10.1	0.11	<10	<10.1	<10.1	NM	0.7	<10	<12.3	3.4	0.13	NM	<11.2	<11.4	<10.1	<9.7	0.055	<0.039
Pyrene	ug/l	50	NE	<10	NM	0.12	<10.1	0.23	<10	<10.1	<10.1	NM	0.24	<10	<12.3	0.53	0.23	NM	<11.2	<11.4	<10.1	<9.7	0.19	<0.039
NPDES General Permit																								
PAHs - Carcinogenic	ug/l	NE	0.028	<0	NM	0.38	<0	1.2	<0	<0	<0	NM	0.11	<0	<0	0.86	0.66	NM	<0	<0	<0	<0	1.3	<0
PAHs - Non carcinogenic	ug/l	NE	0.28	<0	NM	0.34	<0	0.59	<0	<0	<0	NM	2.3	<0	<0	8.6	0.70	NM	<0	<0	<0	<0	0.50	<0
VOCs																								
1,2,4-Trimethylbenzene	ug/l	100	NE	<1	<1	<1	<1	<1	<1	<1	<1	NM	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/l	100	NE	<1	<1	<1	<1	<1	<1	<1	<1	NM	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
2-Butanone	ug/l	4000	90	<5	<5	<5	<5	<5	<5	<5	<5	NM	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Acetone	ug/l	4000	NE	<20	<20	<20	<20	<20	<20	<20	<20	NM	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Benzene	ug/l	2	5	<1	<1	<1	<1	<1	<1	<1	<1	NM	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bromodichloromethane	ug/l	3	NE	<1	<1	<1	<1	<1	<1	<1	<1	NM	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1.2
Chloroethane	ug/l	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	NM	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chloroform	ug/l	20	NE	<1	<1	<1	<1	<1	<1	<1	<1	NM	<1	<1	<1	<1	<1	<1	<1	<1	<1	<4	<1	12.4
cis-1,2-Dichloroethene	ug/l	6	70	<1	<1	<1	<1	<1	<1	<1	<1	NM	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	ug/l	40	5	<1	<1	<1	<1	<1	<1	<1	<1	NM	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Isopropylbenzene	ug/l	300	NE	<1	<1	<1	<1	<1	<1	<1	<1	NM	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Naphthalene	ug/l	70	20	<4	<4	<4	<4	<4	<4	<4	<4	NM	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
n-Butylbenzene	ug/l	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	NM	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
n-Propylbenzene	ug/l	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	NM	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	ug/l	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	NM	<1	<1	<1	<1	9.1	<1	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	ug/l	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	NM	<1	<1	<1	1.2	<1	<1	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	ug/l	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	NM	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	ug/l	200	5	<1	<1	<1	<1	<1	<1	<1	<1	NM	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Trichloroethene	ug/l	0.4	5	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	NM	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Vinylchloride	ug/l	0.2	0.18	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	NM	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylene (Total)	ug/l	300	5	<3	<3	<3	<3	<3	<3	<3	<3	NM	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3

Notes:

A full list of abbreviations is included in the table glossery

Table 3
Groundwater Analytical Results
Phase II Environmental Site Assessment
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

			Borings are ordered by Area:	Bridge 69902								Bridge 69905					Garfield Ave Temporary Ramp Widening									
Boring ID	Units	2019 MDH Drinking Water	NPDES	GP-171	GP-182	GP-183	GP-273	GP-185	GP-187	GP-188	GP-197	GP-227	GP-228	GP-229	GP-244	GP-249	GP-350	GP-264	GP-265	GP-266	GP-267	GP-329	GP-330	GP-331	GP-333	GP-334
Field Sample ID			surface waters designated as drinking water	GP-171-2.93W	GP-182-3.68W	GP-183-2.33W	GP-273-1.83W	GP-185-1.42W	GP-187-0.38W	GP-188-0.40W	GP-197-0.81W	GP-227-2.64W	GP-228-1.83W	GP-229-1.12W	GP-244-3.51W	GP-249-3.61W	GP-350-14.00W	GP-264-5.22W	GP-265-6.04W	GP-266-6.88W	GP-267-7.12W	GP-329-4.11W	GP-330-4.71W	GP-331-4.62W	GP-333-3.49W	GP-334-5.08W
Laboratory ID				10446750005	10473051018	10473308001	10474106017	10474106013	10473870025	10473870022	10473870011	10473594005	10473490015	10473490006	10448151004	10448151008	10476320011	10474360009	10474487004	10474360012	10474360003	10473870014	10473870019	10474360006	10474487012	10474487007
Sample Date				9/6/2018	5/1/2019	5/1/2019	5/8/2019	5/8/2019	5/7/2019	5/7/2019	5/6/2019	5/6/2019	5/3/2019	5/2/2019	9/18/2018	9/19/2018	5/23/2019	5/9/2019	5/10/2019	5/9/2019	5/8/2019	5/7/2019	5/7/2019	5/8/2019	5/10/2019	5/10/2019
DRO and GRO																										
Diesel Range Organics	ug/l	50	200	162	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	495	124	<99.2	<99.2	<99.2	<99	<100	<99	<111	114	108 (T6)	<99.2
Gasoline Range Organics	ug/l	50	200	<100	<100 (T6)	<100 (T6)	<100 (T6)	<100	<100	<100	<100 (T6)	<100 (T6)	<100 (T6)	<100 (T6)	<100 (T6)	<100	<100	<100	<100 (T6)	<100 (T6)	<100	<100 (T6)	<100 (T6)	<100	<100 (T6)	<100 (T6)
WDRO C10-C28 Silica Gel	ug/l	50	200	NM	<100	358 (T6)	207 (T6)	139 (T6)	107	<98	<100	<99.2	533 (T7,T6)	325 (T7,T6)	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Metals																										
Barium, Dissolved	ug/l	2000	NE	166	171	180	189	250	683	340	150	67.3	148	513	574	254	60.6	75.6	31	59.5	43.2	44.6	24.3	39.9	20.3	27.5
Zinc, Dissolved	ug/l	2000	NE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
PCBs																										
PCBs (Polychlorinated Biphenyls)	ug/l	0.04	NE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	<0	NM	NM	NM	NM
Herbicides and Pesticides																										
All Herbicides and Pesticides	ug/l	NE	NE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Semi-VOCs																										
Acenaphthene	ug/l	100	20	<0.041	<0.039	<9.8	<10.4	<10.1	0.087	<0.039	<0.039	0.043	<0.04	<9.8	1.4	<0.044	<0.039	<0.039	<9.6	<10	<10.1	<10	<10.1	<10.1	<9.6	<9.5
Acenaphthylene	ug/l	NE	NE	<0.041	<0.039	<9.8	<10.4	<10.1	<0.041	<0.039	<0.039	<0.039	<0.04	<9.8	0.16	<0.044	<0.039	<0.039	<9.6	<10	<10.1	<10	<10.1	<10.1	<9.6	<9.5
Anthracene	ug/l	600	0.035	<0.041	0.066	<9.8	<10.4	<10.1	<0.041	<0.039	0.06	0.064	<0.04	<9.8	<0.04	0.084	<0.039	<0.039	<9.6	<10	<10.1	<10	<10.1	<10.1	<9.6	<9.5
Benz(a)anthracene	ug/l	NE	NE	<0.041	0.12	<9.8	<10.4	<10.1	0.077	0.086	0.23	0.13	<0.04	<9.8	<0.04	0.15	<0.039	<0.039	<9.6	<10	<10.1	<10	<10.1	<10.1	<9.6	<9.5
Benzo(a)pyrene	ug/l	0.1	NE	<0.041	0.085	<9.8	<10.4	<10.1	<0.041	0.072	0.21	0.095	<0.04	<9.8	<0.04	0.16	<0.039	<0.039	<9.6	<10	<10.1	<10	<10.1	<10.1	<9.6	<9.5
Benzo(b)fluoranthene	ug/l	NE	NE	<0.041	0.11	<9.8	<10.4	<10.1	<0.041	0.1	0.29	0.16	<0.04	<9.8	<0.04	0.17	<0.039	<0.039	<9.6	<10	<10.1	<10	<10.1	<10.1	<9.6	<9.5
Benzo(g,h,i)perylene	ug/l	NE	NE	<0.041	0.059	<9.8	<10.4	<10.1	<0.041	0.06	0.15	0.078	<0.04	<9.8	<0.04	0.11	<0.039	<0.039	<9.6	<10	<10.1	<10	<10.1	<10.1	<9.6	<9.5
Benzo(k)fluoranthene	ug/l	NE	NE	<0.041	0.055	<9.8	<10.4	<10.1	<0.041	0.06	0.15	0.056	<0.04	<9.8	<0.04	0.09	<0.039	<0.039	<9.6	<10	<10.1	<10	<10.1	<10.1	<9.6	<9.5
bis(2-Ethylhexyl)phthalate	ug/l	7	NE	NM	NM	<9.8	<10.4	<10.1	NM	NM	NM	NM	NM	<9.8	NM	NM	NM	NM	<9.6	<10	<10.1	<10	<10.1	<10.1	<9.6	<9.5
Chrysene	ug/l	NE	NE	<0.041	0.087	<9.8	<10.4	<10.1	<0.041	0.094	0.23	0.13	<0.04	<9.8	<0.04	0.15	<0.039	<0.039	<9.6	<10	<10.1	<10	<10.1	<10.1	<9.6	<9.5
Dibenz(a,h)anthracene	ug/l	NE	NE	<0.041	<0.039	<9.8	<10.4	<10.1	<0.041	<0.039	0.041	<0.039	<0.04	<9.8	<0.04	<0.044	<0.039	<0.039	<9.6	<10	<10.1	<10	<10.1	<10.1	<9.6	<9.5
Fluoranthene	ug/l	70	1.9	0.055	0.21	<9.8	<10.4	<10.1	0.082	0.13	0.32	0.21	<0.04	<9.8	0.064	0.31	<0.039	<0.039	<9.6	<10	<10.1	<10	<10.1	<10.1	<9.6	<9.5
Fluorene	ug/l	80	NE	<0.041	<0.039	<9.8	<10.4	<10.1	0.042	<0.039	<0.039	<0.039	<0.04	<9.8	0.35	<0.044	<0.039	<0.039	<9.6	<10	<10.1	<10	<10.1	<10.1	<9.6	<9.5
Indeno(1,2,3-cd)pyrene	ug/l	NE	NE	<0.041	0.054	<9.8	<10.4	<10.1	<0.041	0.046	0.12	0.057	<0.04	<9.8	<0.04	0.087	<0.039	<0.039	<9.6	<10	<10.1	<10	<10.1	<10.1	<9.6	<9.5
Naphthalene	ug/l	NE	NE	<0.041	0.057	<9.8	<10.4	<10.1	0.044	<0.039	0.067	0.043	<0.04	<9.8	0.14	0.05	<0.039	<0.039	<9.6	<10	<10.1	<10	<10.1	<10.1	<9.6	<9.5
Phenanthrene	ug/l	NE	3.6	<0.041	0.12	<9.8	<10.4	<10.1	0.1	0.087	0.18	0.15	<0.04	<9.8	0.048	0.25	<0.039	<0.039	<9.6	<10	<10.1	<10	<10.1	<10.1	<9.6	<9.5
Pyrene	ug/l	50	NE	0.053	0.17	<9.8	<10.4	<10.1	0.068	0.12	0.3	0.2	<0.04	<9.8	0.1	0.23	<0.039	<0.039	<9.6	<10	<10.1	<10	<10.1	<10.1	<9.6	<9.5
NPDES General Permit																										
PAHs - Carcinogenic	ug/l	NE	0.028	<0	0.57	<0	<0	<0	0.08	0.52	1.4	0.71	<0	<0	<0	0.92	<0	<0	<0	<0	<0	<0	<0	<0	<0	<0
PAHs - Non carcinogenic	ug/l	NE	0.28	0.11	0.57	<0	<0	<0	0.29	0.34	0.86	0.62	<0	<0	0.72	0.87	<0	<0	<0	<0	<0	<0	<0	<0	<0	<0
VOCs																										
1,2,4-Trimethylbenzene	ug/l	100	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/l	100	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
2-Butanone	ug/l	4000	90	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Acetone	ug/l	4000	NE	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Benzene	ug/l	2	5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bromodichloromethane	ug/l	3	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chloroethane	ug/l	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chloroform	ug/l	20	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<4	<4	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	ug/l	6	70	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	ug/l	40	5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Isopropylbenzene	ug/l	300	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Naphthalene	ug/l	70	20	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
n-Butylbenzene	ug/l	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
n-Propylbenzene	ug/l	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	ug/l	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	ug/l	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	ug/l	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	ug/l	200	5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Trichloroethene	ug/l	0.4	5	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Vinylchloride	ug/l	0.2	0.18	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylene (Total)	ug/l	300	5	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3

Notes:

A full list of abbreviations is included in the table glossery

Table 3
Groundwater Analytical Results
Phase II Environmental Site Assessment
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

Borings are ordered by Area:				I-535/Garfield Bridge Demolition				I-35 Low-Level Bridge Demolition																	
Boring ID	Units	2019 MDH Drinking Water	NPDES	GP-335	GP-336	GP-337	GP-435	GP-153	GP-157	GP-159	GP-162	GP-163	GP-168	GP-172	GP-173	GP-194	GP-198	GP-202	GP-205	GP-206	GP-290	GP-292	GP-208	GP-223	GP-222
Field Sample ID			surface waters designated as drinking water	GP-335-5.52W	GP-336-6.95W	GP-337-6.78W	GP-435-3.04W	GP-153-7.36W	GP-157-2.08W	GP-159-4.19W	GP-162-2.55W	GP-163-3.72W	GP-168-4.5W	GP-172-2.57W	GP-173-2.78W	GP-194-13.97W	GP-198-0.78W	GP-202-0.80W	GP-205-1.36W	GP-206-2.14W	GP-290-3.10W	GP-292-3.31W	GP-208-2.40W	GP-223-2.38W	GP-222-1.97W
Laboratory ID				10474360021	10474360015	10474360018	10484416006	10452340014	10447922021	10452519003	10446535013	10446535010	10446750010	10473051013	10473308014	10452340003	10473870005	10473594016	10473594010	10473490026	10473490022	10473490014	10473490019	10473308030	10473308023
Sample Date				5/9/2019	5/9/2019	5/9/2019	7/23/2019	10/18/2018	9/18/2018	10/18/2018	9/6/2018	9/6/2018	9/7/2018	5/1/2019	5/2/2019	10/17/2018	5/6/2019	5/6/2019	5/6/2019	5/3/2019	5/3/2019	5/3/2019	5/3/2019	5/2/2019	5/2/2019
DRO and GRO																									
Diesel Range Organics	ug/l	50	200	<96.2	113 (T6)	<96.2	NM	NM	692 (T6)	NM	584 (T6)	796 (T6)	171	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Gasoline Range Organics	ug/l	50	200	<100 (G-)	<100 (G-)	<100 (G-)	<100	<100	<100	<100	<100	<100	<100	<100 (G-)	<100 (HS,G-)	<100	<100 (G-)	<100 (G-)	<100 (G-)	<100 (G-)	<100	<100 (G-)	<100 (G-)	<100 (G-)	<100 (HS,G-)
WDRO C10-C28 Silica Gel	ug/l	50	200	NM	NM	NM	<96.2	<102	NM	197	110 (T7)	408 (T7)	NM	<96.2	392 (T6)	<98	<98	<96.2	<98	151 (T6)	<96.2	<94.3	<92.6	167	278
Metals																									
Barium, Dissolved	ug/l	2000	NE	78.4	60.8	113	25.4	539	37.7	145	358	310	407	137	1830	210	201	149	217	83.8	315	239	123	391	385
Zinc, Dissolved	ug/l	2000	NE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
PCBs																									
PCBs (Polychlorinated Biphenyls)	ug/l	0.04	NE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Herbicides and Pesticides																									
All Herbicides and Pesticides	ug/l	NE	NE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Semi-VOCs																									
Acenaphthene	ug/l	100	20	<10.1	<10	<10	<10	<0.049	0.045	<0.038	<0.041	0.04	<0.041	<0.039	0.68	<0.045	<0.039	<0.039	0.46	<0.04	<0.038	<0.039	<0.04	<0.039	<0.038
Acenaphthylene	ug/l	NE	NE	<10.1	<10	<10	<10	<0.049	<0.044	<0.038	<0.041	<0.04	<0.041	<0.039	<0.039	<0.045	<0.039	<0.039	<0.039	<0.04	<0.038	<0.039	<0.04	<0.039	<0.038
Anthracene	ug/l	600	0.035	<10.1	<10	<10	<10	<0.049	<0.044	<0.038	<0.041	0.15	<0.041	0.17	0.78	<0.045	<0.039	<0.039	0.041	<0.04	<0.038	0.33	<0.04	<0.039	0.29
Benz(a)anthracene	ug/l	NE	NE	<10.1	<10	<10	<10	<0.049	0.069	<0.038	<0.041	0.053	<0.041	0.055	1.6	<0.045	<0.039	0.072	0.048	<0.04	<0.038	1.6	<0.04	0.68	0.51
Benzo(a)pyrene	ug/l	0.1	NE	<10.1	<10	<10	<10	<0.049	0.085	<0.038	<0.041	<0.04	<0.041	0.042	1.2	<0.045	<0.039	0.056	0.04	<0.04	<0.038	1.5	<0.04	0.6	0.45
Benzo(b)fluoranthene	ug/l	NE	NE	<10.1	<10	<10	<10	<0.049	0.13	<0.038	<0.041	<0.04	<0.041	0.054	1.4	<0.045	<0.039	0.093	0.067	<0.04	<0.038	1.9	<0.04	0.75	0.53
Benzo(g,h,i)perylene	ug/l	NE	NE	<10.1	<10	<10	<10	<0.049	0.1	<0.038	<0.041	<0.04	<0.041	<0.039	0.61	<0.045	<0.039	0.04	<0.039	<0.04	<0.038	0.99	<0.04	0.42	<0.038
Benzo(k)fluoranthene	ug/l	NE	NE	<10.1	<10	<10	<10	<0.049	0.064	<0.038	<0.041	<0.04	<0.041	<0.039	0.79	<0.045	<0.039	0.041	0.039	<0.04	<0.038	0.94	<0.04	0.41	0.31
bis(2-Ethylhexyl)phthalate	ug/l	7	NE	<10.1	<10	<10	<10	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Chrysene	ug/l	NE	NE	<10.1	<10	<10	<10	<0.049	0.098	<0.038	<0.041	0.084	<0.041	0.044	1.1	<0.045	<0.039	0.062	0.052	<0.04	<0.038	1.5	<0.04	0.74	0.42
Dibenz(a,h)anthracene	ug/l	NE	NE	<10.1	<10	<10	<10	<0.049	<0.044	<0.038	<0.041	<0.04	<0.041	<0.039	<0.039	<0.045	<0.039	<0.039	<0.039	<0.04	<0.038	<0.039	<0.04	<0.039	<0.038
Fluoranthene	ug/l	70	1.9	<10.1	<10	<10	<10	<0.049	0.14	0.15	<0.041	0.15	<0.041	0.11	3	<0.045	<0.039	0.13	0.086	<0.04	<0.038	2.7	<0.04	1.2	0.8
Fluorene	ug/l	80	NE	<10.1	<10	<10	<10	<0.049	<0.044	<0.038	<0.041	<0.04	<0.041	<0.039	0.7	<0.045	<0.039	<0.039	<0.039	<0.04	<0.038	<0.039	<0.04	<0.039	<0.038
Indeno(1,2,3-cd)pyrene	ug/l	NE	NE	<10.1	<10	<10	<10	<0.049	0.072	<0.038	<0.041	<0.04	<0.041	<0.039	0.57	<0.045	<0.039	<0.039	<0.039	<0.04	<0.038	0.86	<0.04	0.33	<0.038
Naphthalene	ug/l	NE	NE	<10.1	<10	<10	<10 (L2)	<0.049	0.77	<0.038	<0.041	<0.04	<0.041	<0.039	<0.039	<0.045	<0.039	<0.039	<0.039	<0.04	<0.038	<0.039	<0.04	0.54	<0.038
Phenanthrene	ug/l	NE	3.6	<10.1	<10	<10	<10	<0.049	0.095	<0.038	<0.041	0.15	<0.041	0.089	3.2	<0.045	<0.039	0.12	0.099	<0.04	<0.038	1.4	<0.04	0.99	0.43
Pyrene	ug/l	50	NE	<10.1	<10	<10	<10	<0.049	0.13	<0.038	<0.041	0.14	<0.041	0.084	2.6	<0.045	<0.039	0.11	0.083	<0.04	<0.038	2.4	<0.04	1.1	0.75
NPDES General Permit																									
PAHs - Carcinogenic	ug/l	NE	0.028	<0	<0	<0	<0	<0	0.62	<0	<0	0.14	<0	0.20	7.3	<0	<0	0.36	0.25	<0	<0	9.3	<0	3.9	2.2
PAHs - Non carcinogenic	ug/l	NE	0.28	<0	<0	<0	<0	<0	0.37	0.15	<0	0.59	<0	0.45	10.3	<0	<0	0.36	0.31	<0	<0	6.8	<0	3.3	2.3
VOCs																									
1,2,4-Trimethylbenzene	ug/l	100	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/l	100	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
2-Butanone	ug/l	4000	90	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Acetone	ug/l	4000	NE	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Benzene	ug/l	2	5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bromodichloromethane	ug/l	3	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chloroethane	ug/l	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1.6	<1	<1	<1	<1	<1
Chloroform	ug/l	20	NE	<1	<1	<1	<4	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	ug/l	6	70	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	ug/l	40	5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Isopropylbenzene	ug/l	300	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Naphthalene	ug/l	70	20	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
n-Butylbenzene	ug/l	NE	NE	<1	<1	<1	<1	<4	<1	<4	<1	<1	<1	<1	<1	<4	<1	<1	<1	<1	<1	<1	<1	<1	<1
n-Propylbenzene	ug/l	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	ug/l	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	ug/l	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	ug/l	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	ug/l	200	5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Trichloroethene	ug/l	0.4	5	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Vinylchloride	ug/l	0.2	0.18	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2 (R1)	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylene (Total)	ug/l	300	5	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3

Notes:

A full list of abbreviations is included in the table glossery

10/4/2019
MNTCO 145399
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Table 3
Groundwater Analytical Results
Phase II Environmental Site Assessment
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

			Borings are ordered by Area:	I-35 Low-Level Bridge Demolition																						
Boring ID	Units	2019 MDH Drinking Water	NPDES	GP-221	GP-209	GP-220	GP-212	GP-213	GP-174	GP-175	GP-169	GP-170	GP-166	GP-176	GP-177	GP-180	GP-179	GP-216	GP-181	GP-215	GP-214	GP-218	GP-219	GP-234	GP-233	GP-238
Field Sample ID			surface waters designated as drinking water	GP-221-1.73W	GP-209-1.97W	GP-220-2.74W	GP-212-4.12W	GP-213-6.53W	GP-174-1.5W	GP-175-1.84W	GP-169-2.03W	GP-170-0.42W	GP-166-1.43W	GP-176-0.91W	GP-177-1.11W	GP-180-1.13W	GP-179-1.71W	GP-216-2.75W	GP-181-0.5W	GP-215-1.81W	GP-214-1.43W	GP-218-2.00W	GP-219-2.22W	GP-234-2.31W	GP-233-3.02W	GP-238-2.88W
Laboratory ID				10473308019	10473308006	10475884020	10475884033	10475884009	10446750006	10446535022	10446535026	10446918015	10446918024	10446918020	10446750022	10446535025	10447109005	10447109010	10446535015	10447109020	10447109015	10447291019	10447109025	10447109035	10447109030	10447291007
Sample Date				5/2/2019	5/1/2019	5/21/2019	5/21/2019	5/21/2019	9/6/2018	9/6/2018	9/6/2018	9/10/2018	9/10/2018	9/10/2018	9/7/2018	9/6/2018	9/10/2018	9/10/2018	9/6/2018	9/11/2018	9/11/2018	9/12/2018	9/11/2018	9/11/2018	9/11/2018	9/12/2018
DRO and GRO																										
Diesel Range Organics	ug/l	50	200	NM	NM	NM	NM	NM	359 (T6)	99.6	146	739 (T6)	1090 (T6)	3420 (T6)	1490 (T6)	204	584 (T6)	376 (T6)	291 (T6)	207 (T6)	162	723 (T6)	238 (T6)	1660 (T6)	174	323
Gasoline Range Organics	ug/l	50	200	[illegible]	[illegible]	[illegible]	134	9960 (G-,G+,pH	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
WDRO C10-C28 Silica Gel	ug/l	50	200	187	139	<128	<116	6950 (T7,T6)	NM	NM	NM	161 (H3,T7)	NM	NM	NM	NM	NM	NM	NM	<98	NM	NM	NM	NM	NM	NM
Metals																										
Barium, Dissolved	ug/l	2000	NE	198	195	1450	2170	NM	369	96	134	227	231	331	371	147	238	558	65.1	259	515	1020	160	549	128	506
Zinc, Dissolved	ug/l	2000	NE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
PCBs																										
PCBs (Polychlorinated Biphenyls)	ug/l	0.04	NE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Herbicides and Pesticides																										
All Herbicides and Pesticides	ug/l	NE	NE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Semi-VOCs																										
Acenaphthene	ug/l	100	20	<9.7	<10	0.12	<1	NM	<0.043	<0.039	<0.038	<0.04	0.091	0.28	0.071	<0.039	0.38	0.26	27.4	<0.038	0.081	0.71	<0.039	0.64	<0.039	0.042
Acenaphthylene	ug/l	NE	NE	<9.7	<10	0.37	<1	NM	<0.043	<0.039	<0.038	<0.04	0.16	0.17	0.057	<0.039	0.09	0.25	5.6	<0.038	<0.04	0.39	0.053	0.35	<0.039	0.053
Anthracene	ug/l	600	0.035	<9.7	<10	0.34	<1	NM	<0.043	<0.039	<0.038	<0.04	0.42	0.26	0.16	<0.039	0.92	0.98	14	<0.038	0.085	2.2	0.1	2	<0.039	0.14
Benz(a)anthracene	ug/l	NE	NE	<9.7	<10	1.1	<1	NM	<0.043	<0.039	<0.038	<0.04	1.2	0.59	0.38	<0.039	1.7	4.8	16	0.071	0.21	4.5	0.37	5.2	<0.039	0.61
Benzo(a)pyrene	ug/l	0.1	NE	<9.7	<10	1.3	<1	NM	<0.043	<0.039	<0.038	<0.04	1.4	0.75	0.45	<0.039	1.6	5.3	18.9	0.08	0.18	4.5	0.43	5.6	<0.039	0.68
Benzo(b)fluoranthene	ug/l	NE	NE	<9.7	<10	1.6	<1	NM	<0.043	<0.039	<0.038	0.049	1.7	1.1	0.57	<0.039	2.1	7.3	27.9	0.1	0.22	5.5	0.5	7.1	<0.039	0.85
Benzo(g,h,i)perylene	ug/l	NE	NE	<9.7	<10	0.93	<1	NM	<0.043	<0.039	<0.038	<0.04	1	0.68	0.33	<0.039	0.83	3.4	13.2	0.054	0.12	2.7	0.25	3.6	<0.039	0.51
Benzo(k)fluoranthene	ug/l	NE	NE	<9.7	<10	0.64	<1	NM	<0.043	<0.039	<0.038	<0.04	0.7	0.54	0.24	<0.039	0.84	3.1	9.1	0.051	0.095	2.2	0.24	2.5	<0.039	0.36
bis(2-Ethylhexyl)phthalate	ug/l	7	NE	<9.7	<10	NM	<3	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Chrysene	ug/l	NE	NE	<9.7	<10	1.2	<1	NM	<0.043	<0.039	<0.038	<0.04	1.1	0.61	0.38	<0.039	1.4	4	17.3	0.063	0.18	3.9	0.29	3.8	<0.039	0.57
Dibenz(a,h)anthracene	ug/l	NE	NE	<9.7	<10	0.26	<1	NM	<0.043	<0.039	<0.038	<0.04	0.17	0.13	0.059	<0.039	0.28	1	4.2	<0.038	<0.04	0.88	<0.039	1.2	<0.039	0.12
Fluoranthene	ug/l	70	1.9	<9.7	<10	1.9	<1	NM	<0.043	<0.039	<0.038	0.063	2.9	1.2	0.87	<0.039	4.4	8.9	46.8	0.15	0.39	9.5	0.61	10.9	<0.039	1
Fluorene	ug/l	80	NE	<9.7	<10	0.13	<1	NM	<0.043	<0.039	<0.038	<0.04	0.14	0.31	0.068	<0.039	0.47	0.34	11.2	<0.038	0.057	0.93	0.07	0.95	<0.039	0.047
Indeno(1,2,3-cd)pyrene	ug/l	NE	NE	<9.7	<10	0.74	<1	NM	<0.043	<0.039	<0.038	<0.04	0.78	0.53	0.24	<0.039	0.7	2.9	12	0.048	0.089	2.3	0.24	2.9	<0.039	0.42
Naphthalene	ug/l	NE	NE	<9.7	<10	0.25	<1	NM	<0.043	<0.039	<0.038	<0.04	0.065	0.24	0.08	<0.039	0.3	0.18	11.5	<0.038	0.2	0.46	0.044	0.5	<0.039	0.074
Phenanthrene	ug/l	NE	3.6	<9.7	<10	1.1	<1	NM	<0.043	<0.039	<0.038	<0.04	1.3	0.76	0.45	<0.039	3.7	3.2	31.7	0.079	0.43	7.1	0.29	6.1	<0.039	0.48 (B)
Pyrene	ug/l	50	NE	<9.7	<10	1.7	<1	NM	<0.043	<0.039	<0.038	0.053	2.2	1.1	0.67	<0.039	3.2	6.9	31.6	0.12	0.31	7.7	0.48	7.8	<0.039	0.91
NPDES General Permit																										
PAHs - Carcinogenic	ug/l	NE	0.028	<0	<0	7.8	<0	NM	<0	<0	<0	0.049	8.1	4.9	2.6	<0	9.5	32	119	0.47	1.1	26	2.3	32	<0	4.1
PAHs - Non carcinogenic	ug/l	NE	0.28	<0	<0	5.5	<0	NM	<0	<0	<0	0.12	7.1	3.8	2.3	<0	13	21	141	0.35	1.3	28	1.6	28	<0	2.6
VOCs																										
1,2,4-Trimethylbenzene	ug/l	100	NE	<1	<1	<1	<1	315 (H5)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	ug/l	100	NE	<1	<1	<1	<1	200 (H5)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
2-Butanone	ug/l	4000	90	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Acetone	ug/l	4000	NE	<20	<20	<20	<20	29	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Benzene	ug/l	2	5	<1	<1	<1	<1	192	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bromodichloromethane	ug/l	3	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chloroethane	ug/l	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Chloroform	ug/l	20	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
cis-1,2-Dichloroethene	ug/l	6	70	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	ug/l	40	5	<1	<1	<1	<1	460 (H5)	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Isopropylbenzene	ug/l	300	NE	<1	<1	<1	<1	63.1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Naphthalene	ug/l	70	20	<4	<4	<4	<4	94.2 (H5)	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
n-Butylbenzene	ug/l	NE	NE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
n-Propylbenzene	ug/l	NE	NE	<1	<1	<1	<1	109	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
p-Isopropyltoluene	ug/l	NE	NE	<1	<1	<1	<1	27.8	<1	<1	<1	4.5	3.8	<1	1.6	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	ug/l	NE	NE	<1	<1	<1	<1	12.3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	ug/l	NE	NE	<1	<1	<1	<1	1.7	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	ug/l	200	5	<1	<1	<1	<1	66.6	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Trichloroethene	ug/l	0.4	5	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Vinylchloride	ug/l	0.2	0.18	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylene (Total)	ug/l	300	5	<3	<3	<3	<3	843	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3

Notes:

A full list of abbreviations is included in the table glossery

Table 3
Groundwater Analytical Results
Phase II Environmental Site Assessment
Twin Ports Interchange - Work Package 1
Duluth, Minnesota
SP 982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

			Borings are ordered by Area:	I-35 Low-Level Bridge Demolition									
Boring ID	Units	2019 MDH Drinking Water	NPDES	GP-240	GP-241	GP-232	GP-230	GP-231	GP-242	GP-246	GP-248	GP-248	GP-250
Field Sample ID			surface waters designated as drinking water	GP-240-3.44W	GP-241-3.98W	GP-232-2.14W	GP-230-1.75W	GP-231-1.04W	GP-242-1.98W	GP-246-1.96W	GP-248-5.70W	GP-248-3.93W	GP-250-12.57W
Laboratory ID				10447462003	10447291010	10475884025	10475884034	10476121004	10447922025	10447955008	10447955004	10476121013	10447955013
Sample Date				9/12/2018	9/12/2018	5/21/2019	5/21/2019	5/21/2019	9/18/2018	9/17/2018	9/17/2018	5/22/2019	9/17/2018
DRO and GRO													
Diesel Range Organics	ug/l	50	200	160	142	NM	NM	NM	968 (T6)	398 (T6)	209	<96	966 (T6)
Gasoline Range Organics	ug/l	50	200	<100	<100	<100	<100	<100 (R1)	<100	<100	<100 (R1)	<100	<100 (R1)
WDRO C10-C28 Silica Gel	ug/l	50	200	NM	NM	<110	<110	<105	599 (T7,T6)	NM	<106	NM	<102
Metals													
Barium, Dissolved	ug/l	2000	NE	283	223	237	473	562	671	570	382	30.8	632
Zinc, Dissolved	ug/l	2000	NE	NM	NM	NM	NM	<20	NM	NM	NM	NM	NM
PCBs													
PCBs (Polychlorinated Biphenyls)	ug/l	0.04	NE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Herbicides and Pesticides													
All Herbicides and Pesticides	ug/l	NE	NE	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
Semi-VOCs													
Acenaphthene	ug/l	100	20	0.046	0.13	<1	<1	<0.04	1.8	<0.043	<0.041	<0.039	0.13
Acenaphthylene	ug/l	NE	NE	<0.041	0.061	<1	<1	0.071	<0.043	<0.043	<0.041	0.054	<0.04
Anthracene	ug/l	600	0.035	<0.041	0.23	<1	<1	0.049	0.06	0.069	<0.041	<0.039	<0.04
Benz(a)anthracene	ug/l	NE	NE	<0.041	0.51	<1	<1	<0.04	0.1	0.13	<0.041	<0.039	<0.04
Benzo(a)pyrene	ug/l	0.1	NE	<0.041	0.46	<1	<1	<0.04	0.081	0.13	<0.041	<0.039	<0.04
Benzo(b)fluoranthene	ug/l	NE	NE	0.042	0.55	<1	<1	<0.04	0.11	0.16	<0.041	<0.039	<0.04
Benzo(g,h,i)perylene	ug/l	NE	NE	<0.041	0.28	<1	<1	<0.04	0.06	0.096	<0.041	<0.039	<0.04
Benzo(k)fluoranthene	ug/l	NE	NE	<0.041	0.25	<1	<1	<0.04	0.06	0.086	<0.041	<0.039	<0.04
bis(2-Ethylhexyl)phthalate	ug/l	7	NE	NM	NM	<3	<3	NM	NM	NM	NM	NM	NM
Chrysene	ug/l	NE	NE	<0.041	0.45	<1	<1	<0.04	0.11	0.13	<0.041	<0.039	<0.04
Dibenz(a,h)anthracene	ug/l	NE	NE	<0.041	0.097	<1	<1	<0.04	<0.043	<0.043	<0.041	<0.039	<0.04
Fluoranthene	ug/l	70	1.9	0.069	0.97	<1	<1	0.047	0.24	0.24	<0.041	0.051	0.06
Fluorene	ug/l	80	NE	<0.041	0.13	<1	<1	<0.04	0.081	<0.043	<0.041	<0.039	0.071
Indeno(1,2,3-cd)pyrene	ug/l	NE	NE	<0.041	0.26	<1	<1	<0.04	0.051	0.081	<0.041	<0.039	<0.04
Naphthalene	ug/l	NE	NE	<0.041	0.17	<1	<1	<0.04	0.071	<0.043	0.054	<0.039	0.22
Phenanthrene	ug/l	NE	3.6	<0.041	0.79	<1	<1	0.071	0.14	0.18	<0.041	<0.039	0.13
Pyrene	ug/l	50	NE	0.059	0.84	<1	<1	0.046	0.19	0.22	<0.041	<0.039	0.057
NPDES General Permit													
PAHs - Carcinogenic	ug/l	NE	0.028	0.042	2.9	<0	<0	<0	0.57	0.81	<0	<0	<0
PAHs - Non carcinogenic	ug/l	NE	0.28	0.128	3.0	<0	<0	0.3	0.71	0.71	<0	0.11	0.32
VOCs													
1,2,4-Trimethylbenzene	ug/l	100	NE	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1
1,3,5-Trimethylbenzene	ug/l	100	NE	<1 (R1)	<1	<1	<1	<1	<1	<1	<2	<1	<1
2-Butanone	ug/l	4000	90	<5	<5	<5	<5	<5	<5	<5	<10	<5	<5
Acetone	ug/l	4000	NE	<20	<20	<20	<20	<20	<20	<20	<40	<20	<20
Benzene	ug/l	2	5	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1
Bromodichloromethane	ug/l	3	NE	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1
Chloroethane	ug/l	NE	NE	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1
Chloroform	ug/l	20	NE	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1
cis-1,2-Dichloroethene	ug/l	6	70	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1
Ethylbenzene	ug/l	40	5	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1
Isopropylbenzene	ug/l	300	NE	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1
Naphthalene	ug/l	70	20	<4	<4	<4	<4	<4	<4	<4	<8	<4	<4
n-Butylbenzene	ug/l	NE	NE	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1
n-Propylbenzene	ug/l	NE	NE	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1
p-Isopropyltoluene	ug/l	NE	NE	<1 (R1)	<1	<1	<1	<1	<1	<1	<2	<1	<1
sec-Butylbenzene	ug/l	NE	NE	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1
tert-Butylbenzene	ug/l	NE	NE	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1
Toluene	ug/l	200	5	<1	<1	<1	<1	<1	<1	<1	<2	<1	<1
Trichloroethene	ug/l	0.4	5	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.8	<0.4	<0.4
Vinylchloride	ug/l	0.2	0.18	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.4	<0.2	<0.2
Xylene (Total)	ug/l	300	5	<3	<3	<3	<3	<3	<3	<3	<6	<3	<3

Notes:

A full list of abbreviations is included in the table glossery

Appendix D

Work Package 1 Construction RAP Project Layout Figures

Legend

Response Action Areas extend to Work Package 1 Construction Limits

This map must be used in conjunction with Figure 1-2

Response Action Plan Polygon Notes:

ACWM / Landfill Disposal Area

All disturbance or removal of the ACWM will be managed as regulated ACWM. The asbestos abatement contractor will perform abatement and disposal of ACWM to ensure compliance with all applicable federal and state regulations.

Discrete Area Soil

Discrete Area Soil contains higher level contamination (exceeding one or more Tier 2 Industrial SRVs). Discrete Area Soil is commonly associated with historical point source releases of contaminants.

Regulated Soil

Regulated Soil contains low level contamination [exceeding one or more MPCA Soil Leaching Value (SLV) and/or Tier 1 Residential Soil Reference Value (SRV) but less than all Tier 2 Industrial SRVs]. Regulated Soil is found throughout the Project limits and is generally associated with non-point source releases from decades of industrial land uses.

Mercury Hotspot

Mercury in one known location in the project is above the landfill acceptance criteria (total mercury in soil of 466 mg/kg). The mercury hotspot was delineated with borings and sampling indicated that the hotspot is limited laterally and vertically.

Hazardous Lead Impacted Soil

Hazardous Lead Impacted Soil contains lead concentrations exceeding the Toxic Characteristic Leaching Procedure (TCLP) limit for characteristically hazardous for lead. The low number and scattered occurrence of these samples indicates that soil with hazardous lead concentrations are not associated with large releases but are isolated occurrences within Project limits.

Undesignated Soil

Several Project areas could not be investigated because of access issues.

Response Action Areas depicted on Figure 1-2

Unregulated Fill

Material that is assumed to be unregulated based on extrapolated results. Unless other conditions are encountered during excavation this material can be used on or off site.

Boring Location (SEH)

Test Pits Locations (WSB)

ACWM* Identified

ACWM* not Identified

*Asbestos Waste Containing Material

Inplace Below Ground Structure to Remain

Twin Ports Interchange Design

Work Package 1 (90% Design)

Work Package 2 (pre-60% Design)

Limits of Disturbance (WP 1)

Construction Limits (WP 1)

Pond

Retaining Wall

Bridge

General Design Features

Drain Structure

Drain Structure Removal

N W E S

0 150 300 Feet

Additional Notes:

bgs - Below Ground Surface in feet

T2SRV - Tier 2 Soil Reference Value, MPCA Risk-based site evaluation guidance for industrial levels.

MPCA = Minnesota Pollution Control Agency

WORK PACKAGE 1 ONLY -
This map depicts select depth ranges and must used in conjunction with other Response Action Plan Figures, which depict other depth ranges.
(Appendix D: D-1 and D-2)

Michigan/Superior Intersection

I535 and Garfield Avenue

SEH

3535 VADNAIS CENTER DR.
ST. PAUL, MN 55110
PHONE: (651) 490-2000
FAX: (888) 908-8166
TF: (800) 325-2055
www.sehinc.com

Project: MNTCO 151179

Print Date: 12/13/2019

Map by: Mahernill
Projection: UTM Zone 15N
Source: SEH Digi
MnDOT, ESRI, WSB,
Google Imagery

Contaminated Soil and Asbestos Containing Waste Material Areas

Construction RAP/CCP

Twin Ports Interchange

Minnesota State Projects: 6982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

Appendix D
WORK PACKAGE 1

App D
1-1

This map is neither a legally recorded map nor a survey map and is not intended to be used as one. This map is a compilation of records, information, and data gathered from various sources listed on this map and is to be used for reference purposes only. SEH does not warrant that the Geographic Information System (GIS) Data used to prepare this map are error free, and SEH does not represent that the GIS Data can be used for navigational, tracking, or any other purpose requiring exacting measurement of distance or direction or precision in the depiction of geographic features. The user of this map acknowledges that SEH shall not be liable for any damages which arise out of the user's access or use of data provided.

Legend

Response Action Areas extend to Work Package 1 Construction Limits

This map must be used in conjunction with Figure 1-1

Response Action Plan Polygon Notes:

Unregulated Fill

Material that is assumed to be unregulated based on extrapolated results. Unless other conditions are encountered during excavation this material can be used on or off site.

Response Action Areas depicted on Figure 1-1

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Regulated Soil

Regulated Soil contains low level contamination [exceeding one or more MPCA Soil Leaching Value (SLV) and/or Tier 1 Residential Soil Reference Value (SRV) but less than all Tier 2 Industrial SRVs]. Regulated Soil is found throughout the Project limits and is generally associated with non-point source releases from decades of industrial land uses.

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Mercury in one known location in the project is above the landfill acceptance criteria (total mercury in soil of 466 mg/kg). The mercury hotspot was delineated with borings and sampling indicated that the hotspot is limited laterally and vertically.

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Hazardous Lead Impacted Soil contains lead concentrations exceeding the Toxic Characteristic Leaching Procedure (TCLP) limit for characteristically hazardous for lead. The low number and scattered occurrence of these samples indicates that soil with hazardous lead concentrations are not associated with large releases but are isolated occurrences within Project limits.

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ACWM* Identified

ACWM* not Identified

*Asbestos Waste Containing Material

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Work Package 2 (pre-60% Design)

Limits of Disturbance (WP 1)

Construction Limits (WP 1)

Pond

Retaining Wall

Bridge

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Drain Structure

Drain Structure Removal

N W E S

0 150 300 Feet

Additional Notes:

bgs - Below Ground Surface in feet

T2SRV - Tier 2 Soil Reference Value, MPCA Risk-based site evaluation guidance for industrial levels.

MPCA = Minnesota Pollution Control Agency

WORK PACKAGE 1 ONLY -
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(Appendix D: D-1 and D-2)

Michigan/Superior Intersection

No Unregulated Materials

I535 and Garfield Avenue

SEH

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ST. PAUL, MN 55110
PHONE: (651) 490-2000
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www.sehinc.com

Project: MNTCO 145399
Print Date: 12/13/2019

Map by: Mahernill
Projection: UTM Zone 15N
Source: SEH Digi
MnDOT, ESRI, WSB,
Google Imagery

Unregulated Soil Areas

Construction RAP/CCP

Twin Ports Interchange

Minnesota State Projects: 6982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

Appendix D
WORK PACKAGE 1

App D
1-2

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Project: MNTCO 145399
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MnDOT

Groundwater Results

Phase II Environmental Site Assessment
Twin Ports Interchange - Work Package 1 Addendum
Duluth, Minnesota
SP 6982-322 (I-35), SP 6980-60 (I-535) and SP 6915-136 (TH 53)

PRELIMINARY DRAFT 12/18/2019

Figure
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