ENVIRONMENTAL ASSESSMENT WORKSHEET

This Environmental Assessment Worksheet (EAW) form and EAW Guidelines are available at the Environmental Quality Board's website at: http://www.eqb.state.mn.us/EnvRevGuidanceDocuments.htm. The EAW form provides information about a project that may have the potential for significant environmental effects. The EAW Guidelines provide additional detail and resources for completing the EAW form.

Cumulative potential effects can either be addressed under each applicable EAW Item, or can be addressed collectively under EAW Item 19.

Note to reviewers: Comments must be submitted to the RGU during the 30-day comment period following notice of the EAW in the *EQB Monitor*. Comments should address the accuracy and completeness of information, potential impacts that warrant further investigation and the need for an Environmental Impact Statement (EIS).

1. **Project title:** Spirit Lake Sediment Remediation Project

2. **Proposer:**
   Contact person: U.S. EPA, Great Lakes National Program Office, Attn: William Murray
   Title: Project Manager
   Address: 77 W. Jackson Blvd (G-17J)
   City, State, ZIP: Chicago, IL 60604
   Phone: 312-353-6324
   Email: murray.williamj@epa.gov

3. **RGU**
   Contact person: City of Duluth – Adam Fulton
   Title: Deputy Director, Dept. of Planning and Economic Development
   Address: 411 W. 1st St., Room 160
   City, State, ZIP: Duluth, MN, 55802
   Phone: 218-730-5580
   Fax:
   Email: afulton@duluthmn.gov

4. **Reason for EAW Preparation:** (check one)

Required:	**Discretionary:**
☐ EIS Scoping	☐ Citizen petition
X Mandatory EAW	☐ RGU discretion
	☐ Proposer initiated

   If EAW or EIS is mandatory give EQB rule category subpart number(s) and name(s):

Subpart 27 – Wetlands and Public Waters
Subpart 35 – Land Conversions in Shoreland

5. **Project Location:**
County: Saint Louis County
City/Township: City of Duluth
PLS Location (¼, ¼, Section, Township, Range): Sections 34 and 35, T49N, R15W, and Sections 2 and 3, T48N, R15W
Watershed (81 major watershed scale): St. Louis
GPS Coordinates:
NAD 1983 State Plane Minnesota North FIPS 2201 Feet
   - X: 2849109.064555
   - Y: 397424.601362

Tax Parcel Number:
   - 010-2746 (for TR 49, 15)
   - 010-2730 (for TR 48, 15)

Attachment to the EAW:
At a minimum attach each of the following to the EAW:
- County map showing the general location of the project;
- U.S. Geological Survey 7.5 minute, 1:24,000 scale map indicating project boundaries (photocopy acceptable); and
- Site plans showing all significant project and natural features. Pre-construction site plan and post-construction site plan.

Acronym List:

AOC	Area of Concern
APE	Area of Potential Effect
BMP	Best Management Practices
BUI	Beneficial Use Impairment
CDF	Confined Disposal Facility
CY	Cubic yards
EMNR	Enhanced Monitored Natural Recovery
FS	Feasibility Study
Ft	Feet
GIS	Geographic Information System
GLLA	Great Lake Legacy Act
GLNPO	Great Lakes National Program Office
LSMRR	Lake Superior and Mississippi Railroad
MNDNR	Minnesota Department of Natural Resources
MNR	Monitored Natural Recovery
MOA	Memorandum of Agreement
MPCA	Minnesota Pollution Control Agency

OHWL	Ordinary High-Water Level
OU	Operable Unit
PAH	Polyaromatic hydrocarbons
RAP	Remedial Action Plan
SHPO	State Historic Preservation Officer
SSB	Shallow Sheltered Bay
SWPPP	Stormwater Pollution Prevention Plan
THPO	Tribal Historic Preservation Officer
TPH	Total Petroleum Hydrocarbons
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USS	U. S. Steel
WQ	Water Quality

Figures:

1	County Map
2	U.S. Geological Survey 7.5 minute, 1:24,000 scale map indicating project boundaries
3	Project Site Layout
4	Spirit Lake Design Summary
5	Spirit Lake Habitat Plan
6a/6b-	LSMRR Potential Impact Areas
7	Spirit Lake Project Area Land Use
8	Project Area Zoning Map
9	Project Are Future Land Use Map
10	Project Area Soils Map
11	Potential Wetland Impacts

Attachments:

A	Design Drawings
B	Agency Consultations
C	Natural Heritage Review- June 2019
D	References

6. Project Description:

a. Provide the brief project summary to be published in the *EQB Monitor*, (approximately 50 words).

The Spirit Lake Sediment Remediation Project would remediate chemical constituents of concern and improve habitat in the Spirit Lake area of the Saint Louis River Area of Concern The project would occur across 226 acres and include 770,000 cubic yards of sediment removal, 107 acres of subaqueous capping, 41 acres of enhanced natural recovery, and over 100 acres of habitat enhancement and restoration. Material removed would be placed in onsite confined disposal facilities. The project would require specific design requirements to protect the Lake Superior & Mississippi Railroad (LSMRR) segment that bisects the remediation area. The

project has included tribal consultation, which has continued during the remedial design.

b. Give a complete description of the proposed project and related new construction, including infrastructure needs. If the project is an expansion include a description of the existing facility. Emphasize: 1) construction, operation methods and features that will cause physical manipulation of the environment or will produce wastes, 2) modifications to existing equipment or industrial processes, 3) significant demolition, removal or remodeling of existing structures, and 4) timing and duration of construction activities.

The Great Lakes National Program Office (GLNPO) within the United States Environmental Protection Agency (USEPA) has been working throughout the Great Lakes region to implement contaminated sediment cleanups under the Great Lakes Legacy Act, focusing on sediment remediation at known AOCs. The Great Lakes AOCs are areas that have experienced severe environmental degradation as a result of past pollution or industrial activity. GLNPO, in conjunction with U. S. Steel Corporation (USS – the project private partner), is planning to address sediment chemical constituents of concern in and adjacent to Spirit Lake, which is part of the Saint Louis River AOC. The purpose of the Spirit Lake Sediment Remediation Project (Project) is to address chemical constituents of concern, primarily polycyclic aromatic hydrocarbons (PAHs) and associated heavy metals (including lead, copper and zinc), in the Spirit Lake area, and to support the eventual de-listing of the Saint Louis River AOC.

The Spirit Lake site (the Site) is located in an open reach of the St. Louis River approximately eight miles upstream of Lake Superior and adjacent to the former USS Duluth Works Steel Mill Superfund site in Duluth, Minnesota (Figure 1). The Site is bounded by the Morgan Park neighborhood of Duluth to the north, Spirit Lake and the St. Louis River to the east, and the USS-owned former steel mill property to the west and south. The remediation area is bisected by the Lake Superior & Mississippi Railroad, situated on the western lake shore. The Site is located west of Spirit Island and tribally owned lake bottom lands. The Site comprises two main areas along the western shore of Spirit Lake: the Wire Mill Delta and the Unnamed Creek Delta (Figure 2). Wire Mill Delta is near the former wire mill pond. Unnamed Creek Delta is north of the Wire Mill Delta at the outlet of Unnamed Creek, where it empties into Spirit Lake. A constructed spit of land separates the two main estuary remediation areas. The upland portion of the site is further divided into operable units (OUs) as shown in Figure 3, some of which are being managed under separate regulatory oversight projects such as the OU-A area. Upland operable units that are part of this remedy include OU-I (the former coke settling basin), OU-J (an area of stabilized tar-impacted soils), and an area referred to as the Tar Between I&J.

The remediation and restoration strategy as recommended by the Spirit Lake Feasibility Study (FS) includes a combination of sediment removal, subaqueous capping (placement of a clean cap cover over impacted sediment), enhanced natural recovery (placement of a 6 inch sand cover to speed up natural recovery processes), onsite disposal of removed sediment in confined disposal facilities (CDFs), and habitat restoration (Figure 4). Each of these remedial actions is further described below. The Project also includes monitored natural recovery areas, which are not areas of site remedial action (no construction activities are necessary as these areas have less impact from constituents of concern), but will be part of a long-term operation, maintenance, and

monitoring plan to confirm compliance with remedial action objectives in accordance with accepted standards. Following publication of the Spirit Lake FS in July 2015, extensive discussions with tribes, resource managers, and stakeholder groups were initiated by USEPA. Meetings with these groups were additionally held during the development of the Spirit Lake FS. These discussions following the FS resulted in modifications to the remedy proposed in the selected remedial alternative from the Spirit Lake FS. These changes were made in an attempt to both address review comments and balance competing stakeholder interests. As a result, an alternative that proposed a "hybrid" remediation approach, one that balanced stakeholder interests while achieving project goals (Alternative 08B), was selected as being consistent with the remedy evaluation criteria of the governing federal statute; rules and guidance provided by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); CERCLA's National Contingency Plan; USEPA's Contaminated Sediment Guidance (2005); and the Minnesota Environmental Response and Liability Act. The recommended alternative incorporates additional habitat features, positions CDFs above the ordinary high-water level (OHWL) elevation for placement of removed sediment and provides a greater amount of open water area in both Unnamed Creek and Wire Mill Pond.

The major components of the selected alternative would include the following (Figure 3 and 4):

- Permitting of construction activities.
- Mobilization and Site support services (such as field offices, dewatering pad, wastewater treatment pad and system, decontamination pads, access roads, temporary fencing, security, power, storage, etc.) within the areas that are available to the Contractor.
- Construction of remedy components, including three onsite CDFs- the Delta CDF (approximate capacity of 196,000 CY), the Upland CDF (approximate capacity of 347,000 CY) and the OU-J CDF (capacity between 40,000 CY and 275,000 CY, depending upon design plan chosen) (Figure 3).
- Dredging approximately 771,000 total CY of contaminated sediments/soils:
    - 731,000 CY within the Unnamed Creek Delta and Wire Mill Pond.
    - 40,000 CY within the former coke settling basin (OU-I and the Tar between I&J).
- In-situ solidification of approximately 28,500 CY of impacted sediment from the Tar Between I&J.
- In-situ solidification of approximately 5,800 CY of impacted sediment and tar within OU-A areas T10 and T-11.
- Process, transport, and disposal of sediments in on-site CDFs.
- Treating contaminated water to effluent discharge requirements and discharge treated water with energy dissipation to Spirit Lake.
- Placement of an engineered cap (materials would include sand and selected areas with carbon amendment) over approximately 117 acres of the site:
    - 107 acres of cap placed over estuary sediments.
    - 9 acres of cap placed in the former coke settling basin (OU-I and the Tar between I&J).
- Placement of a thin layer (6-inches) of cover over approximately 41 acres of estuary sediments (enhanced monitored natural recovery [EMNR]). Additionally, 72 acres

are designated for monitored natural recovery, which does not involve placement of cover or other site disturbances, but will be part of long-term operation, maintenance, and monitoring activities.

- Capping and restoration of surface of CDFs; additionally, grading of approximately 104 acres in selected areas surrounding wetlands within the upland.
- In situ mixing of amendments for chemical stabilization with approximately 15,600 CY of characteristically hazardous soil/sediment to achieve non-hazardous regulatory levels of lead prior to removal of material stockpiling and confirmation testing in advance of off-site disposal.
- Construction of new railroad bridges.
- Creation of public trail and trail extension connector to Morgan Park neighborhood.
- Slope stabilization along Unnamed Creek adjacent to the OU-J CDF to accommodate placement of a culvert extension at the upstream end of the Site.
- Approximately 109 acres of habitat restoration planting (Figure 5).
- Site restoration and demobilization.

On the surface of the Delta CDF, there is potential for future development of a recreation area/park by the City of Duluth following the Spirit Lake Remediation Project. The remedial design would include a pedestrian trail along the top perimeter of the Delta CDF to facilitate public access, which is compatible with future plans. A detailed description of the construction and operation activities, the modifications to existing industry or equipment at the site, the removal or remodeling of existing structures and the timing of construction activities is provided below.

1. Construction and Operation Methods

The Project includes areas of sediment removal, subaqueous and upland capping, combined sediment removal and capping, enhanced natural recovery, and monitored natural recovery (Figure 4). The material removed would be placed in onsite CDFs (Figure 4). The design also includes a habitat restoration component (Figure 5) and construction of a public trail and railroad structures. Design drawings for the Project are provided in Attachment A.

These activities would cause physical manipulation of the landscape; however, the Project design endeavors to maintain a natural landscape appearance, including softened shorelines and habitat betterment features, while accomplishing the ultimate goal of an improved environmental condition of the Project area. The final design would provide habitat benefits including the creation of two shallow sheltered bay aquatic environments, naturalization features for the mouth of Unnamed Creek and upstream areas above the shallow sheltered bay, as well as creation of more locations with water depth transitions from shallow to deeper water in the estuary, and a shoal area that can provide future sites for emergent vegetation establishment.

Each component of the proposed remedy that may contribute to changes in the physical landscape within the Site is discussed in detail below.

<u>Excavation/Dredging</u>
General construction methods- Excavation with low ground pressure equipment or conventional

equipment using temporary access roads would be used to remove soil and sediment from upstream areas of the site. Dredging would be used in the aquatic areas of the site for both the shallow and deeper water portions of the estuary. For upstream areas, removal would consist of mechanical excavation using standard off-road equipment. Control measures such as containment barriers, stream diversion, and/or cofferdams would be used to minimize downstream soil/sediment migration. Dredging in the estuary would consist of mechanical removal. Mechanical removal of sediments would involve the use of an articulated fixed-arm excavator or barge-based crane with a traditional clamshell bucket or environmental bucket. The contractor would select either truck transport from removal areas to dewatering areas or hydraulic transport through a pipeline.

- For hydraulic transport, sediment would first be removed mechanically, then a slurrying process would add water to the dredged sediment in an enclosed mixing vessel to create the slurry. The slurry would be transported by pumping in a pipeline to a sediment processing facility. The processing facility would be located at the destination CDF and would include sand separation and dewatering of the fine-grained fraction using filter presses. Water from the sediment processing facility would undergo solids filtration, then be recirculated back to the slurrying plant for re-use as carrier fluid for more dredged sediment. The remaining fine-grained fraction (filter cake) would be placed in the CDF. Recirculated water would be treated prior to final discharge back to the estuary.
- If the contractor selects conventional gravity dewatering and air drying for management of dredged/excavated materials, drained porewater and contact stormwater will be collected and treated prior to discharge to the estuary.

Selection of the most appropriate removal and material management methods would be based upon further evaluation of site-specific conditions and construction work planning by the contractor.

Implementation areas- The selected alternative includes excavation of contaminated soils and sediment from portions of both the upland and estuary areas of the Site (Figure 4).

Removal of material within the Unnamed Creek Delta would result in a restored estuary through creation of a shallow sheltered bay (SSB) with two depth profiles. For the main area of the bay (to the northwest of the Delta CDF) that connects Unnamed Creek to Spirit Lake, deeper depths are provided for fish habitat considerations (average water depth of 3 to 5 feet (ft)), while the area of the bay northeast of the Delta CDF provides shallow water depths of 1 to 2 feet for establishing emergent wetland type plant communities. The shallow sheltered bay would be created by removing material to a target elevation followed by placement of a subaqueous remedial cap (capping discussed in detail below). The work in this area would also create a shoal feature at the mouth of the bay that is intended to reduce wave energy as well as encourage water flow into and out of the sheltered bay, by focusing seiche flow through a channel at the northern end of the shoal. This configuration has been designed based on hydrodynamic modeling of the Spirit Lake/St. Louis River flow conditions at the Site. Impacted sediment near the shoreline in the Wire Mill Delta, Wire Mill Pond and the northern portion of the Unnamed Creek Delta would be removed but would not be followed with cap placement.

Approximately two ft of sediment would be removed from the former coke settling basin (OU-I and Tar Between I&J). A cap would be placed following removal of the sediments, as detailed in the following section, and the area would generally be restored to its existing condition.

Capping

General construction methods- Capping is a well-established, proven technology for reducing exposure to contaminants. Capping in the Site would consist of either capping over in-situ materials or excavated and placed materials. In the upland portion of the site, capping would be used to control direct exposure to and prevent the erosion of the impacted material. Upland caps are designed for recreational considerations in public access areas and industrial considerations in adjacent areas. In the estuary portion of the site, the caps would consist of a natural granular material such as clean sand or gravel. In some areas, caps may be amended with organic material or carbon to improve function and support restoration. Cap thickness in the estuary would depend on the thickness of the bioactive zone in each area to be capped. Caps would be constructed using standard construction and remediation equipment. Caps are designed for protection of ecological receptors using sediment quality targets, in coordination with the Minnesota Pollution Control Agency. The engineered CDF caps have been designed with a low permeability cover to prevent infiltration and slope to promote surface water run-off to drainage features, thereby protecting groundwater in the area. Approximately 430,000 cy of material would be needed for capping within the site. Cap material will be sourced from the onsite borrow area and imported from Minnesota or Wisconsin aggregate and sand fill suppliers meeting Minnesota Pollution Control Agency (MPCA) Level I/ Level II midpoint sediment quality target requirements.

Implementation areas- The selected alternative includes the placement of a 2-foot-thick soil cap over the OU-I in the upland portion of the site after contaminated soils have been removed to a target elevation. Unnamed Creek downstream of OU-I and adjacent wetland areas would receive 2-foot-thick to 3-foot-thick caps, depending on engineering considerations. In the estuary area, the largest areas of capping would be in the northern portion of the Unnamed Creek Delta adjacent to the shoal feature and in the Wire Mill Delta. Subaqueous caps would occur both in the shallow sheltered bay and lakebed east of the shoal. For the SSB, a cap would be placed upon completion of dredging activities. Smaller areas in between the two deltas would also be capped (Figure 3 and 4).

Caps placed in the upstream portion of the site would not cause any significant physical changes to the landscape or major changes in elevation. For in-water caps, the thickness of the caps may result in conversion of some current open water areas to areas of emergent vegetation depending upon the pre-placement water depth.

Confined Disposal Facility (CDF) Construction

General construction methods- CDFs are a widely used technology for consolidating and containing impacted sediments. CDFs are constructed based on the method of sediment/soil excavation and the geotechnical properties of their underlying sediment/soil. A detailed evaluation of the geotechnical properties of the material to be placed in CDFs on-site was conducted as part of the Pre-Design Investigation for the Project. Following site preparation activities (ground clearing and topsoil removal to one foot below soil surface below containment

berms), the CDFs would be constructed by initially constructing perimeter containment berms followed by filling the containment berms with excavated/dredged material. The excavated/dredged material would undergo gravity dewatering and air drying to remove excess water. Portland cement would be used as a drying agent, if needed, to improve geotechnical characteristics. Placement of excavated/dredged materials would include some compaction intended to provide sufficient strength and density to support construction equipment. CDFs are expected to undergo some settlement during and following construction by consolidation of fine-grained silt and clay. The consolidation process results in shear strength gain improvements in the underlying fine-grained soils (increase in resisting forces). Settlement monitoring of the Upland CDF would be performed to inform fill management and construction activities. This monitoring would be accomplished through the use of settlement plates and other techniques to confirm design assumptions. Temporary erosion controls such as seeding and use of erosion control blankets would be used during construction for CDFs, and permanent erosion control would be managed by engineered caps placed following filling of the CDFs.

Implementation areas- Three CDFs would be constructed in the Site with berm heights ranging from 10 ft to 25 ft. One CDF would be constructed in the OU-M Delta along the spit of land and would be placed at an elevation greater than the ordinary high-water level (OHWL). Two CDFs would be constructed in the Unnamed Creek ravine (the Upland CDF located in OU-L/OU-M and the OU-J CDF located in the OU-J area) (Figures 3 and 4). Only estuary sediments would be placed in the Delta CDF. The majority of the removed material would be consolidated in the Delta and Upland CDFs. Sediment excavated from OU-I will be consolidated in the OU-J CDF. Excess material from the estuary that cannot be accommodated in the Delta or Upland CDF would also be consolidated in the OU-J CDF.

The CDFs constructed in the Unnamed Creek ravine would have the higher berm heights and would use the valley side near these areas during construction to help contain some of the material. The peninsula created by construction of the Delta CDF would not extend east past the OHWL (approximate current shoreline), thereby reducing the CDF footprint and avoiding containment of impacted materials in existing open water.

Enhanced Natural Recovery Thin Cover

General construction methods- Natural recovery uses ongoing naturally occurring processes to contain or reduce the availability of contaminants in impacted sediment. Implementing enhanced natural recovery (ENR) is a way to accelerate the recovery process. For estuary sediments, ENR would include placement of a thin layer (approximately 6 inches) of clean sediment or sand over impacted sediment. This thin cover amendment speeds the development of a clean sediment layer at the sediment-water interface.

Implementation areas- ENR thin cover would be placed in two areas within the Unnamed Creek Delta and in one area in between Unnamed Creek Delta and Wire Mill Delta (Figure 3 and 4). Due to the thin nature of the cover material, placement is not anticipated to contribute to changes in the landscape within the Site.

In-Situ Solidification/Stabilization

General construction methods – Solidification/stabilization encapsulates impacted soil to form a

solid material that restricts the migration of contaminants by decreasing the amount of surface area available for leaching. This is commonly done by mixing cement with metal stabilization agents or other similar additives into impacted soils using a backhoe bucket, rotating mechanical mixing method, or large diameter auger.

Implementation areas – This process has been historically used at OU-J and would be completed for the impacted soils located within the Tar Between I&J and OU-A Areas T-10 and T-11 (Figure 3). The solidified and stabilized material will subsequently be excavated to a set elevation for stream restoration with a wetland cover placed over the solidified Tar between I&J area. The excavated material would be placed in the OU-J CDF.

In-situ solidification/stabilization would be provided for sediments and soil in the Wire Mill pond area to address the delineation of materials with lead concentrations elevated above the regulatory level for toxicity characteristic ($TCLP_{lead} > 5$ mg/L). Chemical stabilization is further facilitated by the addition of metal binding agents within amendments. The solidified/stabilized materials would be sampled to confirm the modified soil mass is non-hazardous prior to offsite disposal.

Unnamed Creek Diversion

Unnamed Creek is an open channel stormwater conveyance feature that enters at the western edge of the site through a culvert. As part of the Project, an approximately 250-foot culvert extension would be installed to allow for construction of slopes adjacent to the creek. Unnamed Creek would be temporarily diverted during construction to allow for stabilization of the Tar Between I&J, excavation and capping within OU-I, construction of the Delta CDF, Upland CDF, Unnamed Creek cap and creek bed, and construction of the shallow sheltered bay. The temporary diversion would reroute stormwater by a temporary open channel constructed of clean materials, aided by temporary features such as Port-a-dams to direct surface water flow away from disturbed areas. Once construction activities are completed, a permanent channel would be constructed on top of the OU-I cap and around the CDFs to protect them from storm and flood events. Storm water flow upstream of the Unnamed Creek water level control weir would be similar to current conditions and would include similar ponding capacity of peak flows. Downstream of the weir, storm water flow would be directed to the shallow sheltered bay created in the OU-M Delta (Figure 3 and 4).

Public Trail

A multi-use trail would be included in the pre-final design. The trail would follow the existing rail line and include a pedestrian bridge at the new Unnamed Creek railroad bridge. The portion of the trail located adjacent to the railroad has been spaced appropriately given accepted standards and considerations of frequency of railroad traffic, existing track speed limit, and other factors. Americans with Disabilities Act accessibility best management practices (BMPs) would be incorporated into the design. The design for the multi-use trail would be developed in coordination with the City of Duluth's plans for the rail and adjacent trail operations. Additionally, the pedestrian trail provided as part of the Spirit Lake Sediment Remediation is compatible with future park features that may be developed by the City of Duluth on the surface of the Delta CDF.

2. Modifications to Existing Industry and Equipment

Within the Site, little to no industry or equipment, aside from the LSMRR, is present. The current roads and industrial buildings would incur only temporary minor impacts (i.e. new access points) associated with construction, if any.

3. Removal or Remodeling of Existing Structures

Lake Superior and Mississippi Railroad

The tourist railroad, the LSMRR crossing the Site and owned by the City of Duluth, contains a historical railroad that is eligible for listing on the National Register of Historic Places under the National Historical Preservation Act, Section 106 regulations. Although the tourist railroad operations will need to be temporarily suspended on the track segment that bisects the Site, the intent of the Project design is to minimize impacts to the railroad and provide for site restoration to address impacts where possible. For the Project to be successful, some impact to the railroad is unavoidable. However, in each area where the railroad would be impacted, rail line and associated materials would be replaced or restored as appropriate to allow for resumed operation of the railroad post-remediation. In terms of removal and remodel of the existing railroad, the Project would result in no net change to the current structure. Materials such as railroad ties and ballast that are not reused following project completion would be disposed of by the Contractor as appropriate; the necessary disposal options for any replaced materials would be decided upon during the project final design phase.

It is estimated that there would be approximately 355 ft of railroad temporarily impacted and 185 ft of railroad permanently impacted (Figures 6a and 6b). All removed areas of the railroad would be replaced. The design in these areas would aim to reduce impacts to components of the railroad that contribute to historic character. A summary of how areas of the railroad would be permanently removed and replaced is presented below. The potential impacts of the removal/replacement of the structure in the historic context are discussed in EAW Item No. 14.

Construction of a Permanent Maintenance Road

The railroad would not be permanently impacted at this location. A temporary road would be converted into a permanent maintenance road to access the Delta CDF. The 20-foot wide permanent truck crossing at the railroad would be located at the spit of land in Unnamed Creek. During construction, this road would be used to transport soil and equipment between upland areas and the SSB, the Delta CDF, and Unnamed Creek. The crossing would be 20 ft wide to provide sufficient width to limit risk of future damage to the existing track. Concrete pads would be placed between the tracks to protect the rail line from repeated crossing by a standard utility truck that would access the Delta CDF to perform routine long-term monitoring and maintenance activities.

Railroad Changes at the New Unnamed Creek Bridge

The current railroad will be permanently impacted at this location but removed rail line and associated materials will be replaced. The new bridge for the permanent diversion of Unnamed Creek would be a 45-foot long precast, prestressed, three-span concrete ballast deck bridge appropriately sized based on modeling results. The bridge design would reduce flooding impact

to the railroad since the channel under the bridge would be able to convey the 100-year storm event without overtopping the railroad, though this flow would submerge the bottom of the bridge deck. The bridge would be designed with colorized concrete for visible features that would to match the look of timber for historical aesthetic. Since the bridge has been designed to convey all upstream flow from Unnamed Creek, existing culverts under the railroad would be abandoned with flowable fill.

Railroad Changes at the New Wire Mill Pond Bridge
The current railroad will be permanently impacted at this location but removed rail line and associated materials will be replaced. The existing railroad bridge would be replaced to allow greater connectivity for Wire Mill Pond and the Spirit Lake estuary. The existing timber bridge and culvert would be removed, and the channel would be widened to allow greater circulation of water in and out of Wire Mill Pond. The new pre-cast, prestressed, 3-span concrete ballast deck bridge would have a total length of approximately 60 ft and would be installed to allow the train to cross the new, wider channel. This bridge would use similar colorized concrete to the new bridge at Unnamed Creek.

Additions to Reduce Traffic Impacts to Historically Significant Morgan Park
A new site entrance on the western side of the U. S. Steel facility in the vicinity of the Ikonics property and surrounding city streets is planned, which would be designed for temporary use for the Project, while providing a permanent road base consistent with the City of Duluth requirements that could be later converted to a paved street. This new site entrance would link truck traffic from nearby Highway 23 (Commonwealth Avenue) to the Site via direct connection to the major highway. The new site entrance significantly reduces potential truck traffic impacts to the Morgan Park neighborhood, which otherwise would require routing along Idaho Street to access the existing site entrance.

Embankment Modifications
At the downstream end of OU-I, a dam and weir structure control the flow of Unnamed Creek before it passes beneath the site entrance via a box culvert. As part of the Project, the earthen embankment slope will be flattened in order to improve long-term slope stability.

4. Timing and Duration of Construction

The construction period is expected to begin in late 2019 and last up to three consecutive construction seasons. The anticipated sequence of construction would occur as follows; however, it is anticipated that many of the activities will be completed concurrently and the final sequencing will be influenced by contractor construction methods and approach:

Year 1

- Construct site access roads and staging areas—All locations where the access roads exit the site would include a stabilized construction entrance.
- Construct permanent stormwater culvert extension upstream of OU-I/OU-J areas.
- Excavate the borrow area.
- Stabilize tar impacted material in the Tar Between OU-I and OU-J.

- Partially construct the OU-J CDF to allow for placement of the OU-I sediment.
- Dredge sediment from and place cap in the former coke settling basin (OU-I and the Tar between OU-I and OU-J).
- Place dredged sediments from OU-I into OU-J CDF and dewater the dredged sediment.
- Manage dewatering water.
- Expand OU-J CDF to accommodate placement of contaminated sediment to be dredged from the Unnamed Creek Delta (if needed based on contractor method selection).
- Temporarily divert Unnamed Creek to outlet southwest of the Delta CDF—Silt fence would be installed at the temporary unnamed creek diversion outlet.
- Install temporary water treatment system.
- Construct the shoal/cofferdam, begin excavation of the shallow sheltered bay, and place excavated material in the Delta CDF.
- Complete the Delta CDF.
- Construct the temporary Unnamed Creek diversion that would outlet to the shallow sheltered bay.

Year 2

- Install a turbidity barrier around Wire Mill Delta and the northernmost dredge area remedial areas during dredging activities to mitigate sediment suspension—The same turbidity barrier would be moved from one site to the other as needed and would be long enough to enclose each relevant remedial area and anchor to the shore.
- Install a turbidity barrier around all capping, residual cover, and EMNR areas in Spirit Lake estuary to mitigate sediment resuspension—The same turbidity barrier would be moved from one site to the next as needed and would be long enough to enclose each relevant remedial area.
- Stabilize the characteristically hazardous lead within the Wire Mill Pond basin prior to excavation.
- Continue excavation of the Shallow Sheltered bay and place excavated material into the Upland CDF.
- Dredge and backfill Unnamed Pond.
- Construct pedestrian trail and Unnamed Creek Bridge.
- Dredge/excavate Wire Mill Pond—A turbidity barrier with sorbent boom on the interior would be installed in the outlet to Spirit Lake.
- Continue dredging and excavation activities, placing dredged/excavated materials in the Upland CDF until complete, and placing any excess materials in the OU-J CDF expanded as required, in a manner that avoids addition impact to wetlands (elevations for expansion are outside of wetland boundaries).
- Construct the cap areas within Spirit Lake.

Year 3

- Place residual covers in Wire Mill Pond and Delta.
- Construct Wire Mill Pond Bridge.
- Construct cap in Wire Mill Offshore.

- Implement shoreline stabilization in the Shallow Sheltered bay.
- Site restoration, aquatic planting.
- Planting maintenance period by construction contractor.

Monitoring would be implemented during construction. The design and associated documents, including the construction quality assurance plan, response action contractor implementation plan, site-specific health and safety plan, and applicable permits or other regulatory requirements would determine the methods and frequency of monitoring to ensure compliance with applicable standards and guidelines, including noise, nuisance odors, surface water quality and turbidity.

c. Project Magnitude:

Table 1. Temporary and Permanent Impacts

	Temporary Impacts	**Permanent Impacts**
Total Project Acreage	46	314
Linear project length	N/A	N/A
Number and type of residential units	0	0
Commercial building area (in square feet)	0	0
Industrial building area (in square feet)	0	0
Institutional building area (in square feet)	0	0
Other uses – specify (in square feet)	0	0
Structure height(s)	N/A	10 to 18 ft

Project temporary impacts refer to the areas outside of the remediation areas that will be used for access, staging, laydown areas, etc. Within the remedial footprint, 218.8 acres occur below the OHWL and 95.3 occur above the OHWL.

d. Explain the project purpose; if the project will be carried out by a governmental unit, explain the need for the project and identify its beneficiaries.

The purpose of this Project is to address chemical constituents of concern, primarily PAHs and associated metals, in the Spirit Lake area of the St. Louis River AOC. The goal of the Project is to improve the environmental condition of the Site through remediation of impacted aquatic and upland sediment, and to restore habitat within the footprint. This would result in ecological benefits to the Spirit Lake watershed. The Project would also benefit the citizens of Minnesota and Duluth by restoring opportunities for recreation within the area.

e. Are future stages of this development including development on any other property planned or likely to happen? X Yes No

If yes, briefly describe future stages, relationship to present project, timeline and plans for environmental review.

Remediation of Spirit Lake is one of the actions included in the Stage II Remedial Action Plan

(RAP) Update (LimnoTech 2013), developed by natural resource managers in Minnesota including state agencies, federal agencies, and the Fond du Lac Band of the Superior Chippewa. These projects were identified to address beneficial use impairments (BUIs) within the St. Louis River AOC. In addition to work at Spirit Lake, other aquatic habitat actions are listed in the RAP update (Table 2). Once all these separate actions are completed, the AOC would be considered for delisting.

Table 2. AOC Aquatic Habitat Projects

Project	Goals	Timeline
Mud Lake Restoration	Address sediment contamination; restore historic water depths; restore sheltered bay habitat	Habitat restoration planning in progress
Kingsbury Bay and Grassy Point Restoration	Restore sheltered bay habitat; improve hydrologic connection of wetlands	In progress
Perch Lake Restoration	Enhance aquatic species passage; restore sheltered bay habitat	Unknown
Spirit Lake Sediment Remediation and Habitat Restoration	Remove impacted sediment; restore habitat	Anticipated construction start late 2019
Multiple St. Louis Bay sites at (Grassy Point, 40th Ave West and 21st Ave West)	Address contaminated sediment; restore sheltered bay and estuary habitat	All scheduled to be completed by 2022

Specific detail on how the Project interacts with nearby future projects is provided in the cumulative impacts discussion in EAW Item No. 19.

f. Is this project a subsequent stage of an earlier project? Yes X No
If yes, briefly describe the past development, timeline and any past environmental review.

No prior remediation work has been performed within the Site's estuary area, whereas upland operable units have had some remedial activity such as characterization, remedial actions, and monitoring. Upland areas required to support the estuary remediation under Great Lakes Legacy Act (GLLA) have been transferred to GLLA regulatory authority for the remediation and will be reverted back to USEPA Region 5 Superfund and/or MPCA for the long-term operation maintenance and monitoring phase, following the remediation work addressed in this EAW. However, as noted in EAW Item No. 6e, the Project is part of a group of projects identified in the Stage II RAP for the St. Louis River AOC as necessary to support the delisting of the AOC. In recent years, several of the listed aquatic habitat projects have been completed.

7. Cover types: Estimate the acreage of the site with each of the following cover types before and after development.

The wetland acreages presented in this table represent all wetlands within the Project footprint, including those in monitored natural recovery areas where direct remediation actions would not occur. The differences in before and after acreages of wetlands and deep water, and the addition of maintained upland areas are further explained in EAW Item No. 11.

While implementation of the Project would involve construction of temporary access roads, a project entrance, and new railroad bridges, these features would not result in addition of impervious surfaces within the Project footprint. Construction of temporary and improvement of existing access roads/entrances is described in EAW Item No. 18. This Project would construct several railroad and pedestrian bridges; while these bridges would be constructed from impervious materials, they will be constructed over pervious areas and water would drain from the bridges onto these surfaces.

Table 3. Cover Types within the Spirit Lake Project Area

Cover Type	Before (ac.)	After (ac.)	Cover Type	Before (ac.)	After (ac.)
Wetlands	208.2	189.8[A]	Lawn/landscaping/maintained upland	0	31.1[B]
Deep water	32.0	19.3[C]	Impervious Surface *(Developed)	10.2	10.2
Streams	0.2	0.2	Stormwater Pond	0	0
Wooded/forest*	1.1	1.1	Other (describe)	0	0
Brush/grassland*	5.2	5.2			
Cropland	0	0	**TOTAL**	**256.9**	**256.9**

*Based on USGS land cover data.

[A] The post remedy acreage of wetlands is a result of some wetland loss to upland and deep water, as well as some deep water area transition to wetland.

[B] lawn/maintained upland is a result of construction of the Delta and Upland CDFs.

[C] Lower post remedy acreage due to conversion of deep water to shallow, open water wetland habitat (this acreage is added to the "after" wetland column).

8. **Permits and approvals required: List all known local, state and federal permits, approvals, certifications and financial assistance for the project. Include modifications of any existing permits, governmental review of plans and all direct and indirect forms of public financial assistance including bond guarantees, Tax Increment Financing and infrastructure.** *All of these final decisions are prohibited until all appropriate environmental review has been completed. See Minnesota Rules, Chapter 4410.3100.*

Table 4. Required Permits

Unit of Government	Type of Application	Status
U.S. Army Corps of Engineers	Section 10/Section 404 Permit	In progress
U.S. Fish and Wildlife Service	Endangered Species Act – Section 7 Consultation	Completed April 2019

Unit of Government	Type of Application	Status
	Migratory Bird Treaty Act Compliance	
	Bald and Golden Eagle Protection Act Compliance	
	Fish and Wildlife Coordination Act Compliance	
Minnesota Historical Society	National Historic Preservation Act Section 106 Consultation	In progress
Minnesota Department of Natural Resources	Coastal Zone Consistency Certification	In progress
	Public Waters Work Permit	In progress
	Water Appropriation Permit	In progress
	Aquatic Plant Management Control Permit	To be obtained by contractor
	Invasive Aquatic Plant Management Permit	To be obtained by contractor, if needed
	Natural Heritage Review	Completed June 2019
Minnesota Pollution Control Agency	Section 401 Water Quality Certification	In progress
	Solid Waste Facility Permit	In progress
	Construction Stormwater General Permit	To be obtained by contractor
City of Duluth	Wetland Conservation Act Determination	Submitted and approved
	Tree Preservation Report	Submitted and approved
	Erosion and Sediment Control Permit	In progress
	Fill and Grading Permit	In progress
	Shoreland and Floodplain Permit	In progress
	Transportation Permit	To be obtained by contractor, if needed
	Obstruction to Watercourses	To be obtained by contractor, if needed
	Stormwater Pollution Prevention Plan and MS4 Statement	To be obtained by contractor

Cumulative potential effects may be considered and addressed in response to individual EAW Item Nos. 9-18, or the RGU can address all cumulative potential effects in response to EAW Item No. 19. If addressing cumulative effect under individual items, make sure to include information requested in EAW Item No. 19

9. Land use:

a. Describe:

i. Existing land use of the site as well as areas adjacent to and near the site, including parks, trails, prime or unique farmlands.

Land use, as described by the City of Duluth, is defined as industrial-general and mixed business use within the Site (City of Duluth 2006). The Site and immediately adjacent areas are urban and/or developed and include portions of the neighborhoods of Riverside, and New Duluth, as well as the areas of Smithville, Gary, and Morgan Park. Other development includes roads, rail yards and rail lines associated with the Canadian National Railway and the LSMRR, and industrial and commercial buildings (HDR 2015). Within the direct Site boundary (Figure 3), land is largely disturbed with cleared areas for roads and no substantive remaining industrial/commercial facility buildings on the grounds of the former U. S. Steel Duluth Works site. A portion of the site, along an unnamed tributary to Spirit Lake, is a more natural area that ranges from sparsely to densely forested cover (Figure 7). The LSMRR runs along the perimeter of the site, bisecting the remedy areas in the estuary from those on the adjacent upland.

North of the Site is the residential neighborhood of Morgan Park. This is a neighborhood that was built by U. S. Steel Corporation in the early 1900s to house workers at the adjacent steel facility (City of Duluth 2001 and 2006). The Morgan Park area is defined as residential urban, residential traditional, and mixed use (Figure 8). This area is within a historic overlay district. There are no prime or unique farmlands within the Site.

A substantial portion of the Site is within Spirit Lake estuary, located immediately to the east of the former USS Duluth Works facility. Spirit Island is approximately 0.33 miles east of the Site, outside of remedy areas and Site boundary. Spirit Island is owned by the Fond du Lac Band of Lake Superior Chippewa and is of immense cultural significance to the Fond du Lac Band, as are the waters of Spirit Lake. As communicated to USEPA during consultations conducted as part of this Project, the Fond du Lac have explained that the historical significance of Spirit Island originates from its purpose as the "sixth stopping place" as told in the Ojibwe migration story, and the place where the Ojibwe first encountered the prophesied 'food that grows on the water', or wild rice. Spirit Island was and is still spiritually and religiously significant to spiritual healers and practitioners. Ceremonial practices held on the island represent a religious tradition that incorporates ancient teachings into a modern context. These current practices are based in healing and restoration of balance and aim to restore cultural traditions by extension of harmony with the natural landscape; therefore, the spiritual "feeling" of the land as well as the viewshed from the island is of the utmost importance to the Fond du Lac and is vital to the setting and cultural meaning of the area. The Fond du Lac have indicated that the viewshed is as much a part of the experience as the island itself and its rich historic context. For non-tribal users, the viewshed is significant due to its scenic qualities and views of the surrounding natural landscape.

ii. Plans. Describe planned land use as identified in comprehensive plan (if available) and any other applicable plan for land use, water, or resources management by a local, regional, state, or federal agency.

The Duluth comprehensive plan 2018 update, called "Imagine Duluth 2035," estimates future land use at the site to be Open Space (Figure 9). Open Space is defined as high natural resource

or scenic value, with substantial restrictions and development limitations. Comprehensive plan policies related to open space (S6) encourage working with public and private groups with a mission of preservation and restoration of the Saint Louis River and Lake Superior. Restoration plans at the site support this future land use. Additionally, the comprehensive plan includes potential redevelopment of the adjacent upland areas of the site with the assistance of Duluth Seaway Port Authority for commercial / industrial uses. Economic development policies (S5) recommend the cleanup of contaminated sites to enhance brownfield redevelopment.

The City of Duluth's St. Louis River Corridor Initiative is an investment plan spanning an area between Fond du Lac and Lincoln Park. The initiative consists of 26 projects supporting the goals of environmental restoration, enriching neighborhood quality of life, attracting new homebuyers, establishing visitor destinations, and stimulating economic development. Several of these are relevant to the Project:

Kingsbury Bay Restoration
The City of Duluth and its project partners, including state and federal agencies, developed a conceptual restoration design for Kingsbury Bay in 2016. Primary goals included developing and protecting open water habitat, creating access and recreational opportunities, and creating habitat restoration opportunities. Restoration plans contained in the Spirit Lake Project support these goals.

Western Waterfront Trail Master Plan
The City of Duluth plans to expand the Western Waterfront Trail, which offers five miles of waterfront access. The Master Plan's overall project goals include restoring and protecting natural habitat along the trail corridor and increasing recreational opportunities within and along the St. Louis River Corridor. Restoration plans contained in the Spirit Lake Project would remove BUIs in the area, making the site safe for recreational uses, which supports the master plan initiative.

St. Louis River Estuary National Water Trail Master Plan (2017)
The Master Plan addresses the design, development and operational management of a National Water Trail in the more wild and scenic portion of the River Estuary. The purposes are the growth of outdoor recreation and tourism and providing increased awareness for river habitat preservation and restoration in the Twin Ports region. Restoration plans contained in the Spirit Lake Project would remove BUIs in the area, making the site safe for recreational uses, which supports the master plan initiative.

The St. Louis River Area of Concern RAP
The RAP identifies project sites in the St. Louis River that require remedial response for sediment contamination and restoration response for habitat enhancement to meet BUI removal objectives and SLRAOC delisting goals. The Proposer has designated the Project Site in this plan to perform restoration work in the river to create and enhance aquatic habitat adjacent to the land. This includes actions that will improve substrate quality to promote a diverse benthic community, and incorporate appropriate set-backs from existing waterfront district infrastructure and sensitive species areas.

St. Louis County Water Management Plan

The Comprehensive Water Management Plan for St. Louis County (Update 2010-2020) identifies priority water quality concerns that would require the most attention in the county to meet its water quality objectives. The Spirit Lake Project aligns with Priority Concern #3, to protect ground and surface water from the combined impacts of point and not-point sources of pollution. While current pollution impacts are not driving the Project, a goal of Priority Concern #3 is to restore watersheds. The focus of the Spirit Lake project is to significantly improve water quality and available habitat to support delisting of the AOC through removal of BUIs.

iii. Zoning, including special districts or overlays such as shoreland, floodplain, wild and scenic rivers, critical area, agricultural preserves, etc.

The Spirit Lake site is currently zoned Industrial-General by the City of Duluth, as described in Item 9a (Figure 8). The I-G district is intended to provide for general- to heavy- impact industrial, processing, assembly, fabrication and manufacturing uses. The district is intended primarily for locations close to major transportation corridors and active commercial centers. This district should be located away from residential development;

The goals and final site design for the Project are compatible with the below special lands; the final design for the site would be compatible with a future change in zoning (due to City of Duluth plans for recreational components for the area), should it occur, as the improved ecological condition of the site would support increased recreational opportunities.

Shoreland

Waters in Duluth have been classified as general development waters, natural environment waters, or cold-water rivers. The shoreland overlay district applies to lands within 1,000 ft of Lake Superior or within 300 ft of rivers, creeks, streams and tributaries and floodplains. The entirety of the immediate shoreline area of the Site falls within the natural environment shoreland management district. Within the northern portion of the site, most of the Unnamed Creek Delta and upstream area are within the general development shoreland overlay district.

Floodplain

Approximately 284 acres along the Site's northern boundary lie within the 100-year floodplain adjacent to Unnamed Creek.

Sensitive Lands

The areas within the sensitive lands overlay district are along the shoreline of Spirit Lake and within Unnamed Creek. The sensitive lands overlay areas are those identified as:

- Stream corridors, wetlands, and water shed and recharge zones
- Entry corridors and important vantage points
- Scenic view sheds, foothills, and ridgelines
- Natural or environmentally hazardous areas
- Slopes greater than 10 percent
- Wildlife habitat and fisheries (City of Duluth 2010).

These lands have high natural resource and scenic value and substantial restrictions to development due to limitations (e.g. soils, wetlands, or steep landscape).

Other Areas
There are no wild and scenic rivers, critical areas, or agricultural preserves within the Site.

Lake Superior Coastal Zone Program
The Site is within the Lake Superior Coastal Zone under the jurisdiction of the Minnesota Lake Superior Coastal Program. As the Project may have a reasonably foreseeable effect on coastal uses, it is subject to federal consistency review. USEPA is required to follow the 15 Code of Federal Regulations 930, Subpart C, in which activities conducted must be reviewed to determine consistency to the maximum extent practicable, with the enforceable policies of the program. The USEPA's evaluation of federal consistency includes a discussion of each enforceable policy and how the project is compatible; this determination will be submitted with the other project permits/authorizations.

b. Discuss the project's compatibility with nearby land uses, zoning, and plans listed in Item 9a above, concentrating on implications for environmental effects.

Remediation of the Site would remove and manage contaminated materials, thereby restoring the site to a condition appropriate for future public access (as determined by USS and the City of Duluth) and provide conditions suitable for ecological and wildlife recovery in aquatic and shoreland areas. The restored site would be potentially suitable for mixed use (as the upland area of the site is currently defined) or for preservation or open space use. The overall outcome of the Project would be a net ecological benefit for the area with new open water and restored habitat. As the City of Duluth has projected the site area to be a future open space (City of Duluth 2018), with scenic value, with substantial restrictions and development limitations, the remediation of the site is in line with this classification. The removal of chemical constituents of concern and ecological benefits of the remedy would give the area high natural resource value and provide opportunities for future recreation, and aligns with the mission of preservation and restoration of the Saint Louis River and Lake Superior.

The Project would not result in any changes to the floodplain capacity or change the frequency or intensity of flooding events; modeling results indicate the Project would not cause a net change in the current flood plain or flood elevation. This Project includes creation of a shoal feature adjacent to the newly created shallow bay in the Unnamed Creek delta. This feature would serve to shelter the western shoreline from wind-driven waves and flood currents, thereby decreasing the impacts to the floodplain from large storm events.

c. Identify measures incorporated into the proposed project to mitigate any potential incompatibility as discussed in Item 9b above.

Acceptable mitigation for the unavoidable adverse effects anticipated on the LSMRR are under discussion between USEPA, Minnesota State Historic Preservation Office (SHPO), the LSMRR organization and the City of Duluth, who owns the property. The decision on mitigation would be detailed in the Memorandum of Agreement between USEPA, USS and the City of Duluth.

Acceptable mitigation for the unavoidable adverse cultural/spiritual effects anticipated on Spirit Island and the waters of Spirit Lake are under discussion between USEPA, SHPO, the Fond du Lac Band, and other tribal parties. The decision on mitigation will be detailed under a joint Memorandum of Agreement with the other consulting parties under Section 106 (LSMRR and the City of Duluth) and the USEPA and USS.

10. Geology, soils and topography/land forms:

a. Geology - Describe the geology underlying the project area and identify and map any susceptible geologic features such as sinkholes, shallow limestone formations, unconfined/shallow aquifers, or karst conditions. Discuss any limitations of these features for the project and any effects the project could have on these features. Identify any project designs or mitigation measures to address effects to geologic features.

Upland areas and the portion of the Unnamed Creek delta currently above the ordinary high-water elevation for the lake contain significant industrial fill deposits, up to 20 ft or greater in some areas. In open waters of the Site, the peat and wetland sediment consist of partially to highly decomposed plant matter and fine-grained mineral sediment. Organic matter is greater than 50 percent in many areas of the lake. The fluvial deposits are generally coarse-grained sand and gravel, cobbles, and boulders within the channel. Fine-grained sand and silt drapes the floodplain and are often interbedded with organic rich sediment and/or peat. On land, sediments consist of clay and silty clay, with scattered fine to coarse grained gravel and generally less than 5 percent sand, interbedded with naturally deposited sand layers, and deposits of peat and organic silt.

b. Soils and topography - Describe the soils on the site, giving NRCS (SCS) classifications and descriptions, including limitations of soils. Describe topography, any special site conditions relating to erosion potential, soil stability or other soils limitations, such as steep slopes, highly permeable soils. Provide estimated volume and acreage of soil excavation and/or grading. Discuss impacts from project activities (distinguish between construction and operational activities) related to soils and topography. Identify measures during and after project construction to address soil limitations including stabilization, soil corrections or other measures. Erosion/sedimentation control related to stormwater runoff should be addressed in response to Item 11.b.ii.

There are seven soil types and one large area of open water (the Spirit Lake estuary) within the Site. Soil types present are listed in Table 5 and shown in Figure 10.

Table 5. Soil Types within the Project Area

Soil Name	Map Unit Symbol	Acreage	Percent of Project Area*
Bowstring and Fluvaquents	1020A	64.92	20
Miskoaki-Cuttre complex	E24F	14.34	4
Cuttre complex	E3A	8.42	3

Urban land-Cuttre-Rock outcrop complex	E18A	10.60	3
Miskoaki-Fluvaquents	E9E	3.52	1
Udalfs-Eutrudepts complex, 25 to 70 percent slopes	F155G	4.22	1

*The majority of the Site (67%) occurs in wetlands and open water.

The site is generally flat and was previously graded to support an industrial facility (steel refinery).

The total volume of sediment to be excavated within the estuary portion of the site is 730,000 CY over 73 acres (Figure 4). A total of 40,000 CY would be excavated over 9 acres in the former coke settling basin (OU-I and Tar Between I&J). Grading activities would occur across approximately 104 acres of upland area, while subaqueous capping and enhanced natural recovery would occur across approximately 148 acres. Site activities that would disturb soils include excavation/dredging, upland capping and subaqueous capping, and CDF construction. Technical challenges and considerations related to the CDFs are presented below. In dredging areas, soils would be disturbed in order to remove contaminated material and resulting elevations may change the type of habitat present. The end result would be improved or remediated substrate and greater variety of depth transitions within the estuary. In capped areas, contaminated soils will be covered with clean material meeting cleanup goals. Seventy-two acres within the Site would be designated as monitored natural recovery areas; these areas would have no sediment or soil disturbance.

Technical Challenges Related to Soils and Topography

Delta and Upland CDFs

The near surface soils at the Site present several challenges with respect to construction of the two CDF's. The organic soils and peat found near the existing ground surface or mudline, range from two to ten ft in thickness, and is most predominant beneath the Delta CDF and submerged areas to the east but is also present in the low-lying areas of Wire Mill Pond. Organic materials, specifically peat, present challenges with respect to low shear strength and high secondary compression settlements. Due to the observed thicknesses of clays and organic material layers, placement of fill would lead to high compression settlements and slow consolidation times without supplemental drainage.

Detailed slope stability and settlement analyses were included in the design of the proposed site improvements. The design for the Upland CDF combines several evaluations to ensure it meets structural requirements, maximizes capacity for dredge material, and optimizes size of the CDF footprint, while controlling overall height for viewshed considerations from Spirit Island. Achieving slope stability factors of safety, structural integrity of Unnamed Creek channel armoring along the northern side of the Upland CDF, permanent channel diversion design, groundwater flow modeling, settlement monitoring during construction, and fill zoning and interim grading plans are aspects of the CDF design.

The design for the Delta CDF also combines several evaluations to ensure that the CDF meets structural requirements, maximizes capacity for dredged material, and optimizes size of the CDF footprint, while controlling the overall height for viewshed considerations from Spirit Island. Special stability considerations were required since the Delta CDF would be constructed in a wetland, and two constructed sides of the new CDF would become new shoreline for the proposed Shallow Sheltered Bay. Slope stability evaluations determined that Upland and Delta CDFs have height restrictions. As a result, Upland and Delta CDFs were designed with the appropriate heights and shallow slopes to satisfy stability analyses and avoid the need for significant ground improvements. Excess capacity would be provided by expanding the OU-J CDF into the upland area of the site, which avoids additional wetland impacts.

Settlement monitoring of the CDFs would be performed to inform fill management and construction activities. This monitoring would be accomplished by settlement plates to confirm design assumptions and chart the time-rate of consolidation during construction.

Special consideration to vegetation establishment would be required for the Project. All disturbed areas would be re-graded as needed to promote positive drainage, scarified, seeded, and either mulched or covered with straw from straw bales to protect seeds. A native seed mix would be required to quickly stabilize and revegetate all disturbed sloped areas. Temporary erosion and sediment controls would be removed upon successful revegetation of the disturbed areas in accordance with the construction stormwater permit. Similarly, permanent erosion control measures would be provided, and are part of the design.

OU-J CDF
The OU-J CDF would span 4.7 acres within the upland portion of the Site. Within the footprint of the OU-J CDF are historical concrete foundations that would be removed prior to berm construction or filling. Down-slope of the OU-J CDF is a solidified area (within OU-J) that was incorporated into the geotechnical evaluations and final grading plan for the OU-J CDF. Unnamed Creek would be moved away from the toe of the OU-J CDF, and the side slope of the OU-J CDF would be armored up to the 100-year flood elevation to mitigate erosive forces from stormwater and maintain stability of the OU-J CDF. OU-J is sized to accommodate the excavated/dredged material from OU-I (capacity of 40,000 CY) but depending on construction contractor approaches and available space in the other two CDFs, the OU-J CDF may be enlarged to receive a greater volume of impacted sediment from other Site areas. The design can be scaled for OU-J to increase its capacity up to 275,000 CY capacity, covering 10.3 acres, without additional impacts to wetland areas.

Shoreline
Shoreline stabilization would be required for all excavation in shoreline areas within the Shallow Sheltered Bay, in the Wire Mill Pond area, and facing the estuary. The design for the shoreline stabilization included an analysis of possible wind wave, boat propeller wash, stormwater, flood currents, and ice erosion. Wind wave erosion and ice erosion were identified as the highest erosion risks effecting the project shoreline.

11. Water resources:

a. Describe surface water and groundwater features on or near the site in a.i. and a.ii.

below.

i. Surface water - lakes, streams, wetlands, intermittent channels, and county/judicial ditches. Include any special designations such as public waters, trout stream/lake, wildlife lakes, migratory waterfowl feeding/resting lake, and outstanding resource value water. Include water quality impairments or special designations listed on the current MPCA 303d Impaired Waters List that are within 1 mile of the project. Include DNR Public Waters Inventory number(s), if any.

Surface Water and Water Quality

The Site is adjacent to the St. Louis River, which discharges into Lake Superior approximately eight miles downstream of the Site. Lake Superior is an Outstanding Resource Value Water. The estuary portion of the Site is located in an open reach of the St. Louis River referred to as Spirit Lake. The Site layout and relation to the former USS Duluth Works are shown on Figure 2. A small creek and community storm water conveyance channel, referred to as the Unnamed Creek, carries flows from 2,000 acres of upstream watershed within the City of Duluth and Midway Township. Unnamed Creek is channelized stream with steep slopes and low flow and contains few desirable stream habitat features (e.g. riffles and pools). It enters through a large culvert located along the Site's western edge, flows through the western portion of the Site and discharges to the St. Louis River.

The St. Louis River is Minnesota's largest tributary to Lake Superior and some areas of the river are listed as impaired waterways on the MPCA's Clean Water Act 303d Impaired Waters List. The following water bodies located within one mile of the Site are listed as having impaired water quality or special designations on the 303d Impaired Waters List:

- *St. Louis River (reach from Oliver Bridge to Pokegama River, ID No. 04010201-533)* - This river was last assessed in 2007 and is currently listed as having restrictions on aquatic consumption due to PCB concentrations in fish tissue and mercury in fish tissue exceeding the water quality standard.

- *Stewart Creek (T49 R15W S21, west line to St. Louis River, ID No. 04010201-884)*- This creek was last assessed in 2011 and is currently listed due to high bacteria levels caused by the presence of Escherichia coli (*E. Coli*) in the water.

Stewart Creek is a designated trout stream within one mile of the project boundary; however, the location of this creek is upstream (along the St. Louis River in a different subwatershed) of the project site and the project does not flow to this waterbody. The project would not produce any impacts either during or post-construction to this waterbody and therefore no additional BMPs would be necessary.

As described in EAW Item No. 6, the Lower St. Louis River is also a Great Lakes AOC because of legacy pollution and other use impairments. The Lower St. Louis River RAP lists nine BUIs for the AOC. The primary BUI's addressed with the Project are Loss of Fish and Wildlife Habitat, Degradation of Benthos, Degradation of Aesthetics, and Beach Closures/Contact Restrictions.

The MN water quality (WQ) standards as applicable to the St. Louis River that protect uses in the Project area include:

- Class 2B: Minn. R. 7050.0222, subpart. 1 and 4. Defines applicable WQ standards for aquatic life and recreation (includes cool and warm water sport fish).
- Class 3C: industrial consumption (includes all waters of the state that are or industry may use as a source of supply for industrial process or cooling water, or any other industrial or commercial purposes, and for which quality control is or may be necessary to protect the public health, safety, or welfare).
    - Class 3C also specifies the protection of cool and warm water sport fish, indigenous aquatic life, and wetlands. Minn. R. 7050.0223, subpart. 1 and 4 describes these applicable WQ standards.
- Class 4A and 4B: agriculture and wildlife. Includes all waters of the state that agriculture may use for any agricultural purposes, including stock watering and irrigation, or by waterfowl or other wildlife and for which quality control is or may be necessary to protect terrestrial life and its habitat or the public health, safety, or welfare.
    - Class 4A also includes a sulfate limit of 10 milligrams per liter (mg/L) for the protection of wild rice where it is present.
    - Class 4A waters also include cold water sport fish (trout waters) and 4B waters include cool and warm water sport fish. Minn. R. 7050.0220 subpart. 3a and 4a, and 7050.0224, subpart. 1, 2 and 3 defines these applicable WQ standards.
- Class 5: aesthetic enjoyment and navigation. Minn. R. 7050.0220, subpart. 3a, and 7050.0225 define these applicable WQ standards.
- Class 6: other uses and protection of border waters. Minn. R. 7050.0226 defines these applicable WQ standards.

Public waters are designated as such to indicate which lakes, wetlands, and watercourses over which DNR Waters has regulatory jurisdiction. The statutory definition of public waters includes public waters and public waters wetlands that occur below the OHWL. The Site includes the following DNR Public Waters:

- Spirit Lake (ID 69129103)
- St. Louis River Estuary (ID 62929100), Public waters basin
- National Wetlands Inventory Wetlands (below ordinary high water) (NO ID)
- Unnamed Creek (at its confluence with Spirit Lake) (S-002-005-B001, S-002-005-D001)

<u>Existing Wetland Types</u>
Wetland communities are present throughout the Site. There are six types of wetlands, as classified using USFWS Circular 39 Classification System (Shaw and Fredine, 1956), the USFWS Cowardin Classification System (Cowardin et al., 1979), and Eggers and Reed Plant Community Classification System (Eggers and Reed, 1997), identified in the Site: shallow open water wetland; deep marsh; shallow marsh; alder thicket and shrub-carr; floodplain forest; and sedge meadow and fresh wet meadow (Figure 11).

Shallow, open water habitat less than 6 ft in depth consisting of submerged, emergent, floating

vegetation, or a combination, are classified as wetland habitat by Minnesota guidance. Open water areas deeper than 6 ft are considered deep water habitat and are not classified as wetland. Most of the wetland habitat in the Site is shallow, open water wetland.

There are approximately 131 acres of shallow, open water wetland within the Site. Water depths in this habitat type range from 18 inches to 6 ft. Within this shallow, open water habitat there are documented beds of submerged aquatic vegetation that include water celery (*Vallisneria americana*), coontail (*Certaophyllum demersum*), flexuous naiad (*Najas flexilis*), variegated yellow pond lily (*Nupharlutea variegate*), white water lily (*Nymphaea odorata*), and pond weeds (*Potamogeton epihydrus, Potamogeton nodosus, Potamogeton richardsonii,* and *Stuckenia pectinata*).

There were five additional types of wetlands identified in the Site: deep marsh; shallow marsh; alder thicket and shrub-carr; floodplain forest/hardwood swamp; and sedge meadow and fresh wet meadow. Deep marsh covers approximately 10 acres of the site. In the deep marsh areas, vegetation consists of giant bur-reed (*Sparganium eurycarpum*), broad-leaved arrowhead (*Sagittaria latifolia*), and soft stem bulrush (*Schoenoplectus tabernaemontani*). The area delineated as deep marsh also includes unvegetated mud flats. At the time this area was surveyed, it was inundated with 12 to 18 inches of water.

Shallow marsh covers approximately 12 acres of the Site. Water depths in the shallow marsh were up to 12 inches deep at the time of the site visit. Vegetation in the shallow marsh areas included reed canary grass (*Phalaris arundinacea*), common reed grass (*Phragmites australis*), manna grass (*Glyceria striata*), rice cut grass (*Leersia oryzoides*), river bulrush (*Schoenoplectus fluviatilis*), soft bulrush (*Schoenoplectus tabernaemontani*), broad-leaved arrowhead (*Sagittaria latifolia*), giant bur-reed (*Sparganium eurycarpum*), beggarticks (*Bidens connata*), and jewelweed (*Impatiens capensis*).

Alder thicket and shrub-carr habitat covers approximately 35 acres of the Site. Dominant vegetation in the alder thicket included alder (*Alnus incana*), balsam poplar (*Populus balsamifera*), Canada bluejoint (*Calamagrostis canadensis*), sedges, scouring rush (*Equisetum*), and reed canary grass. Dominant vegetation in the shrub-carr habitat included willows (*Salix spp.*), balsam popular (, scouring rush, red raspberry (*Rubus idaeus*), and sedges (*Carex spp.*). One unique area within the shrub-carr habitat, north of Unnamed Creek and south of the railroad tracks, is dominated by scouring rush, bog birch (*Betula pumila*), balsam willow (*Salix pyrifolia*), tamarack (*Larix laricina*), and black spruce (*Picea mariana*).

Floodplain forest/hardwood swamp covers approximately 10 acres of the Site. Tree species within this forested wetland included aspen (*Poulus tremuloides*), willows, black ash (*Fraxinus nigra*), green ash (*Fraxinus pennsylvanica*), and balsam poplar. Shrub species found in this habitat included red-osier dogwood (*Cornus sericea*), sandbar willow (*Salix interior*), honeysuckle (*Lonicera tatarica*), and common buckthorn (*Rhamnus cathartica*). The soil in this forested area is non-native fill.

The sedge meadow and fresh wet meadow covered approximately 7 acres of the Site. Dominant vegetation in the fresh wet meadow area was purple loosestrife (*Lythrum salicaria*) and bluejoint (*Calamagrostis canadensis*). Dominant vegetation in the sedge meadow was lake sedge (*Carex lacustris*) and soft stem bulrush. Soils in these areas was primarily non-native sandy fill.

Deep open water (water depth greater than 6 ft) covers approximately 32 acres within the project footprint. These areas provide vital fisheries habitat; the MNDNR considers valuable fisheries habitat to be present below the 2 ft water depth within the Project site.

ii. Groundwater – aquifers, springs, seeps. Include: 1) depth to groundwater; 2) if project is within a MDH wellhead protection area; 3) identification of any onsite and/or nearby wells, including unique numbers and well logs if available. If there are no wells known on site or nearby, explain the methodology used to determine this.

The Site is within the Cambrian-Ordovician Aquifer System. This is a USGS principal aquifer system that consists of a complex multiaquifer system of individual aquifers separated by leaky confining units (USGS 1992). The top of the aquifer is located at an elevation of approximately 1,000 ft. The Site is not located within a wellhead protection area.

b. Describe effects from project activities on water resources and measures to minimize or mitigate the effects in Item b.i. through Item b.iv. below.

i. Wastewater - For each of the following, describe the sources, quantities and composition of all sanitary, municipal/domestic and industrial wastewater produced or treated at the site.

Water requiring treatment would be produced during sediment dewatering activities following removal operations. The approximate volume of water would be estimated during the final design phase of the Project. Water would be treated at an on-site, temporary water treatment system supplied by the contractor to meet the specified volumes and contaminant profiles developed using site porewater and sediment concentration data. The direct contact water waste streams from the remedial construction activity would be treated to appropriate effluent discharge limits in consultation with MPCA and in accordance with applicable permit conditions. The treatment system would be required to meet NPDES permit requirements for discharge back to the St. Louis River. Based on this information, the water would require treatment for metals, total suspended solids, mercury, nutrients, PAHs, oil, and grease in some areas to meet the effluent standards for an impaired water body in Minnesota. The Contractor would be responsible for providing and maintaining a water treatment system with the ability to meet treated water discharge criteria through the duration of activities that generate wastewater. Monitoring of the treatment system would be performed regularly through sampling to verify that the requirements for discharge are met according to applicable permits.

1) If the wastewater discharge is to a publicly owned treatment facility, identify any pretreatment measures and the ability of the facility to handle the added water and waste loadings, including any effects on, or required expansion of, municipal wastewater infrastructure.

The Project does not anticipate discharge of wastewater to a publicly owned treatment facility . However, if the construction contractor decides to use this approach, they may do so in

coordination with the treatment system's existing permit for effluent discharge. In this instance, the water waste stream would be treated onsite, as a pre-treatment phase prior to additional treatment provided by the facility.

2) If the wastewater discharge is to a subsurface sewage treatment systems (SSTS), describe the system used, the design flow, and suitability of site conditions for such a system.

The Project would not involve discharge of wastewater to a subsurface sewage treatment system. If construction dewatering is used to create a relatively in-dry working condition in the shallow sheltered bay, groundwater extracted from below fill may be infiltrated into the fill soils distant from surface water resources, in consultation with MPCA.

3) If the wastewater discharge is to surface water, identify the wastewater treatment methods and identify discharge points and proposed effluent limitations to mitigate impacts. Discuss any effects to surface or groundwater from wastewater discharges.

Management of wastewater for either conventional construction approaches or an alternative approach to hydraulically transport removed materials for processing, would include stormwater best management practices and would include appropriate water treatment technologies to achieve discharge criteria that is in development in coordination with MPCA. Design requirements for a hydraulic transport approach would include recirculation of water to reduce total wastewater volume requiring treatment. Wastewater treatment processes applicable for the Site constituents may include use of flocculants or filtration to remove constituents sorbed on suspended solids; additionally, use of treatment media for contaminant adsorption or precipitation of dissolved phase constituents from the wastewater stream would occur.

ii. Stormwater - Describe the quantity and quality of stormwater runoff at the site prior to and post construction. Include the routes and receiving water bodies for runoff from the site (major downstream water bodies as well as the immediate receiving waters). Discuss any environmental effects from stormwater discharges. Describe stormwater pollution prevention plans including temporary and permanent runoff controls and potential BMP site locations to manage or treat stormwater runoff. Identify specific erosion control, sedimentation control or stabilization measures to address soil limitations during and after project construction.

Stormwater at the site is conveyed, in large part, through the Unnamed Creek channel which would be rerouted during construction. The remedial action would be designed and constructed to provide a stable water course for stormwater conveyance through the realigned Unnamed Creek channel and discharged to meet applicable water quality standards. For Wire Mill Pond, a turbidity barrier would be placed between the pond discharge area and lake to manage surface water quality, and sorbent booms and pads would be used to actively remove sheen generated during excavations/dredging.

Stormwater from the constructed CDFs would be discharged through multiple letdown channels designed with erosion protection measures to resist erosion during storm events. The remedy would eliminate the potential for residual materials that may remain upstream from migrating to the estuary via stormwater and would provide physical separation of the stormwater from residual materials contained below.

A Stormwater Pollution Prevention Plan (SWPPP) must be developed that meets the requirements of the MPCA NPDES/State Disposal System (SDS) General Stormwater Permit for Construction Activity. The contractor would be required to develop and execute a storm water pollution prevention plan which would be a combination of narrative, plan sheets and standard details fully describing Best Management Practices (BMPs) and responsibilities to ensure that the plan is implemented as written.

Project BMPs would include permanent turf reinforcement mats, temporary erosion control blankets, turbidity barriers, silt fence, temporary vegetation establishment, and sediment control logs to control erosion. Project construction would be completed in phases, with BMPs installed accordingly. Permanent erosion controls focus on both vegetation establishment and use of erosion control materials in conjunction with vegetation on slopes.

iii. Water appropriation - Describe if the project proposes to appropriate surface or groundwater (including dewatering). Describe the source, quantity, duration, use and purpose of the water use and if a DNR water appropriation permit is required. Describe any well abandonment. If connecting to an existing municipal water supply, identify the wells to be used as a water source and any effects on, or required expansion of, municipal water infrastructure. Discuss environmental effects from water appropriation, including an assessment of the water resources available for appropriation. Identify any measures to avoid, minimize, or mitigate environmental effects from the water appropriation.

The Project would require water appropriation if the contractor chooses to use hydraulic placement of capping material or hydraulic transportation of dredged material to a dewatering area. The chemical constituents of concern at the site are bound to sediments; therefore, water used to move clean capping material will remain clean and can be discharged back to the lake without treatment. . If water is appropriated from Spirit Lake for transporting dredged material, it would be cycled several times before being treated and discharged back into Spirit Lake (water treatment will remove PAHs, dioxins, polychlorinated biphenyls, and other contaminants). The use of water from Spirit Lake should not adversely affect the water quality in Spirit Lake or deplete volumes, because the appropriation would be a closed loop system with water being treated prior to discharge. By recycling and recirculating the water used for dredged material transport, the amount of appropriated water would be minimized. With recirculation, approximately 6,000,000 gallons of water would be required and treated for dredging transportation over 8 months of operation. Without recirculation, approximately 1,200,000,000 gallons would be required. Either scenario would appropriate water

in such quantity that a MNDNR water appropriation permit would be required. Additionally, other construction activities, including temporary diversion of portions of Unnamed Creek (i.e., at the confluence of the creek and the lake), and continuous dewatering of upwelled groundwater, may require water appropriation.

iv. Surface Waters

a) Wetlands – Describe any anticipated physical effects or alterations to wetland features such as draining, filling, permanent inundation, dredging and vegetative removal. Discuss direct and indirect environmental effects from physical modification of wetlands, including the anticipated effects that any proposed wetland alterations may have to the host watershed. Identify measures to avoid (e.g., available alternatives that were considered), minimize, or mitigate environmental effects to wetlands. Discuss whether any required compensatory wetland mitigation for unavoidable wetland impacts will occur in the same minor or major watershed, and identify those probable locations.

Wetland Impacts

The Project would include remedial and restoration activities within wetlands and open water. The overall long-term environmental effects on wetlands at the site are anticipated to be beneficial; implementation of remedy would remove contaminated material from the estuary and upland areas, would improve/remediate substrates, and improve conditions for desired wetland communities to thrive.

Project activities within the wetlands would include sediment removal via dredging, placement of caps and thin layers of material to support enhanced natural recovery, construction of confined disposal facilities, and construction support activities. Dredging and capping activities would result in permanent changes to sediment elevation.

Wetlands would be permanently impacted in the following ways:

1. Some wetland habitat would be lost to upland where CDFs are constructed, or where areas are dredged too deep to support a wetland community;
2. Some wetlands habitat types would be converted to another type of wetland habitat (due to changes in elevation and vegetation type), such as shallow, open water wetland converted to an emergent marsh community.

Some areas may have a permanent change in water elevation but would remain wetlands or open water because the post-remedy vegetation type and habitat function would remain the same as the existing condition. There would be permanent impacts as a result of construction and operation of the CDFs. The CDFs would be permanent structures to contain material excavated from the Site. These structures would result in a permanent fill of wetlands.

This Project would result in the creation of shallow bay habitat with depth transitions capable of supporting a shallow, open water wetland habitat (Minnesota wetland Type 5). These areas

would be created in the delta adjacent to the estuary sediment CDF and in the Wire Mill Pond area. Dredged and capped areas in other parts of the estuary would also be planted with proper vegetation to create a variety of wetland habitat types including shallow open water wetland with submerged or submerged and floating vegetation, and emergent marsh (Figure 4).

Habitat restoration at the site would involve planting the remediated areas with a variety of wetland plants appropriate for the final depth of the area (Figure 4). The habitat zones shown in Figure 5 are consistent with the standard planting zones used within the St. Louis River AOC. These planting zones were designed to match the mean water level of the last 30 years in the Spirit Lake estuary. This enables restoration to be planned to include a mosaic of vegetation types that would thrive in an environment with fluctuating water level.

While the post restoration wetland community may differ from the existing community in some areas of the footprint, the new depth transitions and sheltered areas would support a broader range of vegetation and wildlife and provide protection necessary for establishment. A summary of the post-restoration habitat types is presented in Table 6. Note that the total restored aquatic habitat acreage is representative of all areas within the footprint that will be restored with improved/remediated substrate, including those select areas where a depth change is occurring, but where the post-remedy wetland habitat type will not change. Habitat types created would be consistent to the maximum extent practicable with the 2012 Conceptual Plan for Spirit Lake and would reflect the types of habitats that natural resource managers envisioned for the site.

Table 6 Spirit Lake Project Wetland Habitat Summary

Restored Wetland Habitat with Improved/Remediated Substrate and Created Wetlands	**Acres**
Shallow, open water wetland (SAV)	40.5
Shallow, open water wetland (SAV and floating vegetation)	34.9
Shallow, emergent marsh	30.3
Shoreline fringe marsh	3.8
Total Restored/Created Wetland Habitat	**109.5**

The anticipated acres of wetlands impacted is presented in Table 7 and presented in Figure 12. The impacts are presented as those that would occur above the OHWL elevation and those that would occur below the OHWL elevation; wetlands present below the OHWL elevation are expected to be under both federal and state jurisdiction. There would be a large area in the Unnamed Creek offshore where wetland habitat would be created; the area where a cap will be placed offshore is currently deeper than 2 meters and does not support a wetland community. Post-remedy, this area would be between 4 and 6 ft and planted with submerged vegetation (Figure 12). The Project would result in a conversion of 90 acres of current wetland to a different type of wetland (e.g. acres of alder thicket converted to acres of shallow, open water wetland) (Table 6). The post-restoration wetland communities would be consistent with habitat types desired by project stakeholders; these communities would also be created on improved or remediated substrate, thereby enhancing the function and overall habitat quality of the wetland. Just over 9 acres of current wetland will become

deep water (> 6 ft), providing optimal fish habitat. Wetland areas present in parts of the footprint designated for monitored natural recovery (approximately 30 acres of wetlands) would not be impacted by the Project.

Table 7. Potential Wetland Impacts

Wetland Impact Type	Acreage		
	Above OHWL	Below OHWL	Total
New wetland creation	4.6	18.4	23.0
Change to new wetland type with improved substrate	24.3	28.0	52.3
Conversion to deep water habitat	0.5	8.8	9.3
Loss to upland	30.3	0.8	31.1
Temporary	8.7	76.7	85.4

Potential Temporary Wetland Impacts

There could potentially be up to 88 acres of temporary impact to wetlands within the footprint (as shown in Figure 12); however, use of BMPs, as discussed further below, would aim to reduce temporary construction related impacts to the maximum extent possible. Remedial activities may cause temporary disturbance to wetlands where ENR thin covers are placed. In addition, temporary impacts may also occur in some of the areas where dredging or capping is occurring. In these areas, dredging and capping would not result in a change in the wetland habitat type post-restoration and these areas would be replanted; these areas are shown as areas of future submerged (Zone 2) and mixed vegetation (Zone 3) southwest of the shoal feature, in the dredge area at the northernmost point of the Site, and in the Wire Mill Delta (Figure 12). Additionally, the wetlands in the area of future emergent vegetation (Zone 4) in the Unnamed Creek corridor will only experience a temporary impact; these areas will be planted with vegetation consistent with surrounding native plant communities, and therefore this area will not be converted to a different type of wetland habitat. Temporary disturbances may include removal of vegetation, temporary loss of fish and wildlife habitat, and increased concentrations of suspended solids and other constituents in areas of standing water; as noted above, these areas would ultimately have the same wetland function as they did pre-remedy and BMPs would be utilized to minimize impacts throughout the project footprint.

Self-Mitigating Remedy

Although wetland loss would occur (through either conversion to upland or deep water), this Project would improve the quality of existing (and create new areas) habitat at the site, resulting in an overall environmental lift of the project area. Because of the below described overall net benefit to habitats within the Project footprint, this Project can be viewed as self-mitigating and ecological improvements as a whole serve as the mitigation for the Project.

In total, this project would benefit 126.4 acres of total habitat (Table 8) by creating shallow bay habitat with depth transitions capable of supporting a shallow, open water wetland habitat and fisheries habitat

(Figure 12 and 13- fisheries habitat is discussed further in Section 11ivb below), and would improve/remediate substrates across the footprint, which would benefit benthic habitat and all vegetation types. This is also inclusive of the new wetland created offshore of Unnamed Creek (Figure 12).

While the post restoration wetland community may differ from the existing community in some areas of the footprint, the new depth transitions and sheltered areas would support a broader range of vegetation and wildlife and provide protection necessary for establishment. A summary of the post-restoration habitat types is presented in Table 8. Note that the total restored aquatic habitat acreage is representative of all areas within the footprint that would be restored with improved/remediated substrate, including those select areas where a depth change is occurring, but where the post-remedy wetland habitat type would not change.

Table 8. Spirit Lake Project Overall Habitat (Wetland and Other Aquatic Habitat) Benefit Summary

Restored Habitat with Improved/Remediated Substrate	**Acres**
Shallow, open water wetland (SAV), 4 to 6 ft depth	40.5
Shallow, open water wetland (SAV and floating vegetation) 2 to 4 ft depth	34.9
Shallow, emergent marsh, 0 to 2 ft depth	30.3
Shoreline fringe marsh, Zone 4a, 0 to 0.5 ft depth	3.8
Deep water, Zone 1, greater than 6 ft	13.5
Stream Channel Riparian Zone, Zone 7	3.4
Total Restored Habitat	**126.4**

*Habitat acres not included in restoration plan consist of wetlands and deep-water areas within monitored natural recovery areas and ENR thin cover areas.

The end result of the Project would be a net benefit to habitat within the footprint, restoring 126.4 acres of total habitat. This net benefit would be defined as:

[Habitat Acres Improved/Created] – [Wetland Loss] = Net Habitat Benefit

[126.4 acres (Table B-3)] – [40.4 acres (Table B-1)] = **86 acres of habitat benefit within the project area**

This Project has been designed to avoid and minimize wetland impacts to the maximum extent possible while still achieving project goals. Although wetland loss would occur, the ecological improvements as a whole serve as the compensatory mitigation for the site. The standard methods of compensatory mitigation are: restoration; establishment; enhancement; and preservation (40 CFR Part 230 Part J and 33 CFR Part 332). The habitat restoration component included in the Project addresses restoration, establishment, and enhancement within the planned remedy:

Restoration

Restoration is defined as the re-establishment or rehabilitation of a wetland or other aquatic resource with the goal of returning natural or historic functions and characteristics to a former or degraded wetland. Restoration may result in a gain in wetland function or wetland acres, or both. The Project would restore historic function and characteristics to degraded wetlands, specifically within the

Unnamed Creek Delta and Wire Mill Pond. Hydrologic connectivity would also be restored, improving the function of these wetlands.

Establishment

Establishment is defined as the development of a wetland or other aquatic resource where a wetland did not previously exist through manipulation of the physical, chemical and/or biological characteristics of the site. Successful establishment results in a net gain in wetland acres and function. A total of 23 acres of wetland would be created in the Unnamed Creek offshore area. This area has a water depth greater than 6 ft currently and would be capped and planted with submerged aquatic vegetation. Post-remedy, this area would be within the 4 to 6 ft depth range and the vegetation consistent with that of a shallow, open water wetland.

Enhancement

Enhancement is defined as activities conducted within existing wetlands that heighten, intensify, or improve one or more wetland functions. Enhancement is often undertaken for a specific purpose such as to improve water quality, flood water retention or wildlife habitat. Enhancement results in a gain in wetland function but does not result in a net gain in wetland acres. Wetland habitat would be enhanced in all areas where dredging, dredging followed by capping, and enhanced natural recovery thin cover placement, would occur. These actions would remove contaminated material that impedes healthy wetland function or provide a clean layer of sand overtop of impacted material to accelerate natural recovery processes. Remediated substrates provide the basis for enhanced water quality and food web.

Avoidance, Minimization and Best Management Practices

Given the nature of the Project as a remedial action dictated by site conditions, alternate sites cannot be considered.

The selection of the alternative for this Project was a collaborative process between USEPA and various stakeholders and entities, involving state and local agencies and tribal and cultural stakeholder groups. This alternative was chosen because it provided a balance between competing stakeholder interests; to the maximum extent possible while still achieving Project goals, it incorporates tribal comments and concerns regarding impacts on the cultural and spiritual significance of the area, allows development of a Rails-and-Trails trail feature as desired by the City of Duluth, and provides areas to develop aquatic habitat with depth transitions as desired by natural resource managers. It would also provide greater recreational access to the shore and open water areas. The siting of the CDFs was completed through a thorough Feasibility Study process which evaluated project alternatives based upon selected criteria. Implementability, long-term maintenance, and site disruption during construction were key factors in siting CDFs within the footprint. The locations of the CDFs for the project were chosen after thorough consideration of engineering requirements for placement of sediment and treatment of effluent water, as well as the geotechnical properties of the sediment to be contained.

To minimize temporary impacts to wetlands from construction activities, in-water BMPs would be utilized. These BMPs that may be implemented to mitigate and reduce the Project's potential impacts on wetlands would also be used to reduce impacts on water quality as a whole and include:

- Turbidity barriers
- Sorbent controls- booms and pads
- Visual turbidity inspection
- Water quality monitoring
- Sheet pile cofferdam spanning the Unnamed Creek Delta
- Use of clamshell buckets
- Construction timing techniques.

These BMPs listed above are further described below under EAW Item No. 11ivb.

b) Other surface waters – Describe any anticipated physical effects or alterations to surface water features (lakes, streams, ponds, intermittent channels, county/judicial ditches) such as draining, filling, permanent inundation, dredging, diking, stream diversion, impoundment, aquatic plant removal and riparian alteration. Discuss direct and indirect environmental effects from physical modification of water features. Identify measures to avoid, minimize, or mitigate environmental effects to surface water features, including in-water Best Management Practices that are proposed to avoid or minimize turbidity/sedimentation while physically altering the water features. Discuss how the project will change the number or type of watercraft on any water body, including current and projected watercraft usage.

Fisheries Habitat

Approximately 23 acres of existing deep water (water depth greater than 6 ft) habitat would be converted to a shallow, open water wetland in the Unnamed Creek offshore (Figure 13). Additional areas of deep water (approximately 10 acres) could potentially experience minimal temporary construction impacts, although BMPs would be utilized to minimize most impacts. An area of shallow open water wetland in the Wire Mill Delta would be converted to deep water habitat.

The habitat restoration for the Project was designed based on mean growing season water level over the last 30 years of 602.1 in the North American Vertical Datum 1988 (NAVD88) [or 601.9 in the International Great Lakes Datum 1985 (IGLD85)]. It is important to note that this elevation was selected based on a thorough evaluation of water level data within Duluth and Lake Superior, consideration of the USACE long-term average water levels (over the past 100 years), and consideration of input from MNDNR restoration design for other projects throughout the AOC, as well as concerns for planning restoration to provide depths suitable for fish habitat. Designing restoration to the average lake level will allow for plant communities to thrive in a variety of lake conditions and create deeper water areas to provide fish habitat; under certain lower lake level conditions, it may be possible that portions of the site designated to be at a water depth greater than 2 ft may not be classified as open water habitat, and could instead potentially be emergent marsh habitat.

At the request of Minnesota Department of Natural Resources, an analysis of the expected acres of permanent open water habitat zones post restoration was completed based on the current design water level at 602.1 NAVD88 and at 601.9 NAVD88, representative of the USACE Long-Term (100 year) average (Table 9). A lower average lake level could potentially result in approximately 0.2 fewer acres

of water depth greater than 2 ft (permanent open water) across the site. It is important to note that the current habitat design for the Project would also create deep water (6 ft or greater water depth) for fisheries habitat within the Wire Mill Delta area, as well as north of the Unnamed Creek Offshore area.

Table 9. Fisheries Habitat Acreages

Lake Level for Habitat Restoration	Water Depth > 2ft (acres)	Water Depth 0 to 2 ft (acres)
602.1 NAVD88 (current design)	88.9	34.1
601.9 NAVD88	88.7	34.2

Other Surface Water Impacts

An approximately 218-acre portion of the Project construction would occur below the OHWL. The Unnamed Creek and Wire Mill Pond drainage areas would be affected by the construction activities.

The work would be completed over three 8-month periods with winter shutdowns in between at the discretion of the contractor. It is expected that the crews would work onsite from March to November for three years, starting in late 2019 and ending in 2022. A work stoppage due to flows higher than a 2-year storm event would be determined by the contractor and USEPA based on potential safety of personnel, damage to equipment, and environmental effects on water quality, which are regulated by the National Pollutant Discharge Elimination System (NPDES) Construction Stormwater General Permit that requires effective BMPs in place at all times.

Approximately 10,000 ft of the Unnamed Creek (a stormwater conveyance channel) would be temporarily impacted by the Project. The Project would be phased appropriately to allow all flow to go through the temporary diversion for the Unnamed Creek channel until the new channel is completed. Then the flow would be permanently diverted to the new Unnamed Creek channel. The new channel would be constructed using an excavator and the contaminated material layer would be disposed in the Upland CDF or OU-J CDF. A cap would be placed in the stream to prevent future sediment impacts and sand, gravel, vegetation or riprap would be used for stream stabilization to prevent stream bank erosion. The original Unnamed Creek channel would be abandoned and regraded under the new Upland CDF and within the confines of the former coke settling basin (OU-I and Tar Between I&J). The design for Unnamed Creek would be a natural channel design including improved sinuosity, improved bank gradation, enhanced riparian areas, and creation of riffle and pool features as desirable aquatic habitat.

In addition to the modifications to the stormwater conveyance channel, an approximately 250-foot culvert extension will be installed on the upstream end of the Site for slope stability immediately upgradient of the OU-J CDF. The culvert extension will daylight into a grit chamber that overflows into the new channel.

The Wire Mill Pond and the Unnamed Pond at the Site would each be dredged and be made deeper. The work in Wire Mill Pond would be completed in the wet with turbidity barriers to prevent sediment resuspension to Spirit Lake. After the dredging work has been completed and

once water quality within the dredge area meets acceptable standards per permitting requirements, a 6-inch residual cover will be placed over the entire dredged area to prevent any residual constituents of concern from impacting water quality. The residual cover will be imported sand material which will be placed hydraulically at the North Dredge Area, Wire Mill Delta, and Wire Mill Pond areas. The turbidity barrier will remain in place during residual cover placement. Before removing, water quality will again need to meet permit requirements. The excavated shorelines would also be seeded and hydraulically mulched following excavation and cover placement to minimize erosion.

The Project would not result in any changes to the floodplain capacity or change the frequency or intensity of flooding events; modeling results indicate the Project would not cause a net change in the current flood plain or flood elevation.

Resuspension Controls and Best Management Practices

Because resuspension of sediment would occur during dredging and capping work, marine resuspension controls will be used, including a turbidity barrier and sorbent controls such as a sorbent boom and pads. The turbidity barrier would be utilized during all in-water dredging/excavation work and during hydraulic placement of the residual cover, EMNR, and subaqueous cap. Dredging at Wire Mill Pond would require the use of a turbidity barrier plus a sorbent boom. In addition to physical barriers, water quality monitoring would be conducted (as required by MPCA and USACE permits) while undertaking silt-producing activities.

The potential to impact water quality would be minimized by the sheet pile cofferdam across the Unnamed Creek Delta and by a temporary turbidity barrier that spans the limits of disturbance of the Wire Mill Offshore area, the Unnamed Creek Offshore area, and the bridge crossing at Wire Mill Pond. This turbidity barrier spanning the limits of disturbance for the site would protect both deep water and shallower waters. The sheet pile would be installed in the center of the permanent shoal feature.

Best management practices would be implemented to minimize the impacts associated with project construction. These measures could include, but are not limited to:

- Silt curtains, environmental buckets, and other sediment suspension control measures would be implemented during dredging and/or capping activities.
- Manage dredged material during transportation by:
    - Hauling in such a way as to prevent dredged material from leaking, spilling, or otherwise being deposited; and
    - Minimizing vehicle tracking of soil or dredged material off-site at locations where vehicles exit the dredging, storage, disposal and/or reuse facility onto impervious surfaces by BMPs such as stone pads, concrete or steel wash racks, or equivalent systems.
- Implement erosion control measures during dredging and CDF construction by:
    - Stabilizing exposed soil- vegetate, mulch, or otherwise stabilize all exposed areas as soon as land alterations have been completed;
    - Protecting steep slopes;

- Rough grading or terrace slopes;
- Breaking up long slopes with sediment barriers or divert stormwater away from slopes;
- Planning the movement and use of equipment so as to minimize soil disturbance at the Site;
- Installing perimeter controls/ down gradient perimeter sediment-control BMPs before any up-gradient land-disturbing activity begins (e.g. sediment trapping devices); and
- Protecting any areas of the site not directly impacted by construction from disturbance or construction activity by fencing or otherwise clearly marking these areas.

Watercraft Usage

Additional watercraft area would be added in the Unnamed Creek corridor, with a new shallow sheltered bay. The open water area would also be added to the Wire Mill Pond allowing for shallow watercrafts to access the pond.

12. Contamination/Hazardous Materials/Wastes:

a. Pre-project site conditions - Describe existing contamination or potential environmental hazards on or in close proximity to the project site such as soil or ground water contamination, abandoned dumps, closed landfills, existing or abandoned storage tanks, and hazardous liquid or gas pipelines. Discuss any potential environmental effects from pre-project site conditions that would be caused or exacerbated by project construction and operation. Identify measures to avoid, minimize or mitigate adverse effects from existing contamination or potential environmental hazards. Include development of a Contingency Plan or Response Action Plan.

An original Record of Decision (MPCA 1989) approved by the USEPA in 1989 identified a chosen remedy of No Action for sediments adjacent to the former steel facility located adjacent to the Site. Subsequent monitoring by USS and the MPCA suggested that a remedial investigation of the sediments was warranted, and that potential remedial actions may be necessary. Among multiple beneficial use impairments, the AOC has areas with elevated levels of sediment-associated contaminants, including PAHs and metals. Total petroleum hydrocarbons (TPH) and dioxins were also found in elevated concentrations within the estuary. In 2007 the MPCA established risk-based sediment quality target levels for anthropogenic compounds and elements of concern in sediments of the St Louis River estuary. The work proposed is specifically targeted at addressing sediment impacts identified by remedial investigations completed in 2013 (Barr, 2013). A response action plan has been developed, the implementation of which is embodied in the remedial design package being prepared by U. S. Steel and USEPA under a Great Lakes Legacy Act program agreement as described in EAW Item No. 6.

The highest concentration of PAH and metals contaminants in sediment and porewater in the estuary are concentrated around Unnamed Creek Delta and a small portion of sediment in Wire

Mill Delta at the southern end of the Site. Upland sediments are also elevated, most notably nearest the Unnamed Creek Delta and within the former coke-settling basin, operable unit OU-I. Extensive sampling has been conducted at the site and the extent of the chemical constituents of concern has been well documented. The design and remedial techniques have been selected in consideration of all known highest areas of sediment impact, to avoid or minimize adverse effects from the removal or covering of these contaminated areas.

b. Project related generation/storage of solid wastes - Describe solid wastes generated/stored during construction and/or operation of the project. Indicate method of disposal. Discuss potential environmental effects from solid waste handling, storage and disposal. Identify measures to avoid, minimize or mitigate adverse effects from the generation/storage of solid waste including source reduction and recycling.

The Project is not expected to generate significant amounts of solid waste other than the impacted sediments that will be consolidated in CDFs or capped in situ. Removed sediments will be managed within the constructed CDFs as described in detail in EAW Item No. 6b. Impacted sediments that will be managed in situ will be capped. Capping construction methods are described in EAW Item No. 6. In general, the materials in the estuary that would be capped in situ will be covered with caps containing various layers. The biologically active zone (BAZ layer) provides habitat and erosion control (where necessary), the chemical isolation layer reduces the flux of contaminants into the water column, and a mixing layer provides for a clean transition between the underlying sediment and cap materials.

The selected contractor(s) would be responsible for hauling any construction-generated wastes off site to appropriate disposal facilities. Solid waste disposed off-site would be standard disposable materials which would be contained and then hauled away using standard roll-off boxes. Solid waste for off-site disposal may also include debris from estuary dredging that is not suitable for CDF disposal, e.g., metal debris. Should unanticipated materials be encountered during construction activity, they would be evaluated, and the contractor would be responsible for proper handling and disposal.

c. Project related use/storage of hazardous materials - Describe chemicals/hazardous materials used/stored during construction and/or operation of the project including method of storage. Indicate the number, location and size of any above or below ground tanks to store petroleum or other materials. Discuss potential environmental effects from accidental spill or release of hazardous materials. Identify measures to avoid, minimize or mitigate adverse effects from the use/storage of chemicals/hazardous materials including source reduction and recycling. Include development of a spill prevention plan.

During the construction phase of the Project, fuels, oils, lubricants, and other materials typical for the operation and maintenance of earthmoving equipment would be used during construction of project elements. No other chemicals or hazardous materials are needed for or generated by this Project.

The Contractor would be required to prepare a Spill Prevention and Response Plan to address accidental spills or the release of any hazardous material or petroleum products. The plan may include the following measures to avoid and/or minimize spills during construction activities:

- Fueling and equipment maintenance would not be allowed within 100 ft of the water's edge without deploying spill capture methods.
- The contractor shall maintain fuel spill containment kits and trained spill response personnel on site at all times.
- Any spill or release of a hazardous material or petroleum products will be reported to the construction site supervisor who would take immediate action to minimize the potential for groundwater or surface water pollution.
- In the event of a significant spill or release of a hazardous material or a petroleum product, the construction site supervisor would immediately deploy on-site equipment and supplies to contain the spill and contact the MNDNR, MPCA and the Minnesota Duty Officer, according to emergency procedures identified in Minnesota Rules, part 7045.0574 and Minnesota Statutes, par 115.061.Temporary, above ground, on-site fuel storage would not be allowed within the 100-year floodplain.
- Below ground storage tanks would not be allowed.
- Active management of any sheens (from potential petroleum hydrocarbon presence) generated during excavation/dredging would be required of the construction contractor. It is possible that turbidity barriers with adjacent sorbent booms could be utilized to contain sheens; however, the specific management techniques would be the contractor's responsibility.

The Contractor would also be responsible for preparing and following a Health and Safety Plan during construction. Measures and methods for minimizing the potential for spillage and associated effects would be included in the plan.

d. Project related generation/storage of hazardous wastes - Describe hazardous wastes generated/stored during construction and/or operation of the project. Indicate method of disposal. Discuss potential environmental effects from hazardous waste handling, storage, and disposal. Identify measures to avoid, minimize or mitigate adverse effects from the generation/storage of hazardous waste including source reduction and recycling.

Lead impacted soil exceeding the toxicity characteristic threshold are present in the OU-Q upland area (Figure 4). These soils will undergo in situ stabilization prior to transport off-site for disposal. Overburden material will first be removed and kept in a staging area onsite and tested to ensure the material is non-hazardous. Material within one foot of the lead removal limit will be sampled in situ to confirm it is non-hazardous prior to removal. Once the lead impacted soil is accessible, it will be solidified/stabilized in place using a mechanical mixing method selected by the contractor. The specific amendment and mix ratios used for this process, as well as contractor means and methods for completing soil stabilization, would be established at the Project contracting stage. Upon confirmation of successful soil stabilization, the material would be transported off-site for disposal at a MPCA-approved facility permitted to accept such waste. Detailed records would be maintained, including manifests where required, to document final

volumes of all such wastes removed from the site.

13. Fish, wildlife, plant communities, and sensitive ecological resources (rare features):

a. Describe fish and wildlife resources as well as habitats and vegetation on or in near the site.

There are three primary habitat areas within the Site: open water, upland, and wetland. Wetland communities are described in EAW Item No. 11ai.

The upland habitat is the former USS facility property that consists of some cleared areas that were previously developed and some areas of deciduous trees. Vegetation over most of the site has opportunistically grown since closure of the steel facility.

Deep open water areas (water depth greater than 6 ft) are present within the Project footprint in the Unnamed Creek offshore and Wire Mill offshore areas totaling approximately 32 acres.

Fish and wildlife surveys were not conducted in the Site. No fish surveys completed in the last 15 years were identified. Breeding bird survey data is available for the Saint Louis River System (Niemi et al., 2000). Common bird species in wetland areas included swamp sparrow (*Melospiza georgiana*), red-winged blackbird (*Agelaius phoeniceus*), common yellowthroat (*Geothlypis trichas*), song sparrow (*Melospiza melodia*), and yellow warbler (*Setophaga petechia*). Common species in upland areas included red-eyed vireo (*Vireo olivaceus*), common yellowthroat (*Geothlypis trichas*), white-throated sparrow (*Zonotrichia albicollis*), ovenbird (*Seiurus aurocapillus*), American redstart (*Setophaga ruticilla*), song sparrow (*Melospiza melodia*), veery (*Catharus fuscescens*), and yellow warbler (*Setophaga petechial*) (Niemi et al., 2000)

b. Describe rare features such as state-listed (endangered, threatened or special concern) species, native plant communities, Minnesota County Biological Survey Sites of Biodiversity Significance, and other sensitive ecological resources on or within close proximity to the site.

Provide the license agreement number (LA-____) and/or correspondence number (ERDB ____20150180-3a_____) from which the data were obtained and attach the Natural Heritage letter from the DNR. Indicate if any additional habitat or species survey work has been conducted within the site and describe the results.

Rare Features and Biodiversity Sites

USEPA began consultation with MNDNR in December 2014 through submission of the Project for a Natural Heritage Information System review (ERDB 20150180). This initial consultation resulted in identification of a potential rare community within the project footprint. Additional native plant community surveys performed in 2015 indicated that the community of concern, the Sugar Maple-Basswood- (Bluebead Lily) forest, was only present in small, isolated patches within the Site. After consultation with MNDNR, it was concluded that the forest in this area is likely mostly aspen, which is not an MBS area of High Biodiversity Significance. This NHIS review was initiated again in 2019, due to time lapse from initial consultation, to reflect current species and biodiversity site status. The updated NHIS review request was submitted to MNDNR on February 18, 2019 and

received in June 2019. A summary of previous consultation is included in Attachment B. The updated review is provided as Attachment C.

The following ecologically significant or high biodiversity areas were identified through the Minnesota Natural Heritage Inventory Review completed in June 2019:

- St. Louis River Estuary- this ecologically significant area covers the in-water footprint of the project.
- Estuary Marsh- this native plant community has a status of "critically imperiled" in Minnesota. This community is present along the immediate shoreline of Wire Mill Delta, south of Wire Mill Pond; a portion of this community is within the dredge footprint.
- Aspen-Birch-Red Maple Forest- this native plant community has a status of "uncommon but not rare" in Minnesota. This is found within the southernmost tip of the Wire Mill Pond dredge footprint and along a small area of the southeast border of the borrow area footprint.
- Willow-Dogwood Shrub Swamp- this native plant community is classified as "common and abundant" in Minnesota. This is found within the Unnamed Creek Delta.

Federally-Listed Endangered, Threatened, or Special Concern Species

Pursuant to Section 7(c) of the Endangered Species Act , USEPA began consultation with the U.S. Fish and Wildlife Service (USFWS) in November 2014 regarding potential project impacts on species of endangered, threatened, or special concern status and on sensitive ecological resources within the Site. The project information was submitted to the USFWS Information for Planning and Consultation online review system administered by the USFWS. Due to the time lapse from initial consultation, USEPA resubmitted the project review package to the USFWS in January 2019 and has received a response of no comment from USFWS. This online review resulted in a list of 6 species that could be potentially impacted by the Project. No critical habitats were identified. USEPAs determinations for these species (as submitted to USFWS) are presented in Table 10. All agency correspondence regarding these species is presented in Attachment B.

Table 10. Section 7 Determinations for Potentially Present Species

Species / Resource Name	Conclusion	ESA Section 7 / Eagle Act Determination	Additional Information / Documentation
Red Knot (*Calidris canutus rufa*)- Threatened	• Suitable habitat not present • Shoreline and wetland habitat survey conducted.	• No effect	• Species found in muddy or sandy coastal areas, more specifically the mouths of bays and estuaries, unimproved tidal inlets, and tidal flats.
Piping Plover (*Charadrius melodus*)- Endangered	• Suitable habitat not present. • Shoreline and wetland habitat survey conducted.	• No effect.	• Historically, piping plovers nested along the beaches of western Lake Superior but no nests have been documented since 1987 • Piping plovers nest, feed, and rear their young in open, sparsely vegetated sandy areas during spring and summer (April through August) in the Great Lakes. • The Project site has narrow sandy shoreline and heavy vegetation, which is not conducive to piping plover nesting. • Majority of project construction would occur outside of window of piping plover presence in Great Lakes region
Canada Lynx (*Lynx canadensis*)- Threatened	• Suitable habitat not present • No current habitat survey conducted.	• No effect	• Species found in boreal habitats where snowshoe hare are present. • Minnesota Department of Natural Resources (DNR) has records of this species in St. Louis County and unverified and probable records in the general region of the project site in St. Louis County.
Northern Long-eared Bat (*Myotis*	• Potential habitat present	• May affect, but not likely to adversely affect	• Minnesota DNR has records of this species in St. Louis County.

Species / Resource Name	Conclusion	ESA Section 7 / Eagle Act Determination	Additional Information / Documentation
septentrionalis)- Threatened	• No current survey conducted.		• To avoid impacts to the northern long-eared bat, the USEPA is proposing to complete tree clearing associated with the Project between the period of October 1 and March 30. This will eliminate impacts to potential forested habitat and roosting trees that may be used by the northern long-eared bat during the period that the species may be present in the area.
Gray Wolf (*Canis lupus*)- Threatened	• Suitable habitat not present • No current habitat survey conducted.	• No effect	• Gray wolves in the Great Lakes primarily use forested habitat and gray wolves have been historically documented in St. Louis County • Upland habitat present in the Project site is a riparian area of approximately 67 acres and cleared areas with slab and remnant foundations of the former steel operations. • The gray wolf needs ample space with minimal human disturbance, or at a minimum, areas where human disturbance will allow for both gray wolves and their prey to survive; the forested areas that remain at the site are too small to support the gray wolf. • There are no corridors around the site that could be utilized by a gray wolf to connect to other larger forested areas or agricultural tracts (neither of which are present in the surrounding area).

Species / Resource Name	Conclusion	ESA Section 7 / Eagle Act Determination	Additional Information / Documentation
Bald Eagle (*Haliaeetus leucocephalus*)	• Unlikely to disturb nesting bald eagles • No documented nests.	• No Eagle Act permit required	• None
Other Migratory Birds (not including Bald Eagle)- 19 identified by IPaC review	• Suitable habitat not present or species rarely documented in the Site (per consultation of Cornell eBird mapping tool)	• May affect, but not likely to adversely affect	• According to the IPaC review Probability of Presence summary, most migratory birds on the species list for the Project, do not have a high probability of presence during the construction window • The Rusty Blackbird, Lesser Yellowlegs, and Harris Sparrow have a comparatively higher chance of presence; however, suitable breeding habitat for Rusty Blackbird and Harris Sparrow is not present at the site. Preferred habitats include bogs, wet forests, and muskeg for the blackbird, and semiforested tundra for the sparrow. • Lesser Yellowlegs (fewer than 10 individuals) have been sighted along the shoreline of Spirit Lake within the last 5 years. • All practicable management and conservation techniques will be utilized to minimize impacts on migratory birds that may be present during construction. Some stressors such as noise will be present during construction; however, these impacts will be temporary and limited to daylight hours during the project period.

Species / Resource Name	Conclusion	ESA Section 7 / Eagle Act Determination	Additional Information / Documentation
Critical Habitat	• None present.	• No effect	• None

c. Discuss how the identified fish, wildlife, plant communities, rare features and ecosystems may be affected by the project. Include a discussion on introduction and spread of invasive species from the project construction and operation. Separately discuss effects to known threatened and endangered species.

Post-Remedy Habitat Improvement

The Project design aims to maintain a natural landscape appearance, including softened shorelines and habitat betterment features, while improving the environmental condition of the Site. The final design of this Project would provide habitat benefits for fish and wildlife species including the creation of two shallow sheltered bay aquatic environments, naturalization features for the mouth of Unnamed Creek and upstream areas above the shallow sheltered bay, as well as creation of more locations with water depth transitions from shallow to deeper water (suitable for fisheries habitat) in the estuary, and a shoal area that can provide future sites for emergent vegetation establishment. These habitat improvements would provide more ideal areas for shelter, spawning, nesting, and foraging for both aquatic and terrestrial wildlife species. Project impacts on open water habitat with water depth greater than 2ft are described in EAW Item No. 11, as requested by the Minnesota Department of Natural Resources.

Specific impacts related to construction are discussed below.

High Biodiversity Habitats

For the four high biodiversity areas within the project site, impacts would be minimized by use of effective erosion and sediment control throughout the duration of the project. An area of Estuary Marsh is also adjacent to the dredge footprint, and all work would be conducted in an effort to minimize the impact (through minimizing equipment disturbance) to this portion of marsh habitat. Maple forest an shrub swamp habitat would also be protected by use of BMPs for in-water work.

Impacts to Fish, Wildlife, and Plants

Fish, wildlife, and plant communities within the Site would experience both permanent and temporary impacts from construction. Permanent impacts would be largely related to habitat conversion or loss and vegetation clearing; many of these impacts, while permanent, would result in improved/remediated substrates capable of providing better functioning habitat for fish, wildlife and plants., Temporary impacts would include displacement during construction and short-term loss of individuals. Impacts are discussed for each community below.

Dredging and capping/filling activities conducted in the estuary or in wetland areas in the upland portion of the site would produce adverse impacts on fish (and other water column organisms) and bottom dwelling organisms. All construction activities are anticipated to result in temporary displacement of fish and benthic communities. Construction of the CDFs in wetland habitat would result in a conversion of the habitat to upland. Although the CDFs would be planted with appropriate vegetation for the new habitat type, any aquatic and benthic organisms located in those areas would be lost.

Construction of the remedy would likely result in disturbance to the benthic community through injury or loss of individuals and loss of bottom habitat; however, these impacts would be temporary as benthic communities would be expected to recover in the long-term through recolonization of the area. In areas where dredging produces larger changes in water depth, the community may shift to include benthic species that typically inhabit deeper water areas. It is not anticipated that dredging would cause a loss of any critical habitat for benthic species but would instead create new shallow sheltered bay and depth transitions which would have improved substrate and hydrologic connection, thus providing habitat and foraging benefits to aquatic species. Disturbance of the sediment by construction activities would temporarily increase turbidity which would degrade water quality and adversely impact fish and other biota within the water column; however, this is anticipated to be a short-term impact and would be minimized by the use of established BMPs.

Terrestrial wildlife and bird species would experience temporary adverse impacts from construction. These individuals are likely to be displaced during the construction period. Vegetation clearing in the Site would result in a temporary loss of foraging habitat; however, some areas would be replanted as part of the habitat restoration component for the Project, and once established, would serve again as foraging grounds for wildlife and birds. Filling and dredging along the shoreline (and especially in areas that would be converted to open water), may result in species within these areas experiencing a decrease in prey base, depending upon their food source. However, new open water would increase fish habitat, thus benefiting wildlife that consume aquatic organisms. Additionally, the temporary suspension of sediment as a result of construction activities in current open water and wetland areas could result in a reduction in ability of visual predators to capture prey.

Plant communities would experience an adverse impact from the loss of individuals as a result of vegetation clearing throughout the Site during construction. Some of these areas would be converted to open water, while the remaining would be replanted with the appropriate native vegetation. In areas that would be replanted with wetland plants of the same community, the impact is considered temporary, as it is anticipated that these areas would eventually re-establish to pre-project conditions. In areas that would be replanted with vegetation consistent with a different wetland type, the impact is considered permanent, although not a loss of wetland. The existing wetlands within areas of the site that will be converted to a new wetland type would experience an overall benefit from this transition. The existing wetlands impacted by constituents of concern within the site would be enhanced or replaced with a new wetland type and while the ecological function may differ between pre and post construction types, the post construction habitat will be improved, remediated and capable of supporting a thriving vegetative community.

Management of Invasive Species

Management of invasive species introduction and spread from construction would be attained by the use of BMPs during implementation of the remedial activities (e.g. dredging, capping, CDF construction). These BMPs could include, but are not limited to:

- Thorough cleaning of all equipment and vessels prior to start of construction;
- Proper decontamination of all equipment and vessels;

- Use of capping materials free from invasive seed;
- Dedication of specific equipment for use in only certain site habitats (e.g. equipment exclusive for use separately in upland areas and in estuary areas);
- Researching invasive species records for the Spirit Lake area prior to construction to determine if any extra measures should be implemented; and
- Reestablishing native vegetation on slopes and cleared areas of the site.

d. Identify measures that will be taken to avoid, minimize, or mitigate adverse effects to fish, wildlife, plant communities, and sensitive ecological resources.

As described above in EAW Item No. 13c the Project is unlikely to have adverse effects on rare features or listed species within the vicinity. The BMPs utilized to protect surface waters (as described in EAW Item No. 11ivb) would also work to minimize adverse effects on fish and plant communities.

Temporary impacts to fish, wildlife, and plant communities are described above. Several actions can be implemented to minimize some of these impacts to the maximum extent practicable; however, some components of the Project would result in impacts to these species that cannot be avoided if project goals are to be achieved. Upon completion of the remedy, the Site would undergo several habitat changes. While these changes would cause unavoidable temporary impacts to species at the site, there would be an overall net benefit to the ecosystem as a whole.

The creation of shallow sheltered bays in the OU-M delta and the restoration of hydrologic connectivity in the Wire Mill Pond area would provide improved habitat for fish and other aquatic organisms, providing these species with varying water depths, protected conditions and improved bottom substrate. The need for shallow sheltered bay habitat in Spirit Lake is discussed in the Lower St. Louis River Habitat Plan (LimnoTech, 2012). The created shoal feature in the OU-M Delta would also provide an ideal area for establishment of emergent vegetation.

14. Historic properties:

Describe any historic structures, archeological sites, and/or traditional cultural properties on or in close proximity to the site. Include: 1) historic designations, 2) known artifact areas, and 3) architectural features. Attach letter received from the State Historic Preservation Office (SHPO). Discuss any anticipated effects to historic properties during project construction and operation. Identify measures that will be taken to avoid, minimize, or mitigate adverse effects to historic properties.

<u>Designations and Potential Impacts- LSMRR</u>

The LSMRR historic railroad has been determined to be eligible for listing on the National Register of Historic Properties. Mitigation for impacts to the LSMRR will be detailed in a Memorandum of Agreement (MOA) between the affected parties. Discussions supporting development of this MOA are currently underway. All possible measures to avoid or minimize the impacts on the historic character of the LSMRR during design would be taken. In areas where design impacts on the railroad (see EAW Item No. 6) would occur, actions would be taken to ensure that materials used to restore or replace parts of the railroad are compatible with the

existing material. In permanent impact areas, existing historic materials would be reused to the maximum extent practicable while still achieving the goals of the overall project design, and to the extent the materials are structurally sufficient. All best management practices to maintain the structural sufficiency of existing materials during removal, handling and reconstruction would be implemented. To be reused, the existing materials must achieve design standards and design criteria involving maintenance and longevity considerations for new railroad materials. Where materials cannot be reused, work may include repair or limited replacement of contributing components with in kind or with a compatible suitable material. For example, both the new bridge at Unnamed Creek and the new bridge at Wire Mill Pond would be designed with colorized concrete for bents, abutments and spans and other features to match the look of timber for historical aesthetics.

Designation, Potential Impacts, and Consultation History- Spirit Island

As described earlier, the Project would be implemented adjacent to Spirit Island, a culturally and spiritually significant site to the Fond du Lac Band of the Superior Chippewa. While work performed at the site would not physically touch the island parcel, the views both to and from the island would be altered by construction of project elements. Numerous discussions between USEPA and concerned tribal parties have been held since 2013 to discuss how impacts to this significant site can be avoided or minimized, which were integrated (to the maximum extent possible while still achieving project goals) as changes to the preferred alternative throughout the feasibility study and design process. This important consultation and coordination timeline with tribal parties and SHPO is summarized below.

Feasibility Study Planning and Draft FS Production (2012-2014)

- USEPA presented the FS workplan and progress to Project stakeholders.
- Different stakeholder preferences emerged, and a habitat subgroup was formed and produced a Habitat Concept Plan for Spirit Lake.
- Eleven alternatives were evaluated, with Alternative 8 selected as preferred.
- The tribes voiced their concerns on this alternative which were largely focused on contaminated material being stored in estuary and viewshed impacts to Spirit Island, along with limited ability for wild rice restoration; the tribes desired maximum material placed west of the LSMRR and more compatibility with the 2012 Habitat Concept Plan.

Revised FS and Section 106 Coordination (2015 to 2016)

- To respond to tribal concerns on the preferred alternative, Alternative 12, Open Water Bay with Upland CDFs was added to a revised FS for evaluation.
- The tribes still considered this newly added alternative to be a compromise alternative; any material placed within the lake was viewed as a negative impact on the cultural and spiritual significance of the waters of the lake and Spirit Island.
- This new alternative maximized shallow water areas, thereby limiting fisheries habitat.
- Alternative 12 was ultimately dismissed due to cost, high material volumes, shallow bay depths, higher CDF berm heights (which created larger viewshed impacts); the revised FS still recommended Alternative 8.

- Due to lack of stakeholder consensus on a preferred alternative, a stakeholder meeting was convened in Duluth; from these discussions a hybrid alternative (Alternative 8B) was identified and evaluated in an FS addendum.
- Section 106 coordination with SHPO and the LSMRR was initiated.

Progression of Alternative 8B to Design (2016 to 2017)

- The FS Addendum evaluated and recommended Alternative 8B; this alternative provided a reduced estuary footprint, more sheltered habitat and better depth transitions. It also reduced the viewshed impacts to Spirit Island by lowering the berm height of the Delta CDF and eliminated the amount of material placed below the OHWL elevation.
- Viewshed modeling and rendering studies, which evaluated the visual impacts of the alternative, were performed and presented to the tribes at stakeholder meetings.
- Following the FS addendum, cultural resource surveys were completed, and a natural resource managers meeting was held that was attended by the tribes.
- The tribes largely voiced concern over the lack of suitable areas within the preferred alternative for wild rice restoration.
- The tribes also noted that they desired to be involved in the habitat restoration process, and that development of the post-restoration habitats should consider the 2012 Habitat Concept Plan, as this plan is key to restoring natural habitat conditions.
- Alternative 8B has been designed to minimize impacts on the cultural and spiritual significance of both the waters of the lake and Spirit Island, but some impacts would be unavoidable.

Determination of Effect and Memorandum of Agreement Process (2018 to present)

- As part of the Section 106 process, USEPA submitted a Determination of Effect letter to SHPO and Tribal Historic Preservation Officers (THPOs). SHPO responded that the visual impacts as well as the impacts on the feel and setting of the tribal properties occurring with the indirect should be considered.
- Additionally, SHPO recommended that USEPA not move forward into drafting an agreement document with provisions for mitigation of adverse effects until a consultation meeting is held in order to provide an opportunity for all parties to fully engage in dialogue aimed at resolution of adverse effect through mitigation, avoidance and minimization measures.
- Fond du Lac responded to the adverse effect determination for Spirit Island in agreement of the determination but reiterated that the adverse effects on Spirit Island go beyond visual impacts; encapsulation of contaminated material in manmade structures within the estuary are considered antithetical to the practices that make Spirit Island significant.
- Consultation meetings to discuss resolution of adverse effects to Spirit Island and lake occurred in Fall of 2018.
- Discussion included ways in which the intangible impacts to Spirit Island and Spirit Lake could be mitigated; this included interpretive efforts such as signage detailing cultural significance of the area, awareness of indigenous people through development of a cultural center, and the possibility of and challenges associated with wild rice planting efforts.

The USEPA has held discussions in Spring 2019 and is continuing to meet currently with tribal parties and Minnesota SHPO to decide on appropriate mitigation for adverse impacts to cultural resources. These details will be presented in a MOA between the parties.

Cultural Resource Surveys and Overall Consultation Process

A Phase Ia Cultural Resources Survey was developed for the Project and submitted to SHPO in July 2015. The Phase Ia was completed as a desktop literature review. Results of the study found two previously recorded archaeological sites and 254 previously recorded architectural properties, most occurring within the Morgan Park Historic District. The Morgan Park Historic District is eligible for listing on the National Register of Historic Places; however, the remaining architectural properties have not been evaluated. The Phase Ia also found that while the presence of intact archaeological resources is unlikely due to high disturbance from past industrial use of the Site, remnants of historic structures may be present. The Phase Ia recommended an archaeological survey (including submerged areas) be completed along with a visual study to identify potential impacts to the viewshed to/from traditional cultural properties in the Site. In November 2016, computer modeling was used to conduct a viewshed analysis to identify the areas within which historic properties, if present, might be impacted. That analysis formed the basis for the recommended indirect Area of Potential Effect (APE). This study reviewed previously collected data from cultural resources reports for the Site and Geospatial Information System (GIS) data to develop the viewshed model. The computer model used three LiDAR derived data elevation sets in the viewshed analysis. The analysis identified 7 areas of interest (AOIs) from which a sight line could be established to the Site and for which there was available information to indicate that cultural/historic resources could potentially be present. These AOIs included Spirit Island and areas within the City of Duluth and along Skyline Parkway. SHPO provided concurrence on the direct and indirect APE in 2017 (Attachment B).

Following the Phase Ia, a desktop geomorphological study was completed to determine the vertical and horizontal extents of subsurface and surficial disturbances in the area of potential effect (APE) for direct impacts. The study identified and delineated areas that have potential to contain intact cultural deposits within the APE. Phase I Archaeology and Architecture Survey Reports were requested by SHPO to comply with Section 106 requirements and these were completed in 2017. The architectural reconnaissance survey was undertaken within the APE to identify built resources that may possess the qualities of significance and integrity necessary for listing in the National Register of Historic Places (36 CFR 60[a-d]). One previously identified property, the LSMRR, was found to be located within the area of direct effects encompassed by the APE. Previous assessment of this property found that the LSMRR retains the qualities of significance and integrity identified in the National Register criteria for evaluation. Three additional properties, totaling approximately one acre, were identified within the area of potential visual effects within the APE. Reconnaissance level investigation of these resources found that none of the three examples of mod-century ranch house types possesses the significance and integrity required for listing in the National Register. Intensive-level investigation of the three properties was not recommended. The archaeological investigation determined that nearly the entire direct APE was impacted by construction, maintenance, and demolition of the USS facilities. These impacts were documented in historic aerial photographs, changes observed between pre-construction (1907) and post-demolition (2012) topographic data, and in the logs

from 317 geotechnical cores placed within the direct APE. Although the partial foundation remains of the USS Duluth Works may be considered archaeological, their integrity is compromised and it is clear that they have no significant research potential.

15. Visual:

Describe any scenic views or vistas on or near the project site. Describe any project related visual effects such as vapor plumes or glare from intense lights. Discuss the potential visual effects from the project. Identify any measures to avoid, minimize, or mitigate visual effects.

Construction would occur at the site over two to three construction seasons beginning in 2019. Work at the site may be visible from Morgan Park and Spirit Island. The potential for the introduction of visual elements that may diminish the integrity of an historic property's significant characteristics was identified during USEPA project consultation with the SHPO, federally recognized tribes, and other consulting parties. Such potential visual effects were anticipated to be limited to historic properties consisting of buildings, structures, and landscapes, if present. The viewshed model, as described above in EAW Item No. 14, formed the basis for the indirect APE by identifying areas where culturally or historically important structures exist within sightlines to or from the direct Site area could potentially exist. Upon initial presentation of the draft indirect APE to the tribes and SHPO in December 2016, the indirect APE was revised to eliminate areas where views to the Site were the sightlines to the project area were considered unlikely, and to include a larger portion of Spirit Lake where the Fond du Lac band had recently acquired parcels.

Renderings of the post-Project condition area (showing views of the Unnamed Creek and Wire Mill Pond Areas from multiple vantage points within the indirect APE) are provided in Attachment B. While there would be changes to the grading and vegetation in the Site, the post-Project views of the Site from Morgan Park and Spirit island would be similar to the pre-Project views. The Site would appear vegetated and undeveloped, which is consistent with the pre-Project condition. The primary change would occur with vegetation type shift from larger tree cover to smaller, newly planted vegetation (e.g. small trees, shrubs) in the Unnamed Creek area; however, this difference in view will only be present until the planted areas grow in and return to a more densely vegetated appearance. For the views of the Wire Mill Pond portion of the site, vegetation clearing during remediation would result in the creation of new open water. While this would result in a visual change to the area, the creation of new open water is a net habitat benefit of remediation by restoring hydrologic connection between Wire Mill Pond and Spirit Lake and thus restoring the area to a more natural, pre-industry appearance.

16. Air:

a. Stationary source emissions - Describe the type, sources, quantities and compositions of any emissions from stationary sources such as boilers or exhaust stacks. Include any hazardous air pollutants, criteria pollutants, and any greenhouse gases. Discuss effects to air quality including any sensitive receptors, human health or applicable regulatory criteria. Include a discussion of any methods used assess the project's effect on air quality and the results of that assessment. Identify pollution control equipment and other measures that will be taken to avoid,

minimize, or mitigate adverse effects from stationary source emissions.

The Project would not include any stationary source emissions.

b. Vehicle emissions - Describe the effect of the project's traffic generation on air emissions. Discuss the project's vehicle-related emissions effect on air quality. Identify measures (e.g. traffic operational improvements, diesel idling minimization plan) that will be taken to minimize or mitigate vehicle-related emissions.

Minor impacts to air quality are anticipated to occur only during the construction seasons for the projects and would not produce long term impacts. Fuel exhaust emissions contain pollutants including carbon monoxide, nitrogen oxides, reactive organic gases, sulfur dioxide, and suspended particulate matter, all of which carry some associated health risks in large quantities. Emissions would be minor and temporary in nature, arising from the powered equipment during construction. Equipment used would include excavators, dozers, loaders, forklifts, tug boats, office trailer generator, pickup trucks, personal vehicles of workers, and dump trucks. The construction-related emissions would be exempt as de minimus and will meet the conformity requirements under Section 176 (c) of Clean Air Act, and 40 CFR 93.153.

c. Dust and odors - Describe sources, characteristics, duration, quantities, and intensity of dust and odors generated during project construction and operation. (Fugitive dust may be discussed under item 16a). Discuss the effect of dust and odors in the vicinity of the project including nearby sensitive receptors and quality of life. Identify measures that will be taken to minimize or mitigate the effects of dust and odors.

The proposed Project may create temporary fugitive dust during construction activities, including during upland excavation, sediment/excavated material transportation, stockpiling, dewatering, or backfill activities. The dust would be minimized by using aggregate and paved roadways as much as practical when transporting material or equipment, covering stockpiles or spraying them down on windy days, and covering exposed excavation areas with hydraulic mulch (composed of 100 percent recycled wood fibers).

The dredged sediment has the potential for odors. The construction site is generally 200 to 4000 ft from the nearest sensitive receptors located in residential areas. The contractor may submit an odor management plan that will define the methods for controlling nuisance odors that may reach neighboring communities. Residents in the adjacent neighborhoods would be notified about the Project, the intended duration, and points of contact for concerns or questions regarding dust and odors.

17. Noise

Describe sources, characteristics, duration, quantities, and intensity of noise generated during project construction and operation. Discuss the effect of noise in the vicinity of the project including 1) existing noise levels/sources in the area, 2) nearby sensitive receptors, 3) conformance to state noise standards, and 4) quality of life. Identify

measures that will be taken to minimize or mitigate the effects of noise.

The proposed Project may create periodic, temporary noise during construction activities. The construction site is generally 200 to 4,000 ft from the nearest sensitive receptors located in residential areas. The contractor would be required to comply with local noise ordinances and variances. Minnesota Rules 7030.0040, describe noise standards for limiting levels of sound established for public health and welfare. The residential area to the north of the site is classified as a Noise Area Classification (NAC) 1, therefore noise generated at the site that can be heard on a residential property falls under the NAC 1 requirements. NAC 1 requirements include a day time (7:00 AM to 10:00 PM) noise standard (measured in decibels [dBA]) of 60 to 65 dBA and a nighttime (10:00 PM to 7:00 AM) noise standard of 44 to 50 dBA. The residential area is separated from the construction area by a steep ridge which will help to minimize the travel of noise.

The contractor would be required to minimize noise effects by:

- Provide information to Morgan Park neighborhood on timing and schedule of major project elements regularly
- Noise management activities such as work sequencing, allocating certain operations to day-time only if other measures are not effective)
- Requiring proper functioning of equipment muffler systems
- Restricting idling time for inactive equipment to 15 minutes

Residents in the adjacent neighborhoods would be notified about the Project, the intended duration, expected noise levels, and points of contact for concerns or questions.

18. Transportation

a. Describe traffic-related aspects of project construction and operation. Include: 1) existing and proposed additional parking spaces, 2) estimated total average daily traffic generated, 3) estimated maximum peak hour traffic generated and time of occurrence, 4) indicate source of trip generation rates used in the estimates, and 5) availability of transit and/or other alternative transportation modes.

1) There is currently no designated parking in the Site. A 2.5 acre staging area would be provided for the Contractor's equipment, office trailer, and all personal vehicle parking. Post-construction, this staging area would be completely restored to approximately pre-construction site grades and include a thin soil cover meeting Minnesota Industrial Soil Reference Values.

   Access roads would be used to transport dredged/excavated sediment from removal areas to the onsite CDFs for disposal, to transport imported materials to staging areas, and to transport soil excavated and treated from the lead removal site to an approved offsite landfill. The project site includes existing access roads, some of which would be suitable for haul truck support while others will require improvements to stabilize the subgrade and subsurface soil or sediment. Other areas would require temporary access roads to support the contractor's equipment selection. The design includes

both improved and new access roads, but it would be the Contractor's responsibility to create stable and reliable access routes to project areas for their assumed array of equipment. Construction/improvement of access roads for this Project would not result in any permanent increase in impervious surface. Added materials (such as non-woven geotextile fabrics, surfacing aggregate, and compacted granular fill) for new or expanded roads would be removed post-construction. Additionally, there would be two project site entrances provided for all traffic to and from the site to utilize; both originating from State Highway 23. The first entrance is an existing paved road at the north end of the project site connecting to Idaho Street in Morgan Park and the second would be a new access road from the west of the project site that the Contractor would construct. The new west entrance would be constructed along an existing City of Duluth road easement for East Spur Road and would be removed following project completion.

2) Movement of crews, the collection of materials, refueling of vehicles, and transportation of material on and off the Site would generate some increased traffic. Material transportation off the site will occur over less than 30 days.
3) The majority of the traffic to and from the site would only occur at approximately 6:30 AM and 6:30 PM as crews arrive to work and then depart for the day. Other shifts would likely be less extensive as the daytime shift. The arrival time would be before daily rush hour and the departure time will be after the daily rush hour time, making the impact to traffic along Highway 23 minimal. Transportation of material to and from the site will only occur during normal business hours.
4) Normally less than 300 daily trips are anticipated with 75 personal vehicles and 10 construction truck vehicles (2 to 4 one-way trips).
5) A bus route has a stop less than 200 ft from the Site at 88th Ave and Idaho Street. The bus has pick up and drop off times that would work for crews during the weekdays.

b. Discuss the effect on traffic congestion on affected roads and describe any traffic improvements necessary. The analysis must discuss the project's impact on the regional transportation system.

If the peak hour traffic generated exceeds 250 vehicles or the total daily trips exceeds 2,500, a traffic impact study must be prepared as part of the EAW. **Use the format and procedures described in the Minnesota Department of Transportation's Access Management Manual, Chapter 5** ***(available at: http://www.dot.state.mn.us/accessmanagement/resources.html)*** **or a similar local guidance.**

It is not anticipated for this Project to generate an additional 250 vehicles, or 2,500 trips per day on affected roads and trails. During construction, 150 to 300 vehicle trips per day would be required for the crews to travel to and from the Site with approximately 75 vehicles. During the lead removal work, an additional 5-8 trips per day would be required to move material to the landfill on Gary Street. Material would also be brought to the site as needed throughout the Site but would not generate more than 10 additional vehicles in a workday. Excavated soils and

sediment would be managed and disposed of in onsite CDFs, these activities will not generate additional vehicles or trips. The number of trips is not expected to adversely affect local traffic.

c. Identify measures that will be taken to minimize or mitigate project related transportation effects.

Access routes from public roads would be evaluated for safety and operators of equipment turning onto and off public highways will use caution. Use of the most southern road suitable for truck traffic and near the USS site entrance, Idaho St., had been assumed. An additional construction entrance with direct connection to Highway 23 is under consideration in coordination with City of Duluth. No other additional measures would be needed to mitigate project-related transportation impacts. There are currently no construction projects planned for this stretch of Highway 23 that would cause bottlenecks or backups. Equipment operators would be responsible for abiding all posted speed limits, traffic signs, and load restrictions.

19. Cumulative potential effects:

a. Describe the geographic scales and timeframes of the project related environmental effects that could combine with other environmental effects resulting in cumulative potential effects.

Cumulative impacts may occur when there is a relationship between a proposed project and other actions expected to occur in a similar location or during a similar time period. This cumulative impact analysis considers activities occurring within the Project area as well as a broader geographic scope where potential plans may be sited or projects undertaken that would have impacts considered aggregately with Project impacts. The spatial boundaries were determined based upon the likely scope of impacts to specific resources within the Site. The geographic scope of the potential impacts to environmental and cultural resources is presented in Table 11.

Table 11. Geographic Extent of Potential Impact of the Spirit Lake Sediment Remediation Project

Resource	Scope of Impacts
Water Resources (wetlands, open water)	Watershed boundary (St. Louis River)
Biological Resources	Larger Spirit Lake/ St. Louis River habitat
Soils/sediment	Limits of Project Boundary
Vegetation	Limits of Project Boundary
Cultural Resources	Limits of Indirect APE (see EAW Item No. 14)
Aesthetics/Visual Resources	Limits of Indirect APE (see EAW Item No. 14)
Land Use	Limits of Project Boundary
Air Quality and Noise	One-half mile radius from Project Boundary

b. Describe any reasonably foreseeable future projects (for which a basis of expectation has been laid) that may interact with environmental effects of the proposed project within the geographic scales and timeframes identified above.

Response provided in conjunction with the response to EAW Item No 19c, below.

c. Discuss the nature of the cumulative potential effects and summarize any other available information relevant to determining whether there is potential for significant environmental effects due to these cumulative effects.

This cumulative impact analysis considers potential future conditions resulting from the Project in conjunction with other ongoing activities that will affect resources at the site. Cumulative effects are described in alignment with the description of the potential impacts in the previous sections of this EAW; that is in terms of geology and substrates, water resources, biological resources, air quality, noise, infrastructure, cultural resources and the aesthetics. Table 12 presents the known plans that have been produced or projects that have been proposed or completed within the past 5 years and within a one-mile radius of the Site. The actions considered in this analysis may vary from the Project in nature, magnitude, and duration, but will or have had impacts that contribute to cumulative impacts to the general area.

Remediation of Spirit Lake is identified in the St. Louis River AOC Remedial Action Plan (RAP) as a priority action critical to the removal of several BUIs within the AOC. Implementation of this project would utilize several strategies presented in the RAP that would facilitate removal of these BUIs; the resulting net beneficial ecological impacts of the Project are anticipated to align with the beneficial ecological impacts from the other actions slated to occur close to the Site (Table 12). The actions vary in implementation methods, but each aim to improve the aquatic habitats and substrate quality through the removal of contaminated material and enhancement of open water and wetland areas. Restoration cited to occur in Kingsbury Bay and in Mud Lake will also aim to restore hydrologic connectivity within their respective project areas.

When considered cumulatively with these projects, the actions undertaken for the Spirit Lake Project would result in improved fish and wildlife habitat and restored hydrologic connectivity (specifically in the Wire Mill Pond area), both of which are key strategies identified in the RAP update and are necessary to advance the removal of the Loss of Fish and Wildlife Habitat BUI for the St. Louis River AOC.

It is important to note that in conjunction with other nearby projects occurring within the AOC, the Spirit Lake Project would contribute to short-term adverse impacts resulting from the burial of benthic communities during construction activities, clearing of vegetation, and impacts on air quality and noise. Increased turbidity from the Spirit Lake project would also contribute to short-term adverse impacts to water quality in conjunction with the same impacts from other AOC remediation and restoration projects. This turbidity increase may contribute to negative impacts on water column organisms and covering of submerged plants; however, the impacts from this Project will be short-term and would not permanently contribute to reduced water quality conditions in the project area or within the larger AOC area. The impacts to air quality and noise are anticipated to occur only during the construction seasons for the projects and would therefore have limited potential for cumulative effects. Impacts to benthic communities, while likely representing a permanent loss in individuals, are anticipated to be short-term as the communities should recover quickly and the overall habitat of the area would be improved. Clearing activities

performed during the Spirit Lake Project would result in a negative contribution to impacts on vegetation in the general area; however, the Project will introduce overall net ecological benefit to the area, by remediating and/or improving substrates to enhance and create healthy wetland communities.

The impacts of the Spirit Lake Project should also be considered in light of current plans introduced by the City of Duluth for the trail systems present along the St. Louis River corridor and improve habitat along the western waterfront area. These plans outline a path forward for improving Duluth's trail system both along the river corridor and inland. Completion of activities suggested in these plans would renew existing trails through re-paving/grading and widening to allow for more combined uses of walkers, bikers, and equestrians. Several plans consider implementation areas that extend to within one mile of the Site. When considered cumulatively with the likely future impacts of these trail and habitat restoration plans, the actions undertaken for the Spirit Lake Project would contribute to improved natural habitats capable of supporting future recreational uses, removal of hazardous contaminated material, and improvement of the connection between ecological habitats at the Site.

Table 12. Plans and Projects Considered in Evaluation of Cumulative Impacts

Project or Plan Considered	Past, Present, or Reasonably Foreseeable Future?	Description and Location/Proximity to the Site	Anticipated Contribution to Cumulative Impacts	Anticipated Impact Type
St. Louis River Remedial Action Plan (RAP) Stage II Update (2013)	Present and foreseeable future	Plan update presents a roadmap to BUI removal within the St. Louis River AOC and actions needed to achieve removal. Actions to be conducted or recently conducted within one mile of the Site are discussed below.	Suggested actions to occur within Spirit Lake or nearby areas for BUI removal will contribute cumulative impacts to all resource areas evaluated.	Overall net beneficial impacts on water resources, biological resources, soils/sediment, vegetation, and aesthetics. Overall short-term adverse impacts on resources from construction activities.
Radio Tower Bay Restoration *(included in the St. Louis River RAP update)*	Past- construction completed in 2015	Restoration of a 75-acre shallow wetland to remove logging waste and improve fish and wildlife habitat. Phase I removed logging debris and Phase II created sheltered bay bathymetry and restored vegetation beds. Proximity: within one mile from the Site	Water resources • Open water • Emergent vegetation Geology and soils Biological resources Vegetation (submerged and emergent) Aesthetics/visual resources	Short-term adverse temporary impacts on air quality and noise from construction equipment. Short-term adverse impact on benthic communities from burial during construction/fill actions. Overall net benefit to water resources, sediment and soils, vegetation, and biological resources from increased and improved habitats.

Project or Plan Considered	Past, Present, or Reasonably Foreseeable Future?	Description and Location/Proximity to the Site	Anticipated Contribution to Cumulative Impacts	Anticipated Impact Type
			Air Quality and Noise	Contributes to the removal of BUIs presented in the Remedial Action Plan Update.
Kingsbury Bay and Grassy Point Restoration *(included in the St. Louis River RAP Update)*	Future (projected completion 2020)	Restoration of shallow sheltered bay through: • excavation of deposited sediment at mouth of the bay • enhancement of hydrologic connection of the wetland complex Proximity: within 1 mile from the Site	Water resources • Wetlands • Open water Soils/sediment Biological resources Vegetation (submergent and emergent) Aesthetics/visual resources Land use Air Quality and Noise	Short-term adverse temporary impacts on air quality and noise from construction equipment. Short-term adverse impact on benthic communities from burial during construction/fill actions. Overall net benefit on water resources, sediment and soils, vegetation, and biological resources from increased and improved wetland habitat and hydrologic function. Contributes to the removal of BUIs presented in the Remedial Action Plan Update.
Mud Lake Restoration	Future (projected completion 2022)	Mud Lake is a shallow sheltered bay on the Minnesota side of the	Water resources • Wetlands	Short-term adverse temporary impacts on air

Project or Plan Considered	Past, Present, or Reasonably Foreseeable Future?	Description and Location/Proximity to the Site	Anticipated Contribution to Cumulative Impacts	Anticipated Impact Type
(included in the St. Louis River RAP Update)		estuary downstream of the Oliver Bridge and adjacent to the former U. S. Steel property. Goals of the restoration are to: • Re-establish hydrologic connection • Enhance wetlands for migratory birds • Establish wild rice beds • Create deep water angling area for recreational use • Remove contaminated material	• Open water Soils/sediment Biological resources Vegetation (submergent and emergent) Aesthetics/visual resources Land use Air Quality and Noise	quality and noise from construction equipment. Short-term adverse impact on benthic communities from burial during construction/fill actions. Overall net benefit on water resources, sediment and soils, vegetation, and biological resources from increased and improved wetland habitat and hydrologic function. Contributes to the removal of BUIs presented in the Remedial Action Plan Update.
Knowlton Creek Restoration	Past- completed in 2017	Reduce sedimentation and restore coldwater stream habitat Proximity: within 1 mile of the Site	Water resources • Stream habitat Soils/sediment Biological resources Vegetation	Short-term adverse temporary impacts on air quality and noise from construction equipment. Short-term adverse impact on benthic communities from burial during

Project or Plan Considered	Past, Present, or Reasonably Foreseeable Future?	Description and Location/Proximity to the Site	Anticipated Contribution to Cumulative Impacts	Anticipated Impact Type
			(submergent and emergent) Aesthetics/visual resources Land use Air Quality and Noise	construction Overall net benefit on water resources, sediment and soils, vegetation, and biological resources
City of Duluth Trail Master Plans	Foreseeable future	Multiple trail plans designed to layout overall principles of trail and bikeway development in the St. Louis River Corridor and to guide Duluth toward becoming a "trail destination" city. Plans include: • St. Louis River Corridor Trails Plan (2016) • Duluth Trail Master Plan • St. Louis River Water Trail Master Plan • Western Waterfront Trail Mini Master Plan (2016) Outcomes of these plans will include: • Restoration and renewal of various existing trails, extending from Duluth south	Land Use Aesthetics/visual resources Soils/sediment Vegetation Air Quality and Noise	Overall short-term adverse impacts on resources from re-paving of trails, stabilization activities, etc. Beneficial impact on land use and aesthetics by way of improved trail condition, improved access and increased recreational opportunities. Improved stabilization of soils around trails; replanting of vegetation.

Project or Plan Considered	Past, Present, or Reasonably Foreseeable Future?	Description and Location/Proximity to the Site	Anticipated Contribution to Cumulative Impacts	Anticipated Impact Type
		to the project area • Increasing access and recreation in the area • Improving stormwater infrastructure around trails and improving ecologically sensitive areas and habitats Proximity: areas included in plans are within one mile of the Site		
Western Waterfront Habitat Restoration Plan (2016)	Foreseeable future	Plan to restore native vegetation and stabilize banks along the 3.5 miles of shoreline between Tallus Bay and Kingsbury Creek. Proximity: southern portion of plan action area is within one mile of the Site	Water resources • St. Louis river and wetland habitat Biological resources Vegetation Soils/sediment Aesthetics/visual resources Air Quality and Noise	Overall short-term adverse impacts on air quality and noise from any equipment used for stabilization activities Beneficial impacts on water resources, aquatic and terrestrial species, vegetation, and soil/sediment from improved habitat conditions for foraging, nesting, etc. Beneficial impacts on aesthetics through improvement of visual

Project or Plan Considered	Past, Present, or Reasonably Foreseeable Future?	Description and Location/Proximity to the Site	Anticipated Contribution to Cumulative Impacts	Anticipated Impact Type
				appeal of the habitat/restoration of natural landscape.

20. Other potential environmental effects: If the project may cause any additional environmental effects not addressed by items 1 to 19, describe the effects here, discuss the how the environment will be affected, and identify measures that will be taken to minimize and mitigate these effects.

There are no additional potential environmental effects anticipated from the Project.

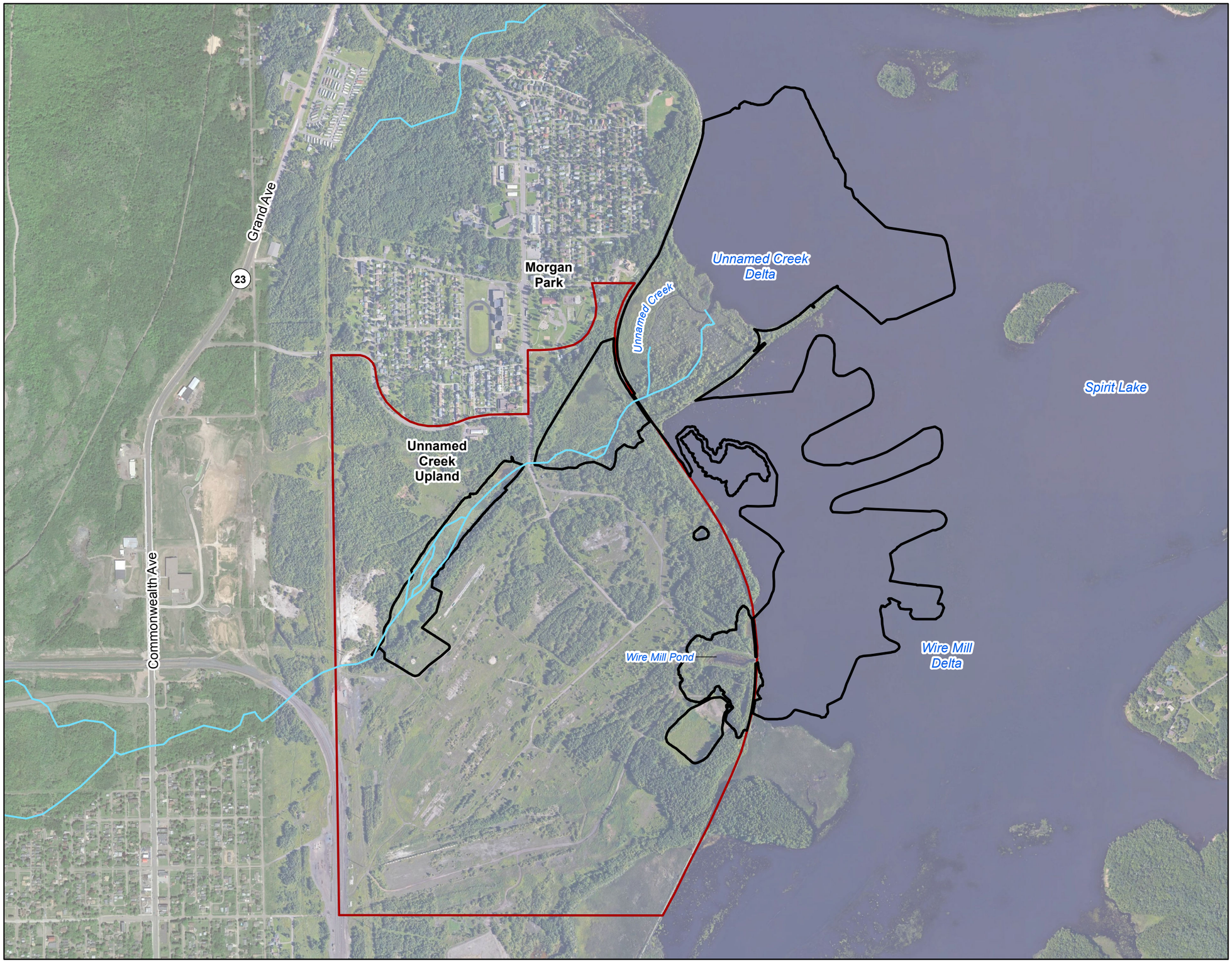
RGU CERTIFICATION. *(The Environmental Quality Board will only accept **SIGNED** Environmental Assessment Worksheets for public notice in the EQB Monitor.)*

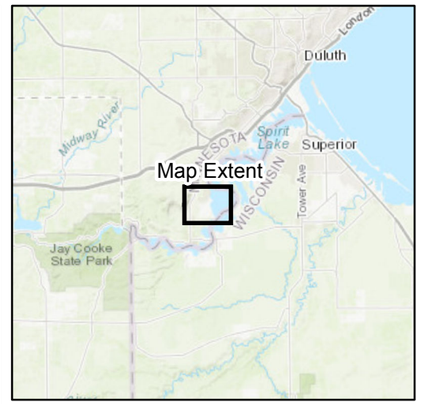
I hereby certify that:

- The information contained in this document is accurate and complete to the best of my knowledge.
- The EAW describes the complete project; there are no other projects, stages or components other than those described in this document, which are related to the project as connected actions or phased actions, as defined at Minnesota Rules, parts 4410.0200, subparts 9c and 60, respectively.
- Copies of this EAW are being sent to the entire EQB distribution list.

Signature _____ Date _____

Title _____





Legend

- Project Boundary
- Approximate U.S. Steel Property (URS, 2008)

Hydrology

- Creek

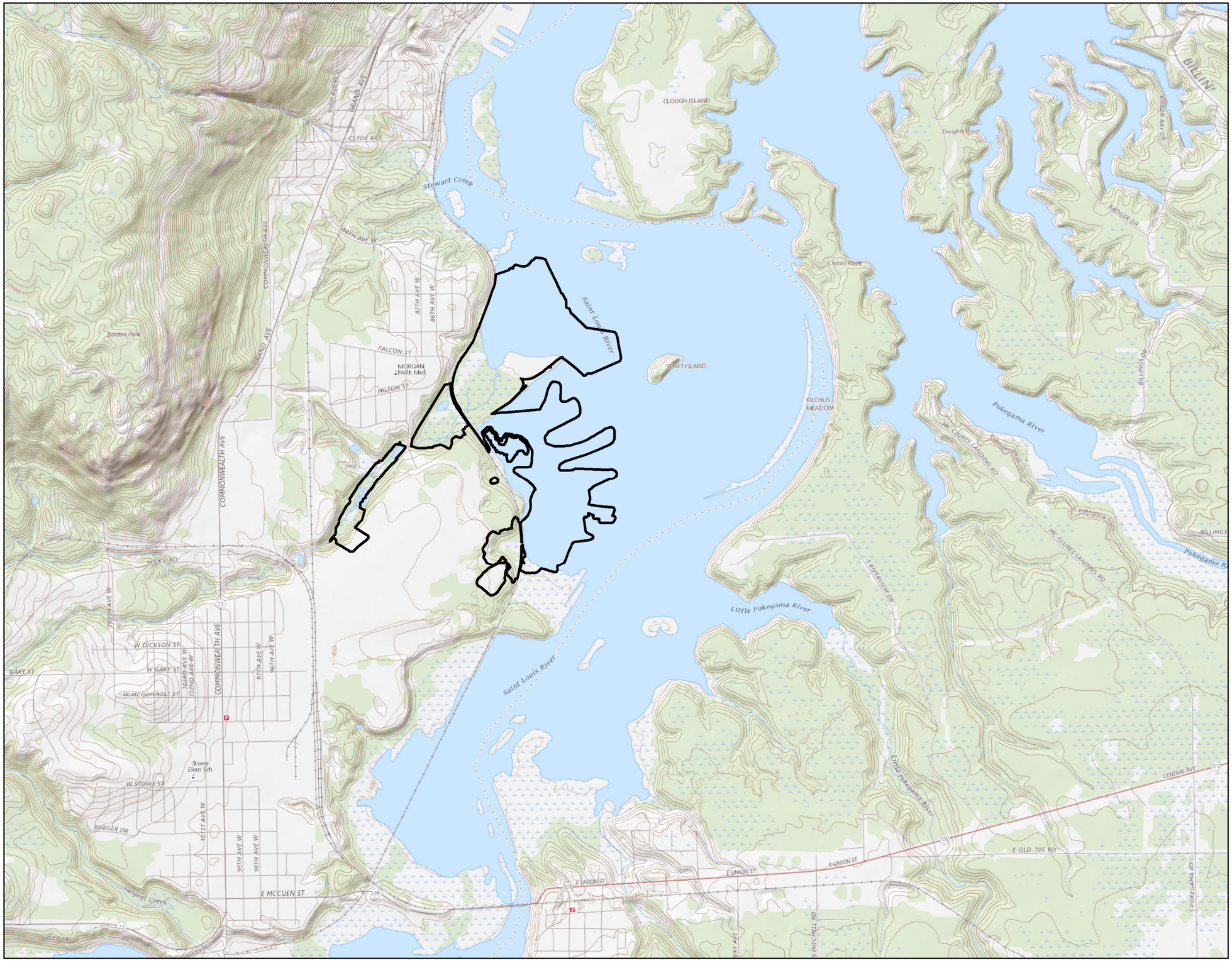
0 500 1,000
Feet

N

Map Date: 5/29/2019
Base Map: Google Earth 2017
Rivers: USGS NHD 2013

Figure 1
Spirit Lake Site Location
Spirit Lake EAW
Duluth, Minnesota

Document Path: \\lovetongis\GISdata\Federal\Midwest\Minnesota\SpiritLake\MXD\RemedialDesign\JPA\Figure X-X Spirit Lake Site Layout.mxd



Legend

Project Boundary

0 0.5

Miles

Map Date: 5/30/2019
Topo: USGS 2013

FIGURE 2
USGS Topographic Map
Spirit Lake
Duluth, Minnesota
Environmental Assessment Workplan

\\lovetongis\GISdata\Federal\Midwest\Minnesota\SpiritLake\MXD\RemedialDesign\EAW\Figure 2 USGS Topo Map.mxd

VICINITY MAP

Legend

- Approximate Location of St. Louis River Channel, Based on Orthophoto Interpretation
- Approximate U.S. Steel Property (URS, 2008)
- Approximate Outer Study Area Limit
- Operable Unit
- State Boundary

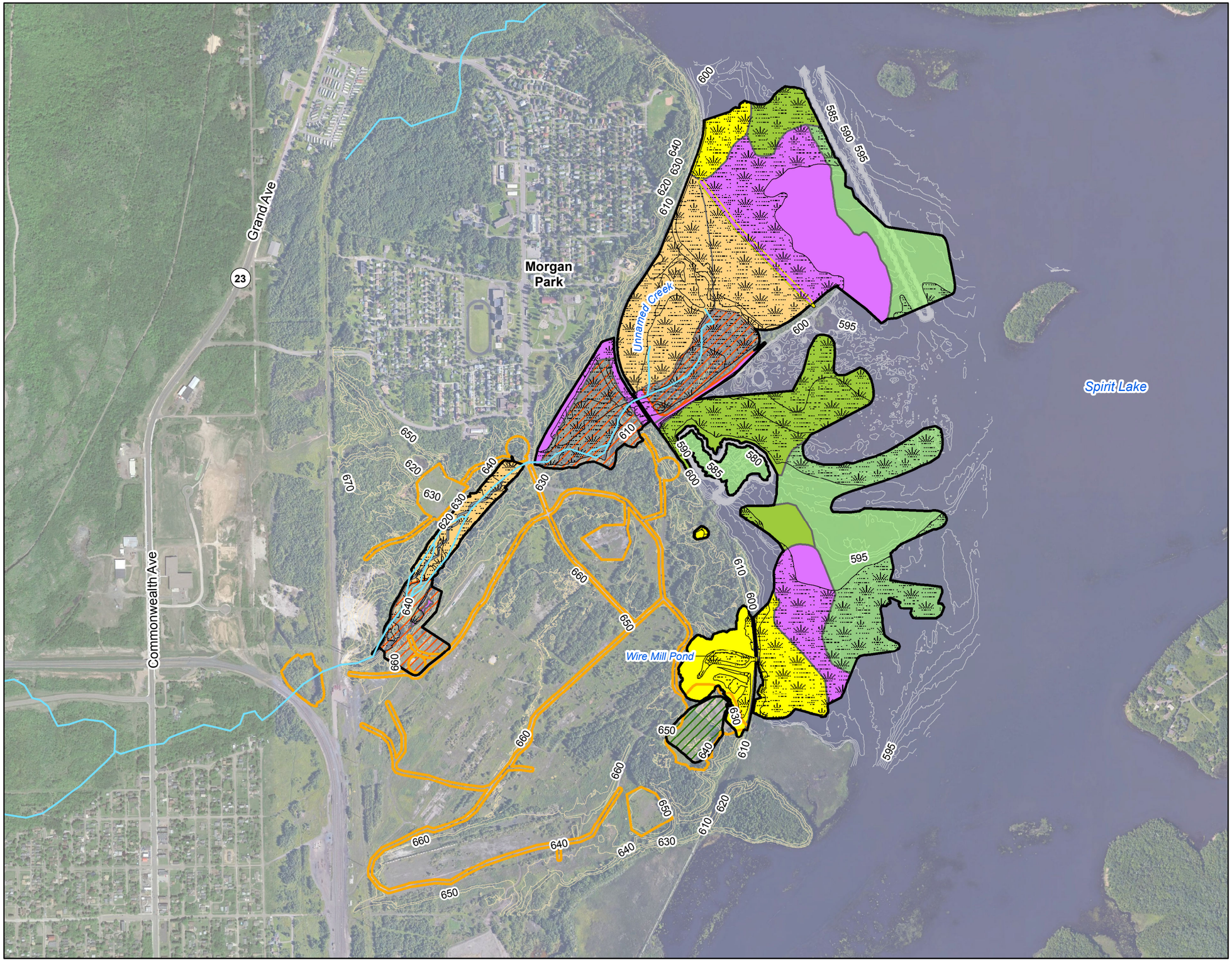
Map Date: 6/12/2019
Base Map: Google Earth 2017
Project Data: Barr 2014

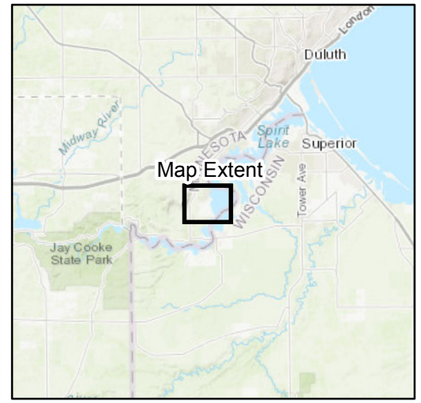
N

0 500 1,000
Feet

Figure 3
Project Site Layout
Spirit Lake EAW
St. Louis River, Duluth, Minnesota

\\lovetongis\GIS\data\Federal\Midwest\Minnesota\SpiritLake\MXD\RemedialDesign\Basis of DesignReport\Figure 1-2 Project Site.mxd





Legend

- Elevation Contours (10 ft)
- Bathymetry Contours (1 ft)
- Potential Area of Temporary Effects
- Shoal Feature
- Project Boundary
- Borrow
- CDF
- Drainage Feature
- Dredge
- Dredge to Set Elevation and Remedial Cap
- ENR Thin Cover
- Remedial Cap
- Monitored Natural Recovery (MNR) Area

Hydrology

- Creek
- Wetland

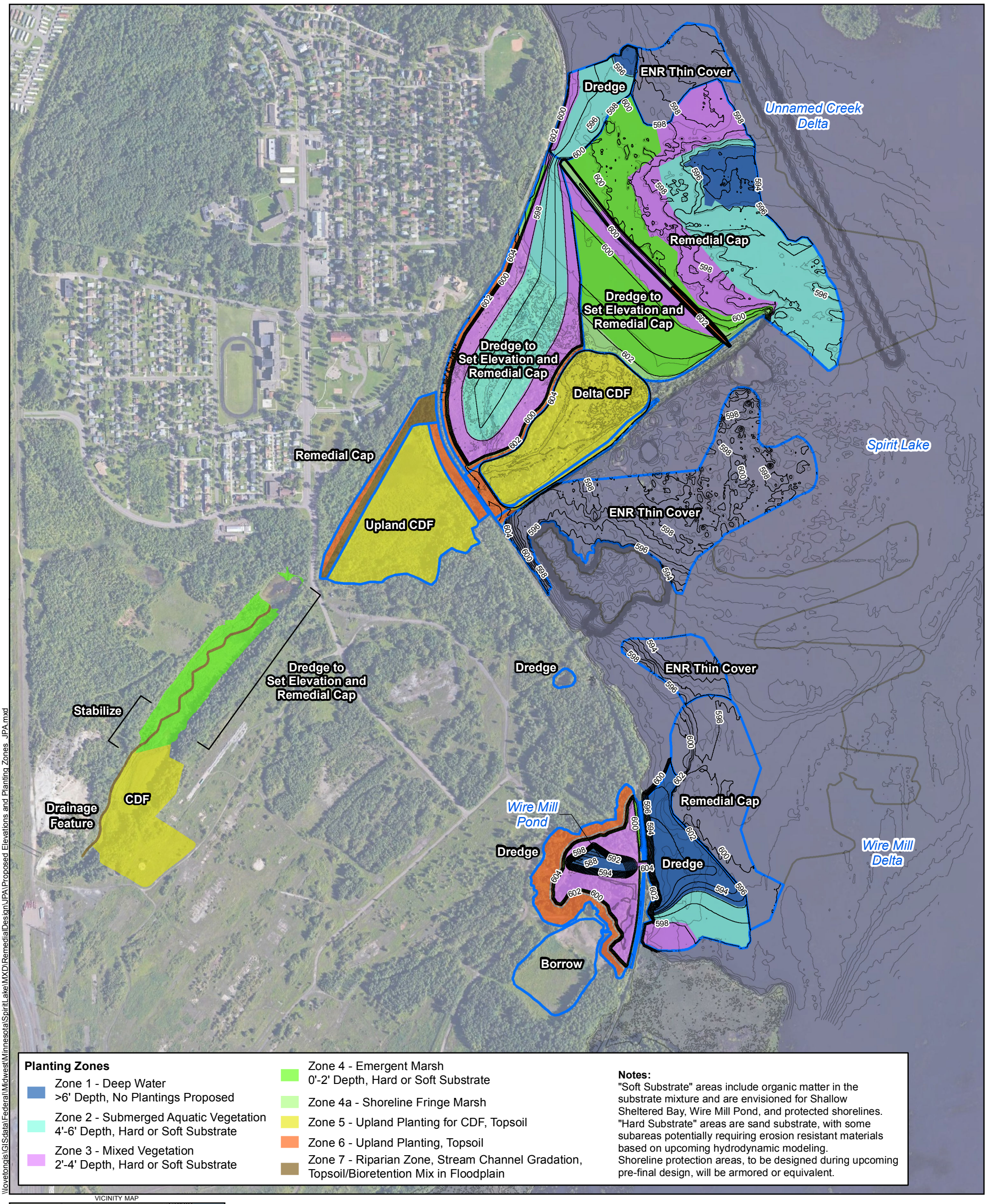
0 500 1,000
Feet

N

Map Date: 6/21/2019
Base Map: Google Earth 2017
Rivers: USGS NHD 2013
Wetlands: Barr 2014, U.S. Steel 2014
Topography/Bathymetry: EA Engineering 2017

Figure 4
Spirit Lake Design Summary
Spirit Lake EAW
Duluth, Minnesota

Document Path: \\lovetongis\GISdata\Federal\Midwest\Minnesota\SpiritLake\MXD\RemedialDesign\JPA\Figure X-X Spirit Lake Design Summary.mxd



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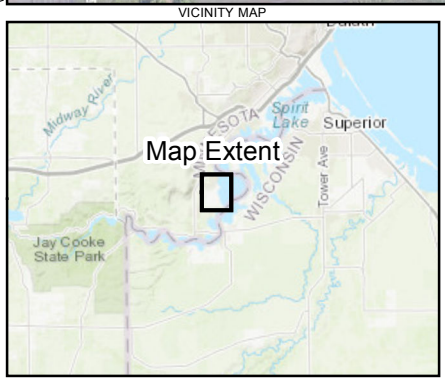
VICINITY MAP



Legend

- Existing Elevation (IGLD85 feet)
- Proposed Elevation (IGLD85 feet)
- Shoal Feature
- Remedial Design Area (Design Type Labeled in Figure)
- Monitored Natural Recovery (MNR) Area

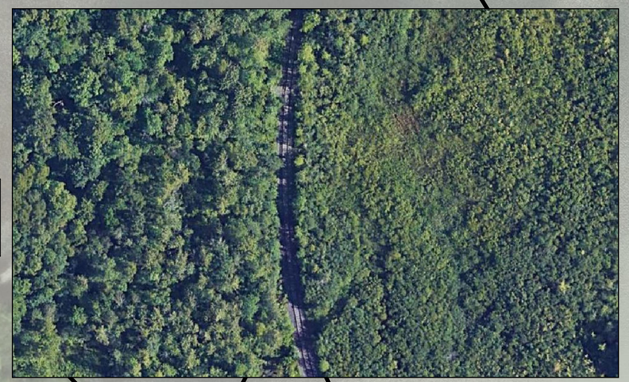
0 500 1,000
Feet

N

Notes:
Elevation values are in vertical datum IGLD85 US feet
OHWL = 602.8 ft
OLWL = 601.0 ft
CDF = Confined Disposal Facility
ENR = Enhanced Natural Recovery

Figure 5
Proposed Elevations and Planting Zones
Spirit Lake EAW
St. Louis River, Duluth, Minnesota

Map Date: 6/21/2019
Source: Google Earth 2017
Projection: NAD 1983 State Plane Minnesota North Foot US



Area 1
Temporary Impact
Rail Stop
Chain Link Fence

Area 2
Temporary Impact
Truck Crossing = 20'

Area 3
Permanent Impact
Install Bridge:
Bridge (50')
Bridge Install (40')
Total = 90'
Temporary Impact
Temporary Water Division

Area 4
Temporary Impact
Rail Taper to Bridge Elevation = 260'

Area 5
Temporary Impact
Culvert Abandonment = 35'

Area 6
Permanent Impact
New At-Grade Crossing
Temporary Impact
Truck Crossing = 20'

Spirit Lake

Legend

- Railroad
- Project Boundary
- Permanent and Temporary Impacts

Note:
Any impacted railroad will be restored to previous condition. The railroad ties and rail steel will be reused whenever possible.

For impact Area 3, no photo showing the railroad in the exact location was available. Photo presented shows the track just north of the impact area. The railroad at the impact area is in similar condition to the track shown in the photo.

N

0 1,000

Feet

Map Date: 2/7/2019
Base Map: ESRI 2016

Figure 6a
Permanent and Temporary Railroad Impacts- North
Spirit Lake
Duluth, Minnesota

Document Path: \\lovetongis\GISdata\Federal\Midwest\Minnesota\SpiritLake\MXD\RemedialDesign\SHPO\Figure 1.mxd

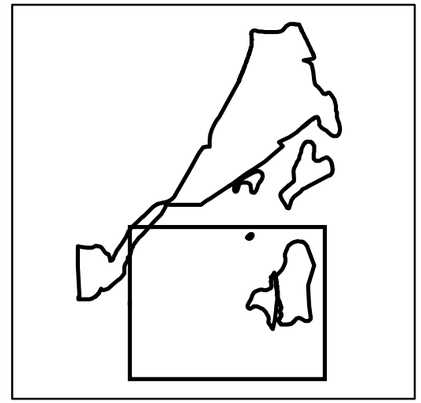
Area 7
Temporary Impact
Truck Crossing = 20'

Area 8
Permanent Impact
Install Bridge:
Bridge (55')
Bridge Install (40')
Total = 95'

Area 9
Temporary Impact
Chain Link Fence

Spirit Lake

Wire Mill Pond



Legend

- Railroad
- Project Boundary
- Permanent and Temporary Impacts

Note:
Any impacted railroad will be restored to previous condition. The railroad ties and rail steel will be reused whenever possible.

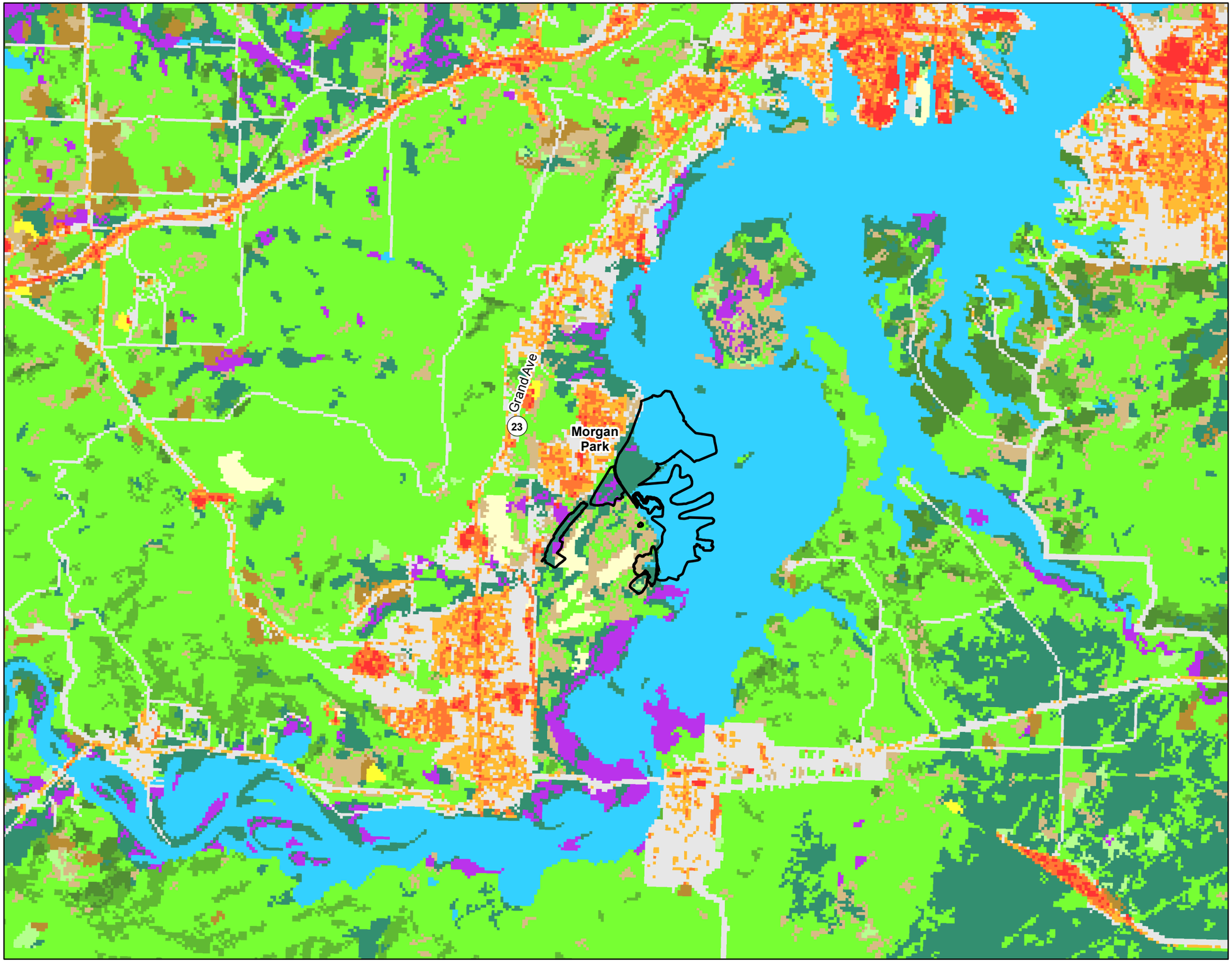
0 800

Feet

Map Date: 2/7/2019
Base Map: ESRI 2016

Figure 6b
Permanent and Temporary Railroad Impacts- South
Spirit Lake
Duluth, Minnesota

Document Path: \\lovetongis\GISdata\Federal\Midwest\Minnesota\SpiritLake\MXD\RemedialDesign\SHPO\Figure 2.mxd



Legend

Project Boundary

Land Cover

- Woody Wetlands
- Shrub/Scrub
- Open Water
- Mixed Forest
- Herbaceuous
- Hay/Pasture
- Evergreen Forest
- Emergent Herbaceuous Wetlands
- Developed, Open Space
- Developed, Medium Intensity
- Developed, Low Intensity
- Developed, High Intensity
- Deciduous Forest
- Cultivated Crops
- Barren Land

N

0 1

Miles

Map Date: 5/29/2019
Base Map: ESRI 2017
Other Data: USGS NLCD 2011

FIGURE 7
Land Cover Map
Spirit Lake
Duluth, Minnesota
Environmental Assessment Workplan

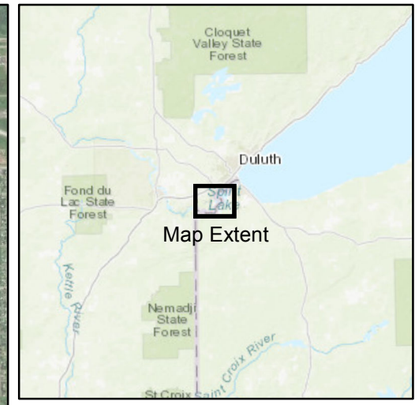
\\lovetongis\GISdata\Federal\Midwest\Minnesota\SpiritLake\MXD\RemedialDesign\EAW\Figure 7 Land Cover Map.mxd

TO BE UPDATED

Grand Ave

23

Morgan Park



Legend

Project Boundary

Zoning

- Industrial General
- Industrial Waterfront
- Mixed Use Business Park
- Mixed Use Institutional
- Mixed Use Neighborhood
- Mixed Use Planned
- Park and Open Space
- Residential Planned
- Residential Traditional
- Residential Urban
- Rural Conservation
- Rural Residential 1

N

0 1

Miles

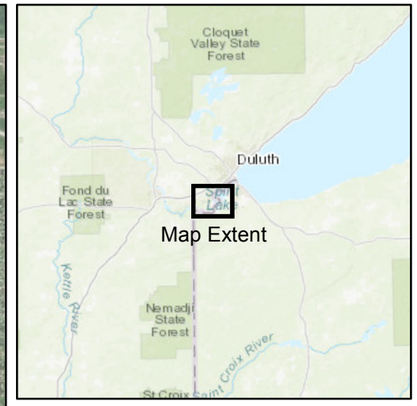
Map Date: 5/29/2019
Base Map: ESRI 2017
Other Data: City of Duluth 2019

FIGURE 8
Zoning Map
Spirit Lake
Duluth, Minnesota
Environmental Assessment Workplan

\\lovetongis\GISdata\Federal\Midwest\Minnesota\SpiritLake\MXD\RemedialDesign\EAW\Figure 8 Zoning Map.mxd

TO BE UPDATED

Grand Ave
23
Morgan Park



Legend

Project Boundary

Future Land Use

- Commercial Waterfront
- General Industrial
- General Mixed Use
- Industrial Waterfront
- Institutional
- Light Industrial
- Low-density Neighborhood
- Medical District
- Neighborhood Commercial
- Neighborhood Mixed Use
- Preservation
- Recreation
- Rural Residential
- Traditional Neighborhood
- Urban Residential

N

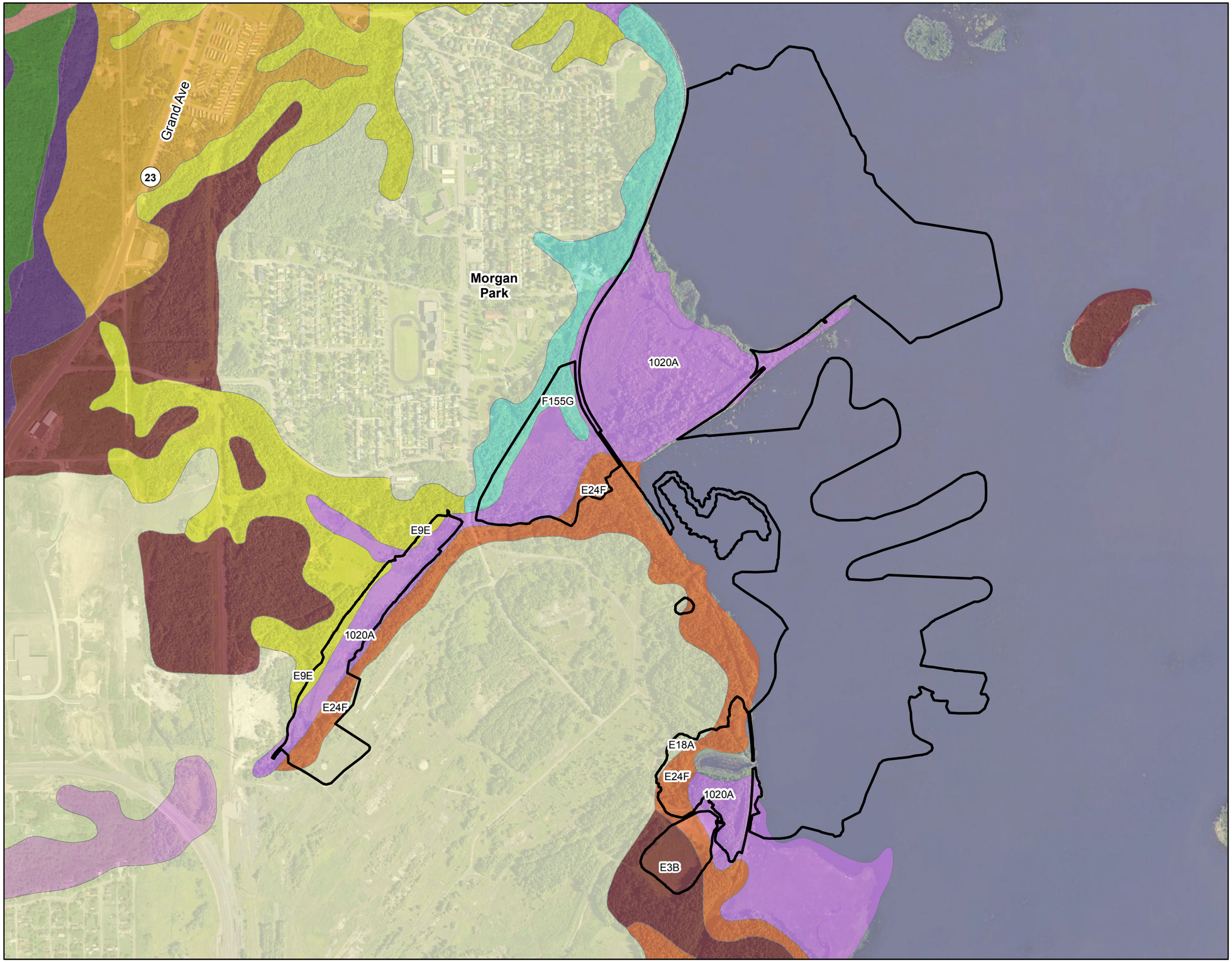
0 1

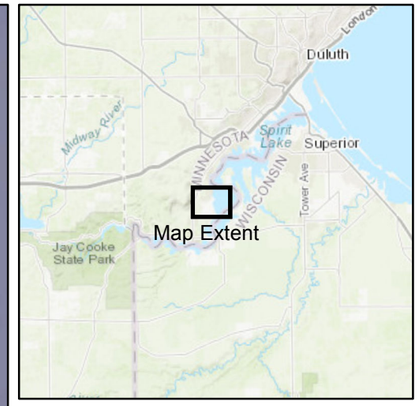
Miles

Map Date: 5/29/2019
Base Map: ESRI 2017
Other Data: City of Duluth 2019

FIGURE 9
Future Land Use Map
Spirit Lake
Duluth, Minnesota
Environmental Assessment Workplan

\\lovetongis\GISdata\Federal\Midwest\Minnesota\SpiritLake\MXD\RemedialDesign\EAW\Figure 9 Future Land Use Map.mxd





Legend

- Project Boundary
- (F148F) Ahmeek-Rock Outcrop-Fluvaquents
- (E14D) Barto, Stony-Greysolon-Rock Outcrop Complex
- (1020A) Bowstring and Fluvaquents
- (E3A, E3B) Cuttre Complex
- (E7B) Cuttre Silt Loam
- (E24F) Miskoaki-Cuttre Complex
- (E9E) Miskoaki-Fluvaquents
- (E23F) Miskoaki-Udifluvents
- (F160F) Rock Outcrop-Mesaba-Barto Complex
- (F155G) Udalfs-Eutrudepts Complex
- (E18A) Urban Land-Cuttre-Rock Outcrop Complex

N

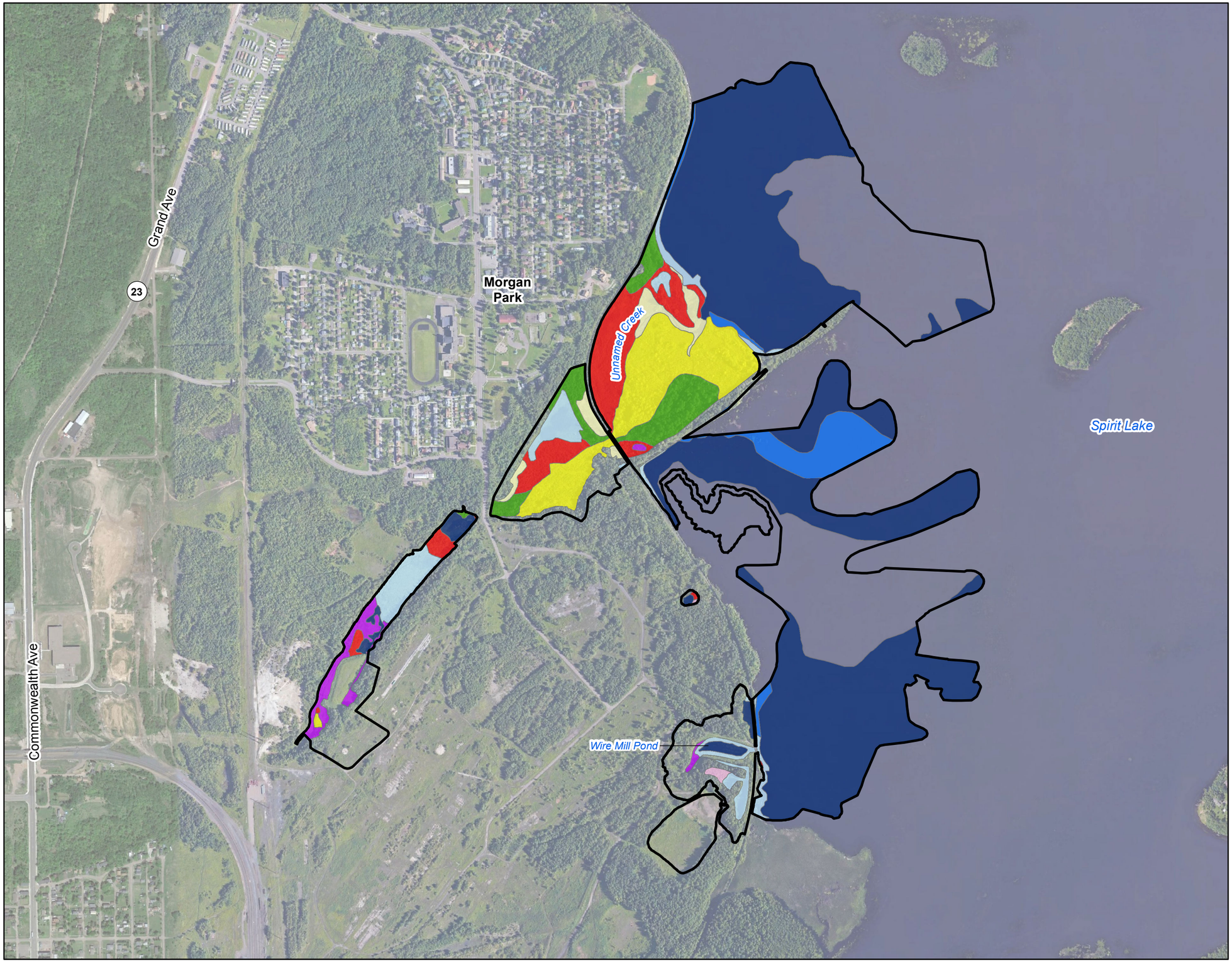
0 1,000

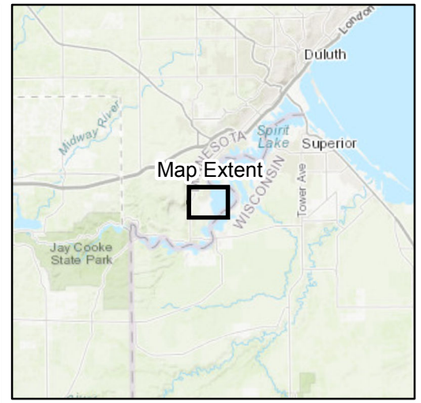
Feet

Map Date: 5/29/2019
Base Map: Google Earth 2017
Other Data: USDA 2014

FIGURE 10
Soils Map
Spirit Lake
Duluth, Minnesota
Environmental Assessment Workplan

\\lovetongis\GISdata\Federal\Midwest\Minnesota\SpiritLake\MXD\RemedialDesign\EAW\Figure 10 Soils Map.mxd





Legend

- Project Boundary

Wetland Type

- Alder Thicket
- Deep Marsh
- Floodplain Forest
- Fresh Wet Meadow
- Hardwood Swamp
- Sedge Meadow
- Shallow Marsh
- Shallow Open Water
- Shrub Carr

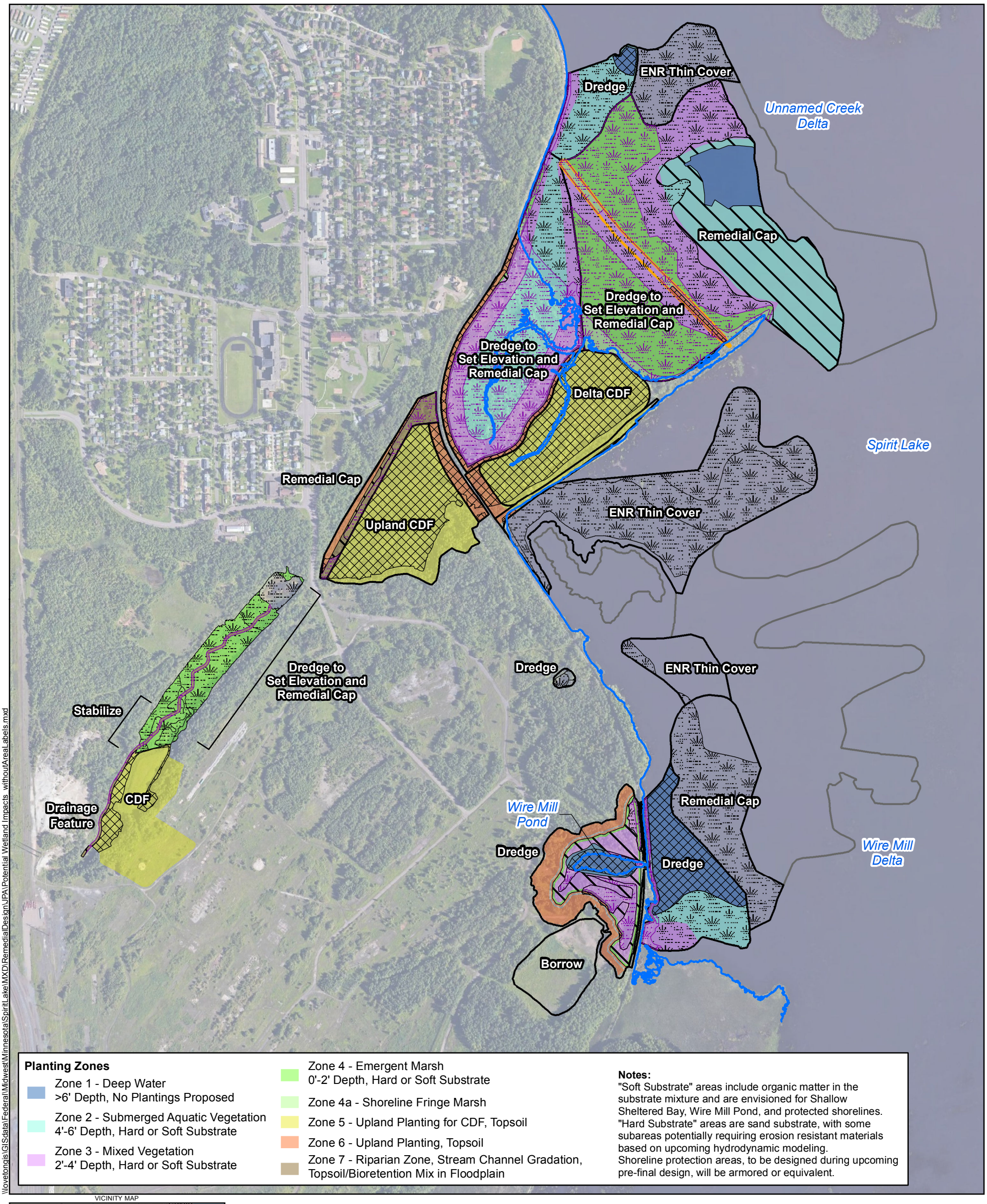
0 500 1,000
Feet

N

Map Date: 5/29/2019
Base Map: Google Earth 2017 Wetlands: Barr 2014
U.S. Steel 2014

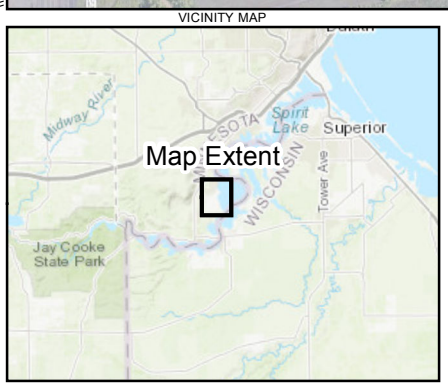
Figure 11
Wetland Types
Spirit Lake EAW
Duluth, Minnesota

Document Path: \\lovetongis\GISdata\Federal\Midwest\Minnesota\SpiritLake\MXD\RemedialDesign\JPA\Figure X-X Wetland Types.mxd



\\lovetongis\GISdata\Federal\Midwest\Minnesota\Spirit Lake\MXD\RemedialDesign\JPA\Potential Wetland Impacts withoutAreaLabels.mxd

VICINITY MAP



0 500 1,000
Feet

N

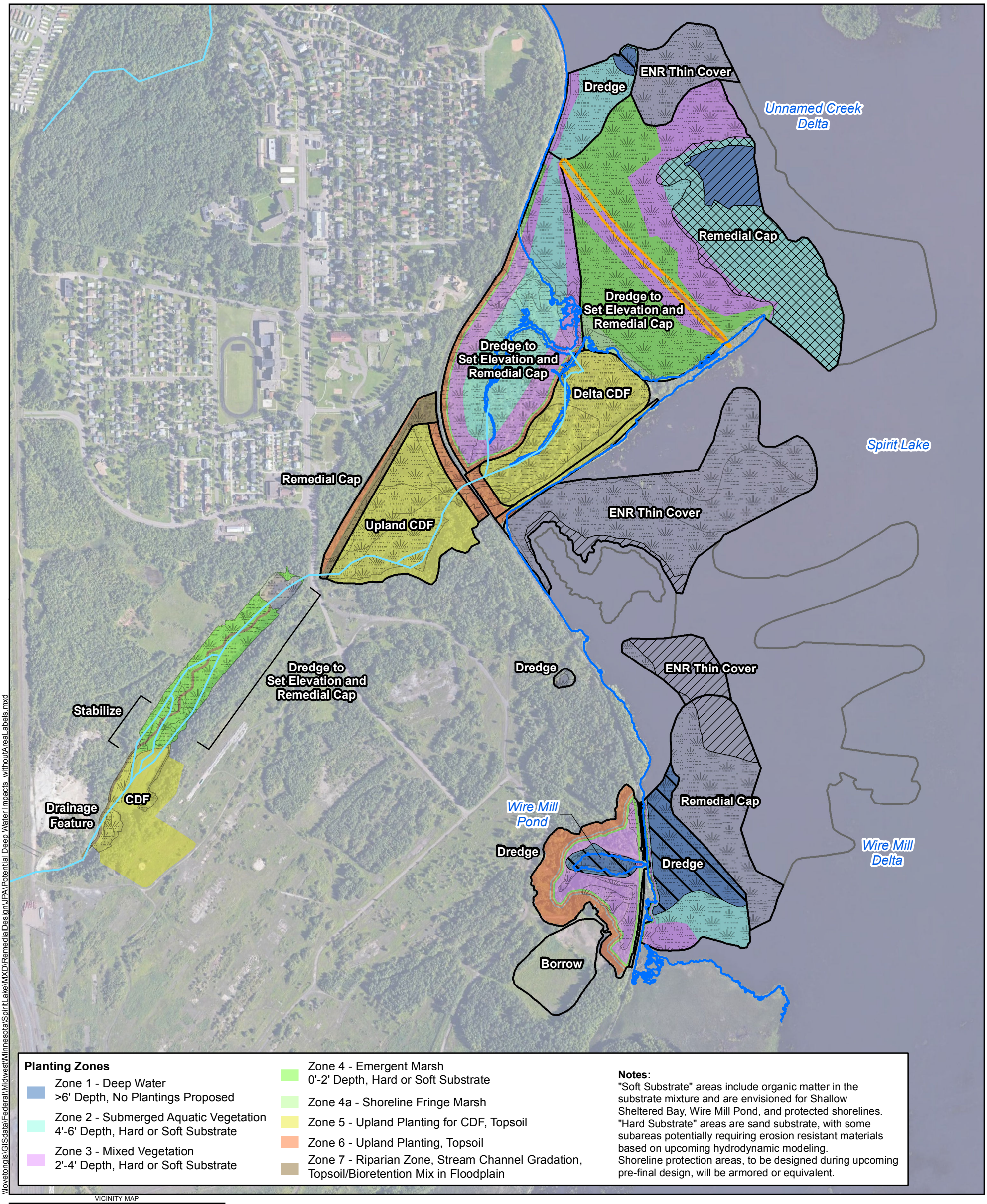
Legend

- Ordinary High Water (OHW) (602.8 ft IGLD85)
- Shoal Feature
- Remedial Design Area (Design Type Labeled in Figure)
- Monitored Natural Recovery (MNR) Area
- Temporary Wetland Impact
- Change to Desired Wetland Type
- Wetland Loss
- Wetland Creation

Note: Wetlands within the MNR areas are not shown.

Figure 12
Potential Wetland Impacts
Spirit Lake EAW
St. Louis River, Duluth, Minnesota

Map Date: 6/21/2019
Source: Google Earth 2017
Projection: NAD 1983 State Plane Minnesota North Foot US



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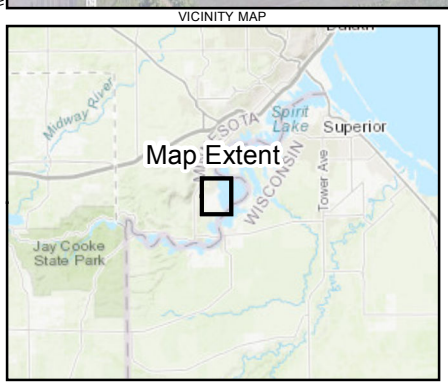
VICINITY MAP



0 500 1,000
Feet

N

Legend

- Stream
- Ordinary High Water (OHW) (602.8 ft IGLD85)
- Shoal Feature
- Remedial Design Area (Design Type Labeled in Figure)
- Monitored Natural Recovery (MNR) Area
- Wetland
- Deep Water (>6') Temporary Impact
- Deep Water (>6') Loss
- Deep Water (>6') Creation

Figure 13
Potential Deep Water Impacts
Spirit Lake EAW
St. Louis River, Duluth, Minnesota

Map Date: 6/21/2019
Source: Google Earth 2017
Projection: NAD 1983 State Plane Minnesota North Foot US