LOWER MINNESOTA RIVER
WATERSHED DISTRICT

Executive Summary for Action

Lower Minnesota River Watershed District Board of Managers Meeting
Wednesday, November 18, 2020

Agenda Item
Item 5. B. - City of Burnsville Trail Improvement Project

Prepared By
Linda Loomis, Administrator

Summary
The City of Burnsville informed the LMRWD of a project they are planning for a segment of trail that crosses the MN River at the new I-35W Bridge. The city's goal is to raise the trail to reduce the length of closures due to flooding. They expect to receive federal funding for the project and have asked the LMRWD if it is interested in partnering with the City. Construction is planned for 2024.

Staff has not yet reviewed the feasibility report, but a response was sent to the City informing them that if the District became a partner in the project, the project would need to be added to the District's Plan. The city was also informed that a permit from the District would be required, since the City has not yet applied for a municipal permit and that a portion of the project falls within a High Value Resource area of the DIstrict.

Staff is asking the Board to provide direction as to whether or not the District should become a partner on this project.

Attachments
Black Dog Trail Flood Mitigation Feasibility Study dated March 6, 2020

Recommended Action
Provide direction to staff

Black Dog Trail Flood Mitigation Feasibility Study

Minnesota River Greenway

Burnsville, Minnesota

BURNS 153788 | March 6, 2020

SEH

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March 6, 2020

RE: Black Dog Trail Flood Mitigation Feasibility Study
Minnesota River Greenway
SEH No. BURNS 153788 4.00

Ms. Jen Desrude, City Engineer
City of Burnsville
100 Civic Center Parkway
Burnsville, Minnesota 55337

Dear Ms. Desrude:

Attached is the Black Dog Trail Flood Mitigation Feasibility Study. This report is intended to provide a summary of the recommended geotechnical, hydraulic, and other stakeholder and agency permitting efforts and considerations needed to aid in the planning for final design of the potential trail raise project. SEH evaluated six concepts for the trail raise and developed opinions of probable cost for each.

Please feel free to contact me if you have any questions or require additional information.

Sincerely,

Emily Jennings

Emily Jennings, PE
Project Manager
(Lic. MN)

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Black Dog Trail Flood Mitigation Feasibility Study

Minnesota River Greenway

Prepared for City of Burnsville

1 Project Location

The Black Dog Trail is part of the Minnesota River Greenway, a paved trail that runs from just south of the Minnesota River adjacent to I-35W in Burnsville, Minnesota to the southern bank of the Minnesota River along West Black Dog Road. This regional trail is ultimately planned to travel 17 miles through Burnsville, Eagan, Mendota Heights, Mendota and Lilydale before ending at St. Paul's Lilydale Regional Park.

Additionally, the trail offers commuters an opportunity to cross the Minnesota River over the I-35W Bridge towards Bloomington, which provides access to the future Minnesota Valley State Trail and multiple trail loop opportunities within the river valley.

The trail is paved and trail use consists of bicycling and walking. There is a nearby trailhead located at Minnesota Riverfront Park that offers amenities such as picnic tables, a grilling area, a bicycle repair station and a parking lot.

The study area for this project includes a segment of the trail located from the northbound exit taper of the I-35W and West Black Dog Road intersection to the trail's convergence with Black Dog Road, running adjacent to Black Dog Lake. This segment allows trail users a connection to the rest of the Minnesota River Greenway towards Eagan, along West Black Dog Road, and access to the Minnesota River Bridge Crossing. A wetland delineation was not completed for the study but based on the project area and for the purpose of this study, it is assumed that all areas adjacent to the trail are wetlands. The project location is shown in **Figure 1**.

2 Background

In October of 2019, the City of Burnsville (City) reached out to SEH regarding concerns related to the closure due to inundation of the Black Dog Trail segment aforementioned. The City indicated that the trail was under water much of the year, causing for the trail to be closed and commuters to not be able to use the trail as desired.

The Minnesota Department of Transportation (MnDOT) is currently reconstructing the I-35W Bridge over the Minnesota River between Burnsville and Bloomington and as part of the project are also reconstructing a portion of the trail within the MnDOT right-of-way (ROW).

SEH was hired by the City to complete a high level feasibility study to determine the level of effort to raise the trail from the current profile to an elevation which would lower the frequency and

magnitude of trail closure due to flooding. The City completed a topographic survey of the trail segment and provided electronic data of the survey to SEH for the study. Approximate existing trail elevations are shown in **Figure 2**.

2.1 Estimation of Flooding

To estimate the expected inundation frequency of the proposed trail at various elevations, an analysis was completed utilizing available Minnesota River gage and hydraulic modeling data. To estimate the probability of various flow discharge rates in the Minnesota River, the long term USGS gage on the Minnesota River near Jordan (USGS Station Number 0533000) was utilized. This is the nearest long-term recording gage to the site on the Minnesota River. While it is recognized the discharge at the project site may be slightly higher, no major tributaries enter the Minnesota River between Jordan and Burnsville and it should provide a fairly accurate representation of the expected flow rates at the project site. Based on the information contained in the StreamStats Data-Collection Station Report, the period of record for the gage is 81 years (1934 to 2015) for the flow duration statistics. For comparison, the 10-percent duration discharge (or discharge at which the flow rate in the river is expected to be exceeded 10-percent of the time in any given year) is 12,500 cfs. The 1-percent duration discharge is 33,700 cfs, which means that in any given year the discharge is expected to be higher than this rate for an average of 3 to 4 days.

The effective HEC-RAS model obtained from the Minnesota DNR for the Lower Minnesota River was utilized to estimate the stage-discharge relationship at the project site. Based on the site location, it was determined that HEC-RAS cross-section 23.5 is closest to the project site and provides the best representation of the expected river elevation for the various discharge rates at the project site. The rating curve for cross-section 23.5 was used to estimate the expected Minnesota River discharge rate at various elevations along with the corresponding flow duration probabilities. **Table 1** below provides a summary of the expected average days inundated for the trail at various elevations based on the outlined methodology.

Table 1 – Expected Days Flooded for Various Trail Elevations

Trail Elevation	MN River Discharge @ XS 23.5 (cfs)	Flow Duration (%)		Average Days Flooded Annually	
		Low	High	Low	High
698	15,000	5	10	18.25	36.50
700	22,000	3	5	10.95	18.25
702	30,000	1	2	3.65	7.30
704	38,000	-	1	-	3.65

Based on this information, the City determined that raising the trail to a minimum elevation of 702 provided an acceptable frequency and magnitude of trail flooding.

3 Trail Raise Alternatives

Four alternatives to raise the trail in-place were evaluated. These alternatives consisted of a conventional earth embankment, a reinforced soil slope, and a hybrid conventional earth embankment/reinforced soil slope and conventional earth embankment/boardwalk. Two other

alternatives consisting of a conventional earth embankment and a reinforced soil slope adjacent to the existing I-35W exit ramp were also evaluated. A retaining wall alternative was investigated but not evaluated further.

The conventional earth embankment was evaluated as this would be considered a standard approach, and likely the lowest cost option for raising the trail. However, due to the presence of wetlands and organic deposits, other options to reduce the extent of impacts, such as use of a reinforced soil slope, retaining wall and boardwalk were considered. Realigning the trail closer to the I-35W exit ramp was considered as suggested by MnDOT.

A review of the soil information from the Foundation and Analysis Design Report (FADR) for the Southeast Black Dog Road Reinforced Soil Slope, completed by American Engineering Testing, Inc. and dated October 24, 2019, was completed. The review was performed to obtain an understanding of the potential soils that may be encountered in the area and impact alternative development for the trail raise. The following is a summary of assumptions used in the evaluation of the trail raise alternatives based on review of information obtained from the FADR and our experience with expected soil conditions:

- It is likely that organic and alluvial clay soils are present.
- It is anticipated that the trail raise will induce settlement of the underlying soils.
- Slope stability could be a concern due to the potential for encountering organic soils.

Based on the presence of the organic soils and alluvial clays it is anticipated that the trail raise of up to 4 feet could result in at least 4 inches of settlement. This assumes the thickness of the compressible soils is less than 10 feet, as encountered near the road. However, as the trail is located further into the wetland and directly adjacent to Black Dog Lake, it is very likely that the organic deposits would be thicker. Additional soil borings are recommended to be obtained for final design to confirm potential settlement and slope stability issues that may need to be mitigated.

All trail raise alternatives assume a trail width of 10 feet with 2 foot shoulders on either side. For purposes of developing the opinion of probable construction cost, the pavement section was assumed to be 4 inches of asphalt over 6 inches of aggregate base course. We assumed that the raised trail could be built on the existing ground without any subgrade corrections. A section view of potential alternatives relative to the existing trail is shown in **Figure 3**.

3.1 Conventional Earth Embankment

The conventional earth embankment consists of earth fill to raise the trail with 3 feet horizontal to 1 foot vertical side slopes. The advantages of a conventional embankment section consist of the following:

- Standard construction practices
- Minimal cost
- Can handle embankment settlement better than other alternatives evaluated
- Can incorporate geotextile or geogrid reinforcement if needed to address potential slope stability issues

- Less confined trail
- Provides more natural setting with vegetation restoration

The disadvantages of a conventional embankment section consist of the following:

- Larger impact to adjacent wetlands
- May require placement of fill into Black Dog Lake
- May require riprap protection along portions of Black Dog Lake

The conventional earth embankment alternative is a potential option for the raised trail, therefore becoming Concept 1 of this report. It is the most cost effective and provides the most standard construction approaches. The footprint associated with this option is shown in **Figure 4**. Based on the footprint, a portion of the embankment may need rip rap protection as is extends into and below the normal water level of Black Dog Lake.

3.2 Reinforced Soil Slope (RSS)

The reinforced soil slope (RSS) consists of incorporating geogrid and geocells into an earthen embankment to allow for the construction of a steeper slope. Slopes of ½ foot to 1 foot horizontal to 1 foot vertical can be constructed to reduce the embankment footprint. The same trail section as a conventional embankment can be used in conjunction with the RSS, however the embankment top width would need to be increased to accommodate for the installation of guardrail or fence due to the adjacent steep side slopes. The RSS can be incorporated on either or both sides of the trail as needed. The advantages of a RSS section consist of the following:

- Reduces the footprint of the raised trail
- Can handle embankment settlement without causing visual distress or deterioration of the reinforcement elements or vegetated facing
- Can incorporate geotextile or geogrid reinforcement if needed to address potential slope stability issues
- Provides more natural setting with vegetated slope restoration

The disadvantages of a RSS section consist of the following:

- More confined construction operation; requires more labor
- Requires a guardrail or fence for user safety
- Trail section is more confined
- More expensive than conventional earth embankment

Although this option is higher cost than the conventional earth embankment, the RSS will result in fewer impacts to adjacent wetlands, which will require mitigation or replacement that come at a cost, therefore the RSS alternative is a potential option for the raised trail. There are portions of the trail where the raise is minimal, therefore RSS will not provide a significant reduction in impacts in comparison to the conventional earth embankment. Concept 2 of this report is a combined RSS/conventional earth embankment. The footprint associated with this combined

RSS/ conventional earth embankment option is shown in **Figure 5**. Concept 3 of this report is the least impactful, with the entire trail being raised with an RSS Section. The footprint associated with an entire RSS section is shown in **Figure 6**.

3.3 Retaining Wall

The retaining wall alternative consists of modular block units with geogrid reinforcement. Retaining walls would allow further reduction of adjacent wetland impacts. The walls can be constructed nearly vertical, with a 1 inch setback per 16 to 18 inches. The same trail section as a conventional embankment can be used in conjunction with the retaining wall; however pavement would extend the full width of the trail and shoulders to the back of the blocks. A guardrail or fence would be required and incorporated into the retaining wall due to the adjacent steep slopes. The retaining walls can be incorporated on either or both sides of the trail as needed. The advantages of a retaining wall section consist of the following:

- Reduces the footprint of the raised trail
- Can incorporate geotextile or geogrid reinforcement if needed to address potential slope stability issues

The disadvantages of a retaining wall section consist of the following:

- More confined construction operation; requires more labor
- Requires a guardrail or fence for safety
- Trail section is more confined
- More expensive than conventional earth embankment and RSS
- Will experience more deterioration and damage from settlement than conventional earth embankment and RSS

The retaining wall alternative does not appear to be a good option for accommodating the trail raise. It is much more costly than the other alternatives and it may experience more deterioration and damage from settlement that would be expected at this site. In addition, due to the trail raise requiring only 3 to 4 feet of increase in elevation and the block units being approximately 2 feet in width, there is not a significant reduction in impacts in comparison to the RSS section. This alternative was not considered further.

3.4 Boardwalk

A boardwalk is an elevated path that can consist of timber deck and beams on helical piling, concrete deck on trusses with driven piling, or concrete slabs or planks on driven piles, for example. A boardwalk option would allow further reduction of adjacent wetland impacts. The same trail section as a conventional embankment can be used in conjunction with the boardwalk with pavement sections tying into boardwalk sections. A guardrail or fence would be required and incorporated into the boardwalk segments due to the elevated walkway. For the purposes of this study, a timber deck was analyzed. Concrete deck or slabs have some similar advantages and disadvantages but will be at least twice the cost of a timber deck.

It should be noted that a boardwalk is considered a structure while a trail of conventional embankment or RSS is considered fill (not a structure). As this is a structure, it would be subject

to different regulations as listed in City Code Section 10 Floodplain Regulations. Due to the depth of inundation (greater than 10 feet) of the potential boardwalk trail segment under the Minnesota River base flood elevation, the feasibility of any structure should be questioned.

The advantages of a timber deck boardwalk section consist of the following:

- Reduces the impacts of the raised trail
- The foundation system including helical piling can withstand settlement and loading

The disadvantages of a timber deck boardwalk section consist of the following:

- Snow removal for timber deck boardwalks is recommended by a broom sweeper or snow throwing equipment
- Snow removal by a standard plow may cause damage to timber decking and undo stress to railing members and their connections
- A timber deck boardwalk will be slippery for at least first few years. As the timber decking weathers over time, the concern of a slippery surface may reduce
- Timber decking has less long term durability than a conventional or RSS embankment
- A boardwalk is more expensive than conventional earth embankment and RSSnd requires more maintenance
- Depth of inundation (greater than 10 feet for base flood) may cause flotation, collapse, lateral movement or dislodging of structures. Design for these considerations will increase price

Although this option is higher cost than the conventional earth embankment and the RSS, a boardwalk will result in fewer impacts to adjacent wetlands, which will require mitigation or replacement that come at a cost, however the boardwalk will likely result in higher maintenance and costs at an increased frequency. There are portions of the trail where the raise is minimal, therefore a boardwalk would not be necessary. Concept 4 of this report is a combined boardwalk/conventional earth embankment. The footprint associated with this combined boardwalk/ conventional earth embankment option was estimated as negligible in boardwalk segments and quantified by assuming the same fill needed for Concept 3.

3.5 Realigned Trail

During the preparation of this report, the City met with MnDOT and there was discussion of relocating the trail to be directly adjacent to the new I-35W exit ramp, constructed as part of the adjacent MnDOT project. The realigned trail was evaluated at an elevation of 702, tying into the existing exit ramp embankment. The existing exit ramp embankment had approximate side slopes of 3 feet horizontal to 1 foot vertical. It was assumed that the realigned trail would consist of an entirely fill section. The potential realigned trail and cross sectional information is shown in **Figure 6A**.

The advantages and disadvantages of realigning the trail for each embankment option are similar to those listed in the previous sections. Additional disadvantages will include increased wetland impacts, increased costs and concern for biker safety due to the adjacent traffic, therefore a permanent barrier was included in the analysis for the entire length of the trail evaluated.

4 Hydraulic Impacts

The trail segment is located within the mapped FEMA floodway for the Minnesota River, as shown in **Figure 7**, however after closer examination of the floodway, it was determined that this floodway is not realistic because it does not correctly account for expansion on the downstream side of the I-35W bridge. The trail segment is much lower than the adjacent I-35W roadway and entrance/exit ramps located immediately upstream. **Figure 8** shows the trail alignment overlain with LiDAR elevation data. The trail is proposed to be raised to an elevation of 702; and as shown in the figure, this elevation is approximately 5 feet below the lowest elevation of the I-35W entrance/exit ramps located immediately upstream of the trail. Due to this, the proposed raise of the trail segment will not have an impact on flood elevations, as these are controlled by the higher, adjacent roadways in this area essentially making the trail located in an area of ineffective flow. Therefore, hydraulic modeling is not required to prove that there would be no-rise associated with the proposed trail changes.

There is one culvert crossing under the existing trail segment that was identified in the City's survey. This culvert exists near the south end of the segment, immediately adjacent to the MnDOT/Xcel ROW boundary. It is not clear if this culvert is owned by the City or MnDOT, but this culvert was not shown in the MnDOT I-35W plans, therefore for the purposes of this study, it was assumed that this culvert would be replaced by the City. The culvert has a minimal angle of skew from the existing trail. The culvert condition and capacity should be reevaluated with the proposed trail raise however at this time is assumed that the culvert will be removed, replaced and realigned with a longer, 24" CMP culvert for in-place trail raise options.

5 Stakeholder and Agency Considerations

As part of the feasibility effort, key stakeholders and agencies that may be impacted by, or regulate the proposed trail, were identified. The role of these stakeholders and/or agencies is discussed, in addition to approval authorities and considerations with regards to the proposed project.

5.1 Stakeholders

Stakeholders are those who may be affected by or have an effect on a project. Key stakeholders are those who can significantly influence, or are important to the success of, the project. The City of Burnsville is one of several entities that own, operate, or regulate the property where the existing and proposed trail resides. Stakeholders' interests can be many and varied, but these groups typically focus on economics, social impacts, time, or the environment.

5.1.1 City of Burnsville

The trail is owned and operated by the City of Burnsville. The city is responsible for securing permissions, permits, funding and completion of construction for the proposed project. The City of Burnsville is anticipated to lead the process and coordinate with all the other stakeholders. The City may need to obtain a Conditional Use Permit (CUP) from themselves to demonstrate the no-rise scenario as discussed in **Section 4**.

5.1.2 U.S. Fish and Wildlife Service

The trail exists within the Minnesota Valley National Wildlife Refuge (Black Dog Preserve), which is owned by the U.S. Department of the Interior; the U.S. Fish and Wildlife Service is responsible for its management.

5.1.3 Xcel Energy

The trail is located within an Xcel Energy easement. The Xcel Energy contact for this area and project has been identified as:

> Brian Sullivan, Siting and Land Rights
> Brian.E.Sullivan@xcelenergy.com
> Phone: 612.330.5925
> Cell: 612.366.0234

As indicated by Mr. Sullivan, all plans must be reviewed and approved by Xcel Energy prior to construction. Xcel Energy will review the plans for any changes in grade that could impact the proximity to conductors or facilities leading to a potential safety risk caused by the project.

5.1.4 MnDOT

While most of the trail is located outside of the Minnesota Department of Transportation (MnDOT) I-35W ROW, MnDOT ROW exists on both ends of the project and may still have requirements for trail design and construction limits. Additionally, MnDOT has plans to raise and improve segments of the trail that do exist in the ROW that will connect with this segment, and coordination is required for consistency of design.

5.1.5 Lower Minnesota River Watershed District

The trail is located within the jurisdiction of the Lower Minnesota River Watershed District (LMRWD). The LMRWD currently does not have a permit program for projects within the District. Instead, LMRWD provides guidance and policy direction to municipalities and counties within the District relating to water quality requirements in local ordinances and codes, or within local surface water management plans. Plan review may be prudent to demonstrate compliance, but the City of Burnsville would be responsible for ensuring the watershed standards are met.

5.2 Agencies and Resource Considerations

This section describes the project area by documenting the specific environmental resources that could potentially be affected by the proposed trail improvements. For each environmental resource identified, a discussion of the regulating agency is included. Where necessary, a discussion of permit approvals are included as well as approximate timelines. A table summarizing any agency issues or permits is included as part of **Section 5.3.**

5.2.1 National Historic Preservation Act (NHPA) resources

The National Historic Preservation Act (NHPA) of 1966, as amended, establishes the Advisory Council on Historic Preservation (ACHP) and the National Register of Historic Places (NRHP). Section 106 of the NHPA requires consideration of the effects of undertaking on properties that are eligible for inclusion in the NRHP. Compliance with Section 106 requires consultation with the State Historic Preservation Officer (SHPO) if there is a potential adverse effect to historic properties on or eligible for listing on the National Register of Historic Places.

Review of the MN Office of the State Archaeologist Public Viewer and resources provided as part of the MnDOT I-35W project concluded that there are resources potentially eligible for listing in the National Register of Historic Places (NRHP). Review for historic site must be completed prior

to starting any projects regulated by a federal agency. However, a formal review from SHPO cannot commence until funding and coordination with other agencies has begun.

5.2.1.1 Department of Transportation Act Section 4(f) and 6(f) resources

5.2.1.1.1 Section 4(f)

Section 4(f) of the Department of Transportation Act of 1966 provides protections for publicly-owned parks, recreational areas, wildlife and waterfowl refuges and historic sites. Section 4(f) requires avoidance of the publicly-owned resource unless there is no feasible and prudent alternative to its use.

Within the project area, several Section 4(f) properties may be impacted by the proposed trail improvements. These properties are outlined with the agency/governmental unit with jurisdiction below, in **Table 2**. Section 4(f) Resources as shown on **Figure 9**.

Table 2 – Section 4(f) Resources

Resource	Agency with Jurisdiction
Minnesota Valley National Wildlife Refuge (Black Dog Preserve)	US Fish and Wildlife Service (USFWS)
Minnesota River Regional Trail	Dakota County
City of Burnsville Trail (Black Dog Trail)	City of Burnsville

5.2.1.1.2 Section 6(f)

The Land and Water Conservation (LAWCON) Fund Act of 1965, as amended, provides a nationwide program to help preserve, develop and provide accessibility to outdoor recreation resources. Similar to Section 4(f) described above, Section 6(f) requires consideration of all practical alternatives to avoid a LAWCON conversion.

The closed LAWCON funded park within the City of Burnsville is Terrace Oaks Park, located 2.5 miles SE of the project area. North of the project, the City of Bloomington's Minnesota River Valley Park, located along the north side of the Minnesota River and west of I-35W, was acquired using LAWCON funds. These parks will not be affected by the proposed trail improvements.

5.2.1.1.3 City of Burnsville Trail (Black Dog Trail)

The City of Burnsville Trail is located on USFWS property (Black Dog Preserve), partially within MnDOT ROW, and is part of an Xcel energy easement. The project proposes improvements to the existing City of Burnsville Trail. Because the action would not involve any 4(f) land acquisition, it is not anticipated that a permit is required. However, notification of the project to the Federal Highway Administration (FHA) is recommended.

5.2.1.2 Threatened or Endangered Species

The Minnesota Department of Natural Resources (MnDNR) Natural Heritage Information System (NHIS) database was reviewed to determine known occurrences of listed species, habitats, and geologic features within one mile of the project area. The NHIS database comprises locational records of rare plants, rare animals, and other rare features. The MnDNR has three statuses for rare species, classified as: endangered, threatened, and special concern. Specific location information is excluded from this document to assure the sensitive resources are protected in the

future. Alternatively, the information will be presented generally to indicate any sensitive resources within the project area and potential means to avoid, minimize, and/or mitigate negative effects to the resources will be described.

5.2.1.2.1 Species

Plants

Twelve botanical species have been identified within 1-mile of the project area. All of the species have been identified within the calcareous fen community, located approximately 0.33 miles southeast of the existing trail. Impacts to these protected species are not anticipated by the proposed improvements, but coordination with MnDNR should be completed to ensure the project is in compliance with state laws and regulations.

Animals

There are several records of protected native animal species identified in the immediate project area. A total of 25 species of animals have been identified within 1-mile of the proposed project area. Of these, 14 are mussel species that are likely restricted to the Minnesota River. The remaining 11 species are mobile vertebrate species that are not limited in where they may be observed. While impacts are not anticipated, the MnDNR may require a site survey to identify the presence and locations of the species.

Habitats

Eight protected terrestrial communities such as calcareous fens and seepage meadows were also noted in the project vicinity. Portions of Black Dog Lake have been identified as a Seepage Meadow/Carr community. A calcareous fen has been identified by the MnDNR approximately 0.33 miles SE of the existing trail. Impacts to the fen are regulated by the MnDNR and will be coordinated as part of the Public Waters Work Permit Program (below for more details). Additional analysis of the project may be required to demonstrate that it will not have impacts on the fen or other high quality wetlands in the project area.

5.2.1.3 Water Quality and Wetlands and Other Waters of the U.S.

5.2.1.3.1 MnDNR

Two Public Waters are located within 0.5 miles of the project limits, including the Minnesota River and Black Dog Lake (#19-83 P). Work within or below the Ordinary High Water (OHW) of a public water, or within the defined banks for linear watercourses, requires coordination and authorization by the MnDNR. After submittal of a permit application to the MnDNR, permits are subject to a 30 comment period prior to authorization. Public Waters are shown on **Figure 10**.

5.2.1.3.2 Navigable Waterways

The Rivers and Harbors Act (Section 10) regulates the placement of structures and/or work in, or affecting navigable waters of the Unites States including the Minnesota River. The United States Army Corps of Engineers (USACE) is the agency responsible for administering this program. A USACE permit is required to do any work in, over or under a 'Navigable Water of the United States'. Waterbodies have been designated as 'Navigable Waters of the United States' based on their past, present or potential use for transportation for interstate commerce. Impacts to the navigation channel of the Minnesota River are not anticipated as part of the project and therefore coordination with the USACE for a Section 10 permit is not likely.

In Minnesota, a project may need a 401 Water Quality Certification from the Minnesota Pollution Control Agency (MPCA) for projects that require a Federal Energy Regulatory Commission or a U.S. Army Corps of Engineers approval and may result in any discharge into the navigable waters of the United States. Section 401 is administered by the MPCA and requires that an applicant for a federal license or permit provide a certification that any discharges from the facility will comply with the act, including state-established water quality standard requirements.

The U.S. Coast Guard also regulates navigable waters under Section 9, which includes the Minnesota River. As the project does not impede navigation, it is not expected to require a Section 9 permit, however the USACE permit process may include them as part of their review process.

5.2.1.3.3 Wetlands

The National Wetlands Inventory (NWI) map identifies several large wetland complexes located within the floodplain of the Minnesota River, as well as a number of smaller basins associated with roadway ditches and stormwater features. The NWI map is shown on **Figure 11**.

While a delineation is out of the scope of this study, MnDOT conducted an on-site wetland delineation in fall 2015. While wetland boundaries are generally considered valid up to five years, project conditions may have changed due to the MNDOT I-35W project and an updated wetland delineation is anticipated to be required by the Wetland Conservation Act (WCA) and the U.S. Army Corps of Engineers (USACE). A wetland delineation must occur during the active growing season (generally April- October).

Impacts to wetlands are anticipated as part of any of the project alternatives. Construction plans that propose any direct impact or indirect impact to wetlands or watercourses within the project area will require permits from the appropriate regulatory agencies. Wetlands in the project area are regulated by agencies at the local, regional, state, and federal levels including the USACE and the EPA at the federal level, the Minnesota Board of Water and Soil Resources (BWSR) and the MPCA at the state level, and the City of Burnsville at the local level. The City of Burnsville has accepted the responsibility for the administration of the Minnesota Wetland Conservation Act (WCA) of 1991.

It is assumed the project will qualify for a Transportation General Permit (TRGP) authorization by the USACE. If permanent impacts to wetland resources are less than 0.1 acres in size or temporary impacts are less than 0.5 acres in size, the project may proceed without prior construction notice to the USACE. Impacts greater than that require submittal of a Section 404 wetland permit application. General permits and Letters of Permission require a 30-day agency and public review process depending on the nature and location of the project and will take 45 days or more.

Under the Wetland Conservation Act, projects resulting in the loss of 100 square feet or greater of wetland will require a permit. Projects with temporary impacts to wetlands only may qualify for an exemption, but a permit application must still be submitted. Authorization is required within 75-business days of the submittal of a complete application. Mitigation for lost wetland functions and values may also be needed, which is presumed to be possible through purchase of wetland credits from an approved wetland bank within the Lower Minnesota River Watershed.

5.2.1.3.4 MPCA 303d Impaired Waters List

One impaired watercourse is located within the project area vicinity. The Minnesota River is adjacent to the project limits and is impaired due to concentrations of PCB and mercury, excessive turbidity and insufficient dissolved oxygen (Assessment Unit 07020012-505). A TMDL plan for mercury was approved in 2008 (EPA ID 35500) and dissolved oxygen in 2004 (EPA ID 10832).

5.2.2 Floodplains

The FEMA FIRM for the City of Burnsville, Minnesota, Dakota County – Panel Number 27037C0070E, effective December 2nd, 2011 was utilized as part of the floodplain and hydraulic analysis as part of the project alternative considerations. See **Section 4** for additional information about the floodplain analysis and potential impacts.

5.2.2.1 Farmland

The Federal Farmland Protection and Policy Act (FPPA) and the Minnesota Agricultural Land Preservation and Conservation Policy Act, Minnesota Statute §17.80-17.84, were enacted to ensure that impacts to agricultural lands and operations are integrated into the decision-making process at the EA level. These laws are also intended to minimize, to the extent reasonable, actions that result in unnecessary and irreversible conversion of farmland to non-agricultural purposes.

The Natural Resources Conservation Service (NRCS) Web Soil Survey (WSS), NRCS electronic Field Office Technical Guide (eFOTG), and the Dakota County Soil Survey were referenced to identify prime and unique farmland, and farmland of statewide and/or local importance within the project area. No soils are mapped and designated by the NRCS as prime farmland, prime farmland if drained, and farmland of statewide importance located within the project or nearby vicinity and no further coordination is required.

5.2.2.2 Wild and Scenic Rivers

Wild and scenic rivers are designated as part of the National Wild and Scenic River Program by the U.S. Department of the Interior under the Wild and Scenic River Act to protect the most beautiful and unspoiled rivers in the nation. River segments are designated based on their outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values and are to be preserved in free-flowing condition for the benefit and enjoyment of present and future generations. The St. Croix River located along Minnesota's eastern boundary in the south central portion of the state is the only federally designated Wild and Scenic River located within Minnesota, and it is located approximately 23 miles east of the project site. There are no designated National Wild and Scenic Rivers within or near the project area.

Similarly, the Minnesota Wild and Scenic Rivers Act (M.S. 103F.301 – 103F.345) is a state level effort that provides similar protections to designated rivers or sections of rivers in Minnesota. The Act is effectively managed and implemented by the MnDNR. Portions of the Minnesota River are designated as state of Minnesota Wild and Scenic River. The designated stretch is located over 80 miles away, and extends from Lac Qui Parle Dam to Franklin. There are no rivers or segments of rivers within the project area that are designated as Minnesota Wild and Scenic Rivers.

5.2.2.3 Noise

Because the trail is intended for pedestrian use, the proposed trail project should not result in an increase of noise. However, construction activities associated with the project would result in noise and dust. It is recommended that the City require contractor(s) to comply with applicable local noise restrictions and ordinances. Additionally, communities that might be affected by construction noise should be notified in advance of any planned loud construction activities.

5.2.2.4 Air Quality

No air quality impacts are expected to result from the proposed project.

5.3 Resource Summary

Table 3 summarizes resources that may be affected by the proposed trail improvements, the regulating agencies for each resource, and any permits or approvals that may be required. These permit requirements may vary as the project is defined, but is intended to provide a comprehensive list of agencies and entities to include at the beginning of the process.

Table 3 – Resource Summary

Resource Type	Unit of Government	Type of Permit, Application, or Approval	Timeframe
Publicly-owned recreational resources	Responsible officials with jurisdiction over the resource (USFWS, Dakota County, City of Burnsville)	De Minimis Determination	Varies*
Threatened or Endangered Species	MNDNR	Consultation, NHIS Data Request	30 days
		Species Survey	3 months
		Takings Permit	1 year*
Watercourse	MNDNR	Public Waters Work Permit	30-60 days
	USACE	Section 10	120 days
	U.S. Coast Guard	Section 9	120 days
Wetlands	City of Burnsville (Wetland Conservation Act)	No-Loss (temporary impacts)	0-30 days*
		Wetland Replacement Plan	Within 75 days
	USACE	Transportation General Permit (0.01 acres – 3 acres of impact)	30 - 45 days
		Letter of Permission	45 - 60 days*
		Individual Permit	60 - 120 days or more*
	MPCA	401 Water Quality Certification	120-160 days
Floodplains	FEMA	No-Rise Certification	30-60 days
Farmland	NRCS USDA	Farmland Conversion Impact Rating	0-30 days *
Cultural Resources	State Historic Preservation Office	Review of cultural and archeological resources	60 days
** permit not anticipated for proposed trail improvements*			

6 Opinions of Probable Construction Cost

SEH has prepared preliminary cost estimates for construction and engineering fees for the three concepts, discussed within this report, including:

- Concept 1: Raised trail by a conventional embankment from the MnDOT ROW towards Black Dog Road, terminating when an elevation of 702 is met
- Concept 2: Raised trail by a hybrid conventional embankment/RSS, chosen based on impact, from the MnDOT ROW towards Black Dog Road, terminating when an elevation of 702 is met
- Concept 3: Raised trail by a RSS from the MnDOT ROW towards Black Dog Road, terminating when an elevation of 702 is met
- Concept 4: Raised trail by a hybrid conventional embankment/boardwalk, chosen based on impact, from the MnDOT ROW towards Black Dog Road, terminating when an elevation of 702 is met
- Concept 5: Realigned trail adjacent to the I-35W exit ramp consisting of a conventional embankment, beginning at elevation 702
- Concept 6: Realigned trail adjacent to the I-35W exit ramp consisting of RSS, beginning at elevation 702

Unit costs were chosen using MnDOT average bid prices and information from recent mitigation projects. It was assumed that new trail paving would extend from all the way to Black Dog Road. Note that portions of the raised trail as well as repaving of the remainder of the trail are within MnDOT ROW. Detailed cost estimates are in **Appendix A** and a summary of cost estimation is shown in **Table 4**.

Table 4 – Cost Estimation Summary

Concept	Estimated Total Cost
1	$330,100
2	$960,500
3	$1,246,600
4	$1,848,100
5	$630,400
6	$1,890,500

In addition to construction and engineering fees, it is important to consider fees associated with wetland mitigation as required by the project. These estimated fees, summarized in **Table 5**, assume that wetland credits will be purchased from a wetland bank and are not intended to be used as justification for determining an appropriate concept should the project move forward to final design.

Table 5 – Mitigation Cost Estimation

Concept	Permanent Impacts (sf)	Mitigation Area @ 2 X Impact Area (sf)	Wetland Credit Cost @ $2.50/sf	BWSR Withdrawal Fee @ $2,500/ac	Estimated Total
1	18,600[1]	37,200	$93,000	$2,135	**$95,135**
2	10,000[1]	20,000	$50,000	$1,150	**$51,150**
3	3,700[1]	7,400	$18,500	$425	**$18,925**
4	4,000[1]	8,000	$20,000	$460	**$20,460**
5	35,015[2]	66,030	$165,075	$3,800	**$168,875**
6	22,715[2]	45,430	$113,575	$2,600	**$116,175**

[1]Overall impact footprint less existing trail area (Length of Trail x Width of Trail)

[2]Permanent impacts may be reduced if there are already mitigated impacts associated with the adjacent MnDOT project. If so, any already mitigated area may not be included in permanent impacts. For more information, request the delineation and mitigation information from MnDOT.

Wetland mitigation on site is also an option however may not be suggested due to space and location. Mitigation requires replacement at a 2:1 ratio, so there will not be enough space for complete onsite mitigation, therefore a wetland bank would have to be utilized regardless. Due to the interaction with the river/lake, this is a less desirable area for mitigation. Additionally, significant monitoring is required for mitigation for at least 5 years.

7 Recommendations

The trail raise project described in this report is a high level analysis to assist the City in determining the overall feasibility of the project. It is recommended that the City pursue the following actions should the project continue towards final design:

- Continue discussions with MnDOT to collaborate with their planned trail reconstruction, just south of the trail segment
- Initiate stakeholder discussions early in the process to maintain involvement and open communication
- Initiate agency preliminary permitting discussions early in the process to identify the most appropriate path for approval
- Complete a soil investigation at the location of the trail segment to ensure that any chosen alternative will be appropriate for long term stability of the trail
- Initiate final design, if deemed feasible, by using information described in this study

Figures

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FILE NO.	LOCATION MAP	FIGURE NO. 1
BU153788-FIGURES	BLACK DOG MN RIVER TRAIL	
DATE: 02/06/2020	BURNSVILLE, MINNESOTA	

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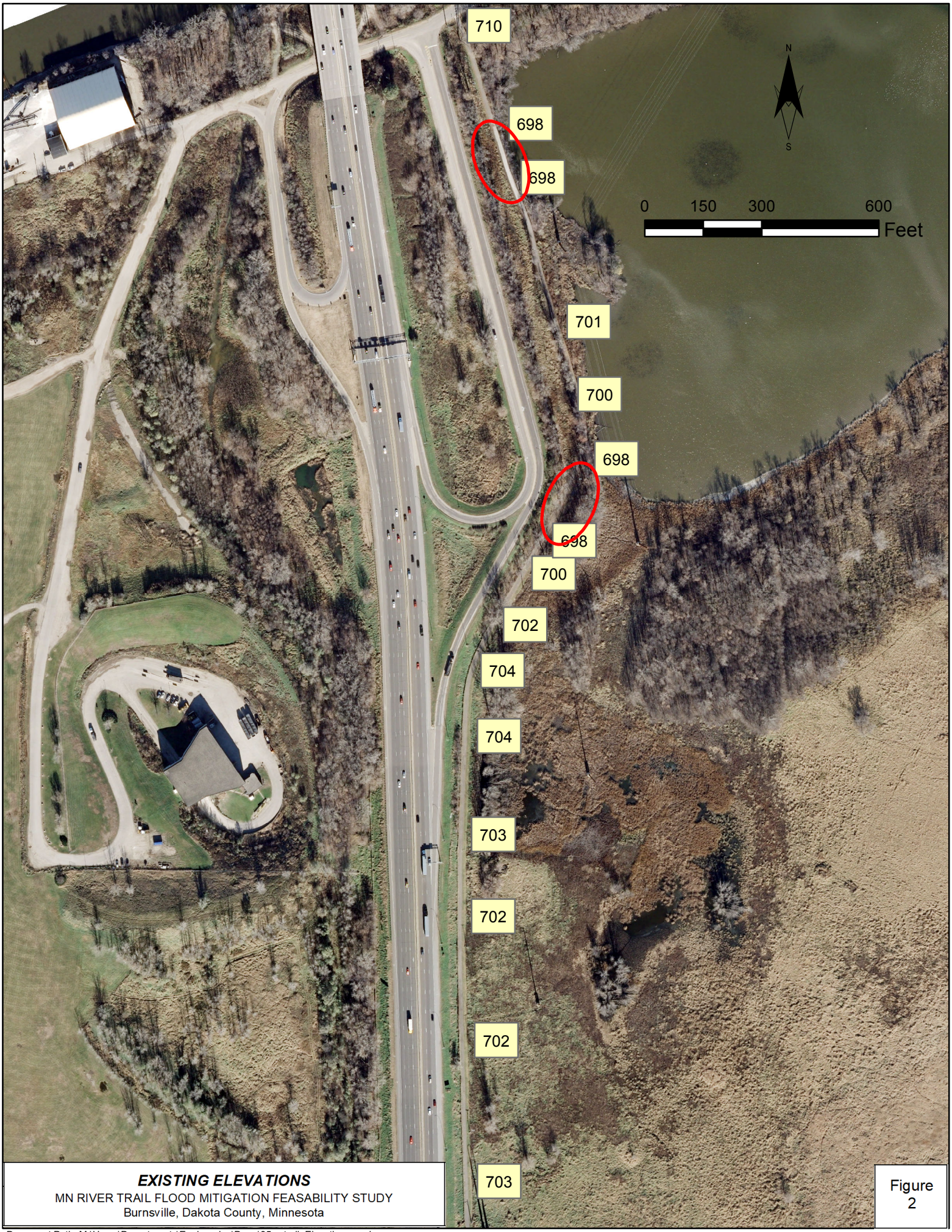

EXISTING ELEVATIONS

MN RIVER TRAIL FLOOD MITIGATION FEASABILITY STUDY

Burnsville, Dakota County, Minnesota

Figure 2

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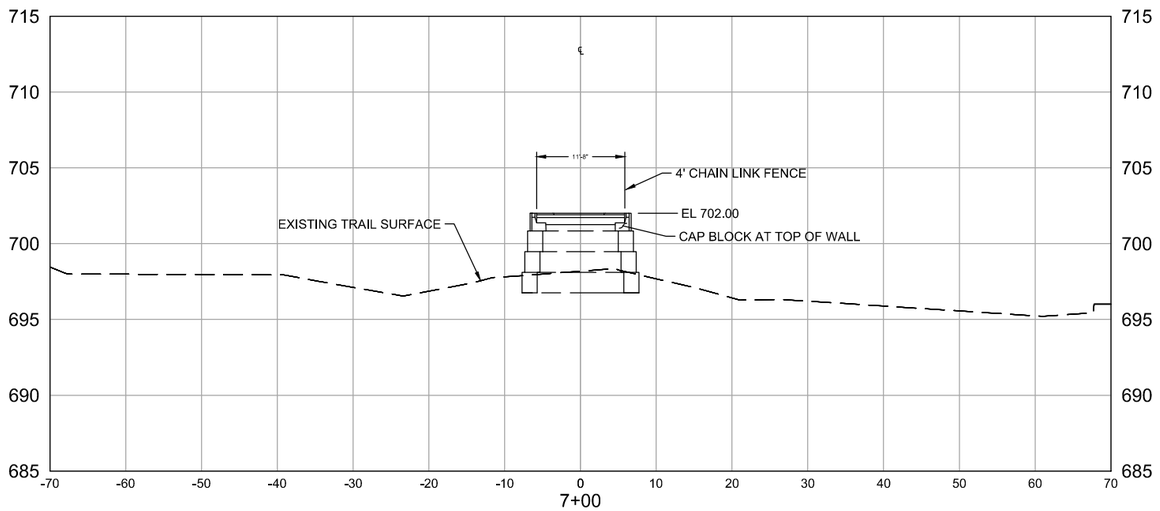

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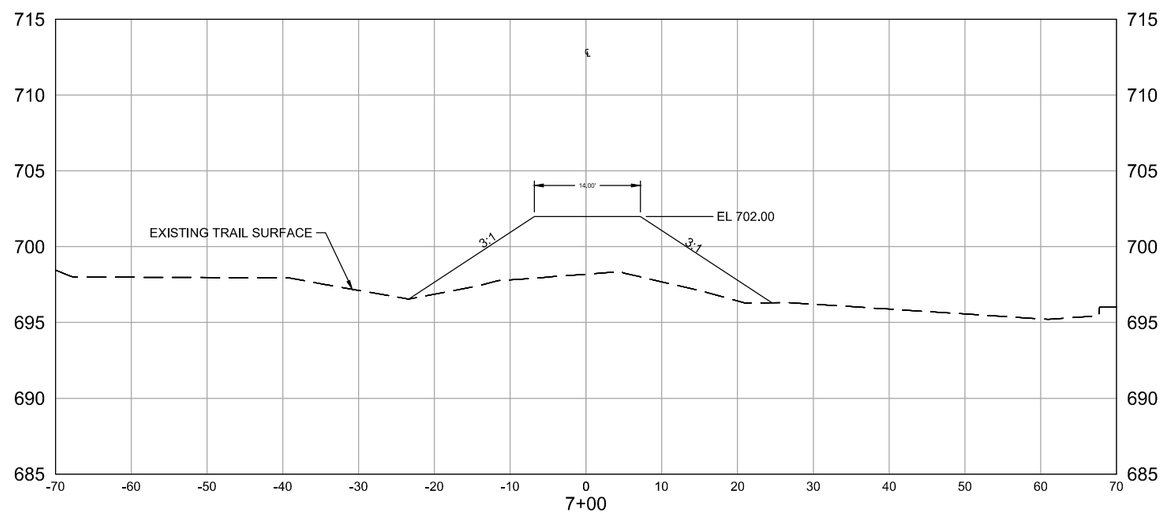
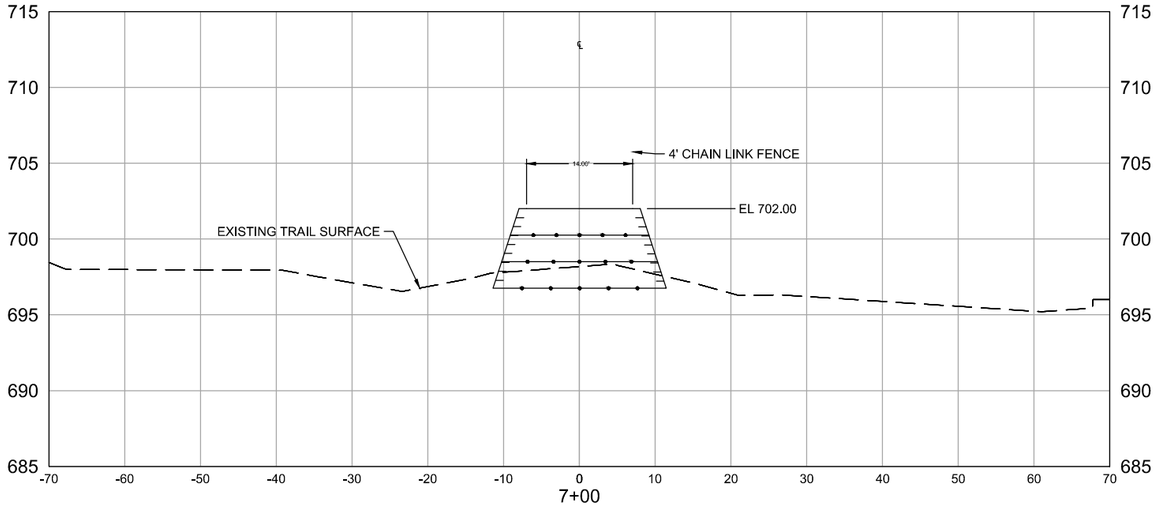


CONVENTIONAL EMBANKMENT



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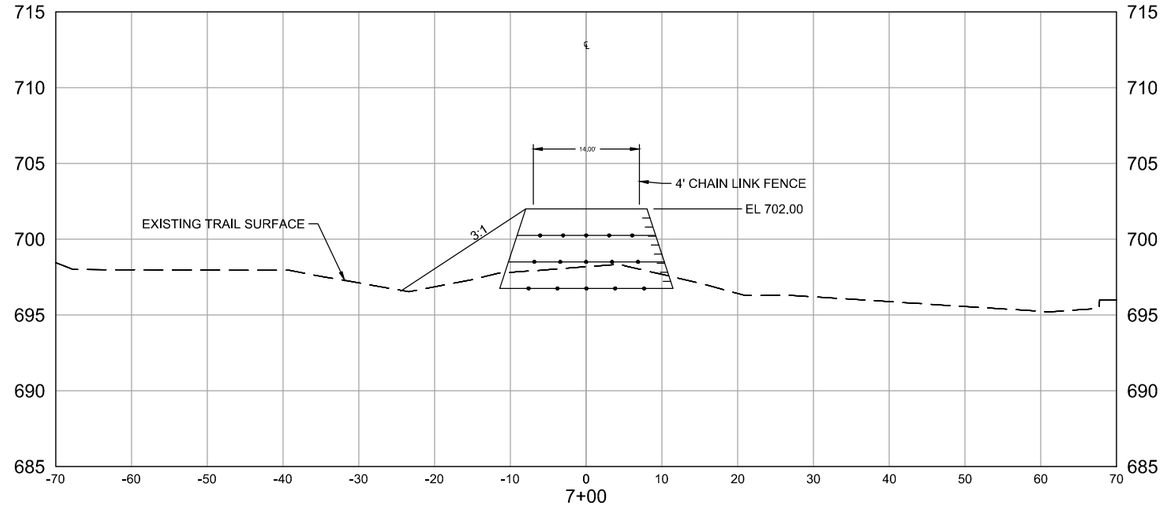

REINFORCED SOIL SLOPE AND CONVENTIONAL EMBANKMENT

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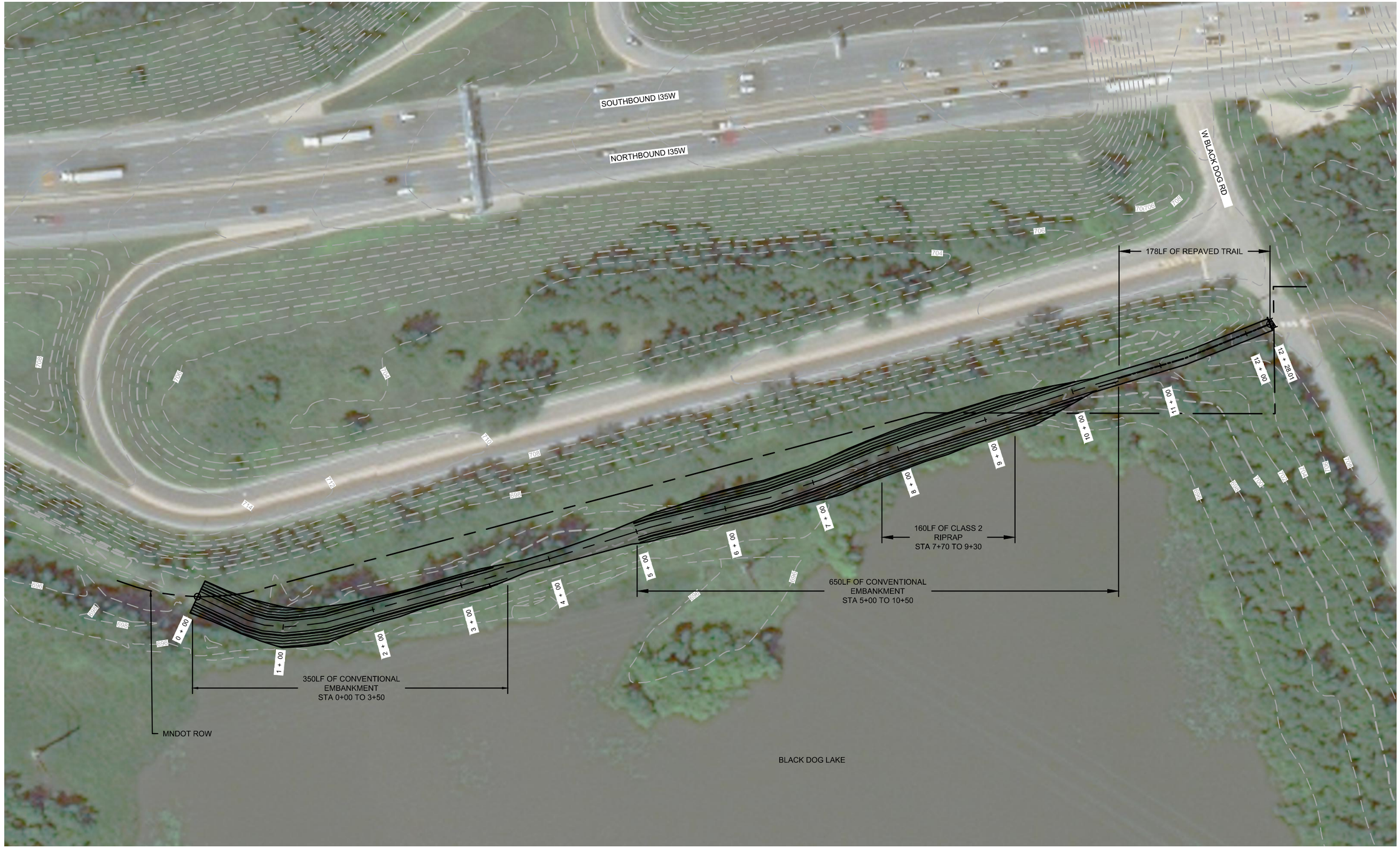
CONCEPT OPTION DETAILS
BLACK DOG MN RIVER TRAIL
BURNSVILLE, MINNESOTA

FIGURE
NO. 3



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IMPACTED AREA CONCEPT 1
BLACK DOG MN RIVER TRAIL
BURNSVILLE, MINNESOTA

FIGURE NO. 4

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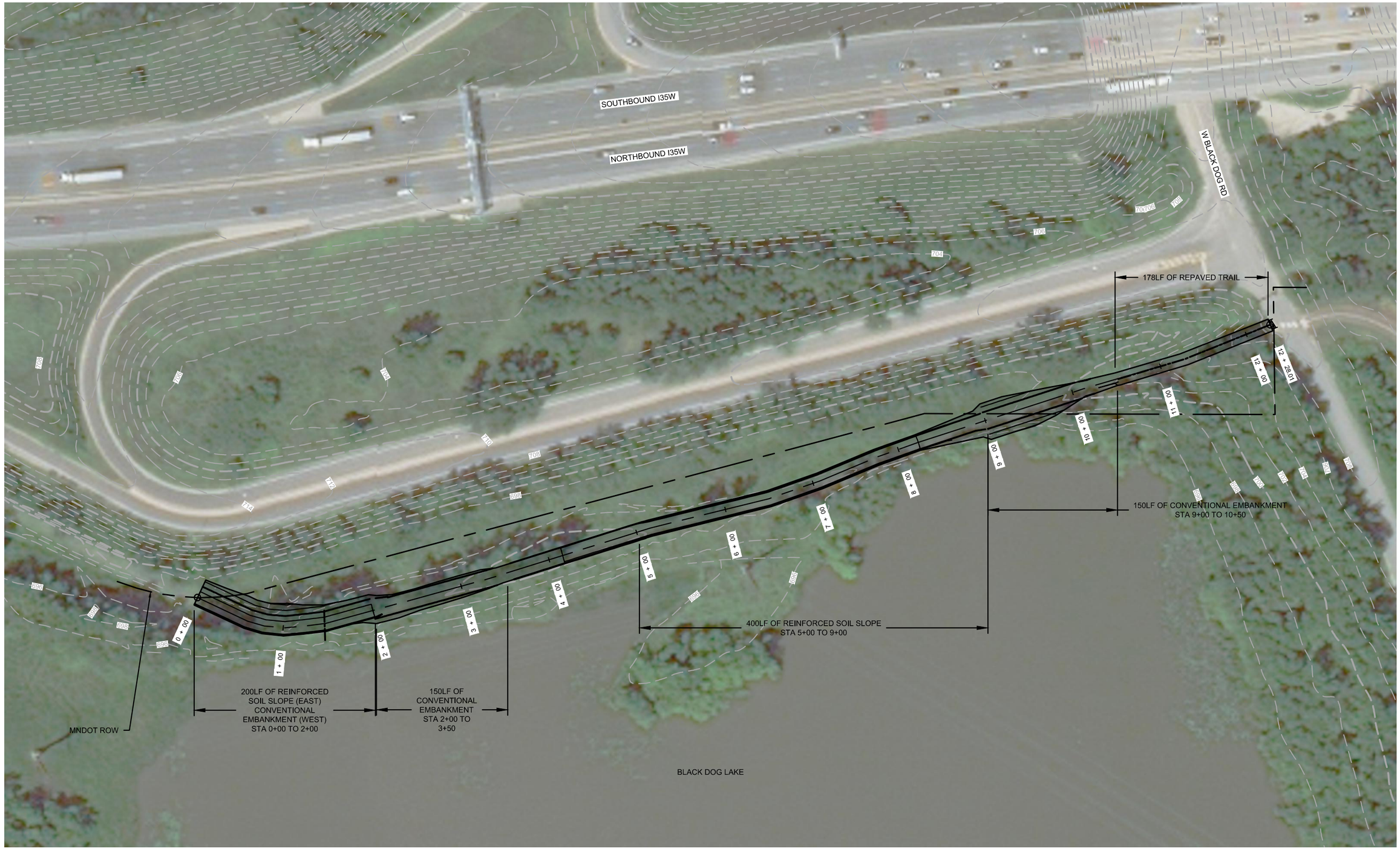

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FILE NO.
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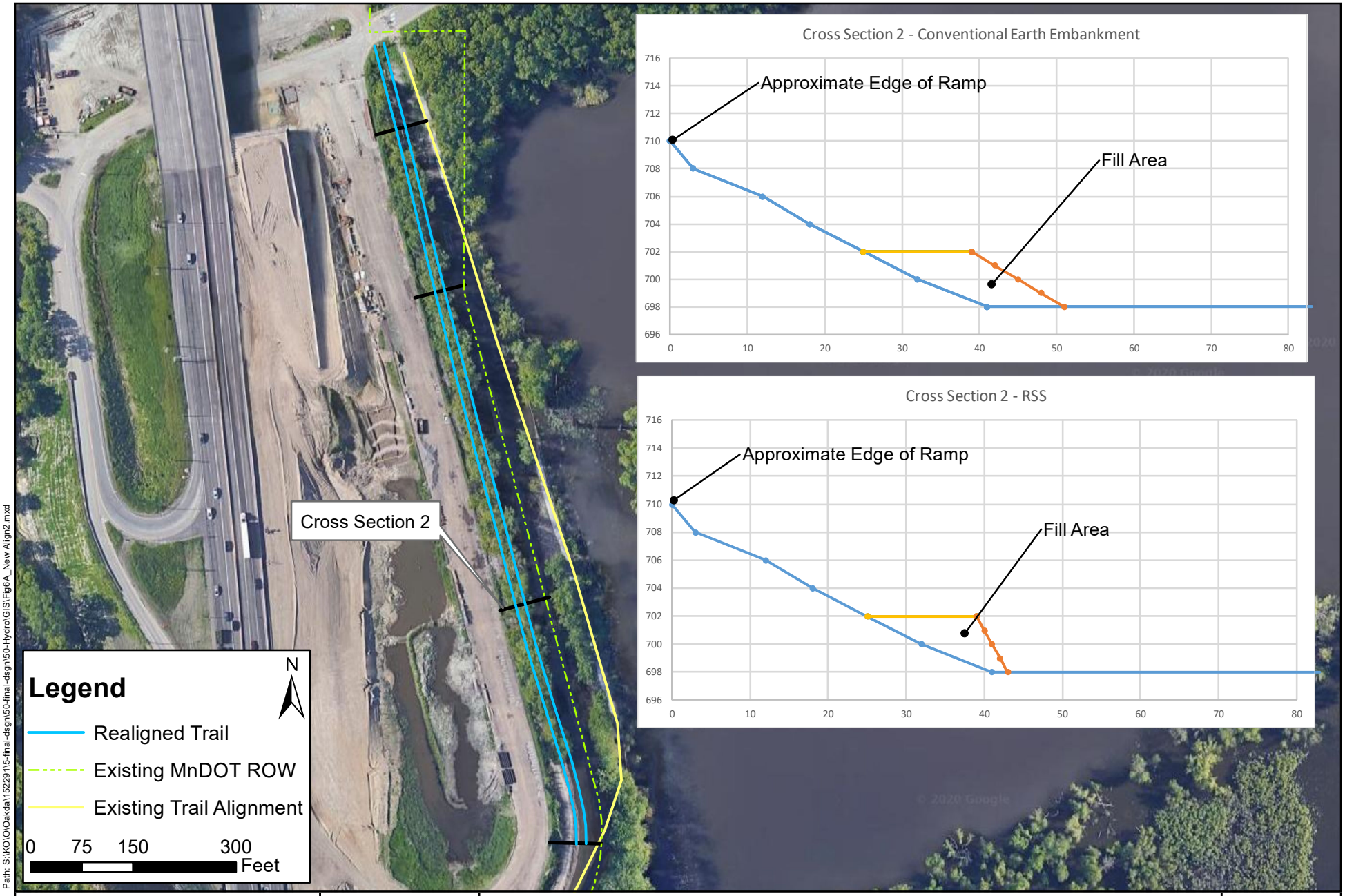
02/06/2020

IMPACT AREA CONCEPT 2
BLACK DOG MN RIVER TRAIL
BURNSVILLE, MINNESOTA

FIGURE
NO. 5



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Print Date: 3/3/2020

Map by: ejennings
Projection: NAD83 HARN Dakota_Ft
Source: SEH, ESRI, Google, FWS, MnDNR

REALIGNED TRAIL

MN RIVER TRAIL FLOOD MITIGATION FEASABILITY STUDY
Burnsville, Dakota County, Minnesota

Figure 6A

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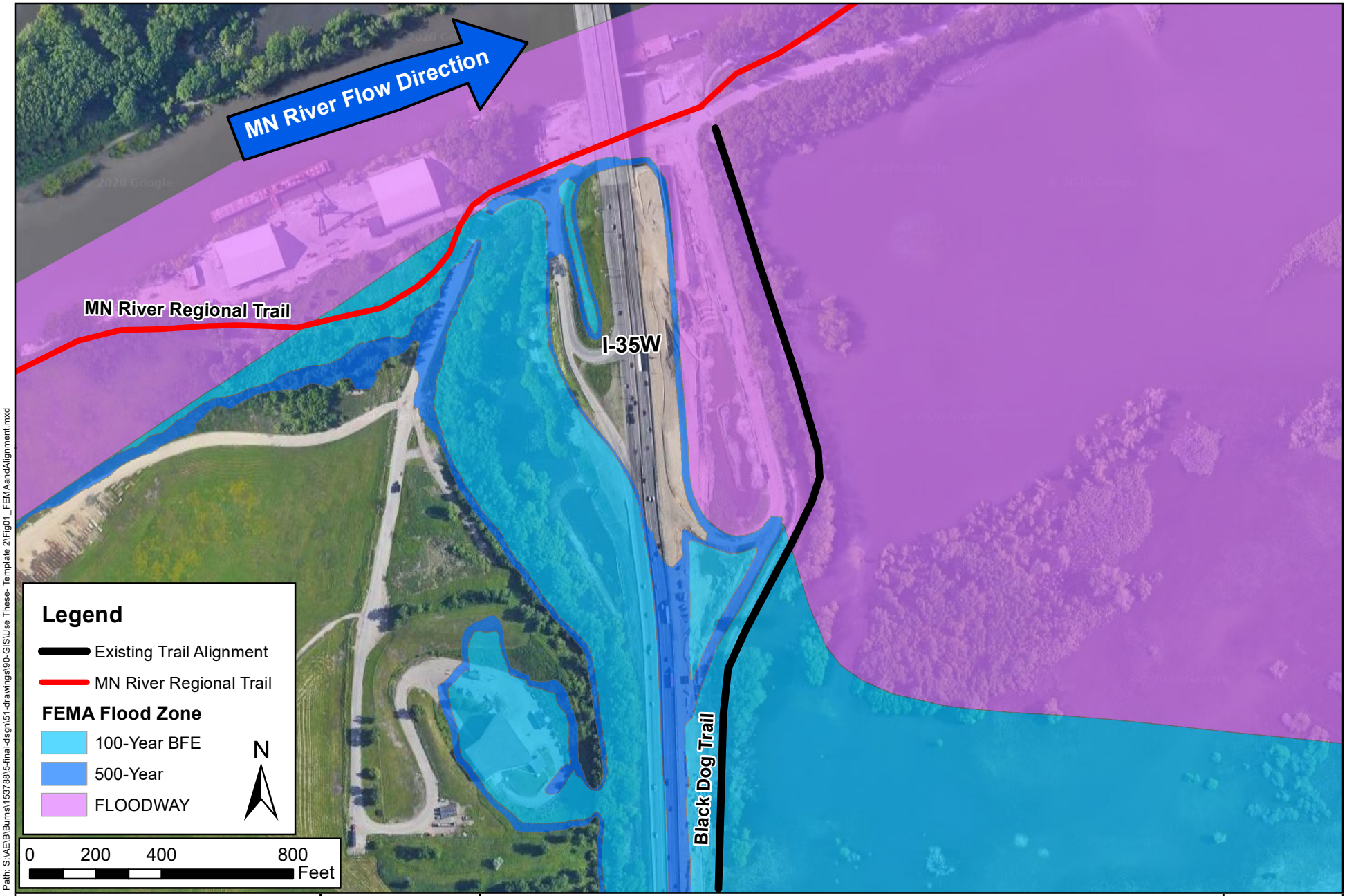

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Map by: ejennings
Projection: NAD83 HARN Dakota_Ft
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FEMA FLOOD ZONES

MN RIVER TRAIL FLOOD MITIGATION FEASABILITY STUDY
Burnsville, Dakota County, Minnesota

Figure 7

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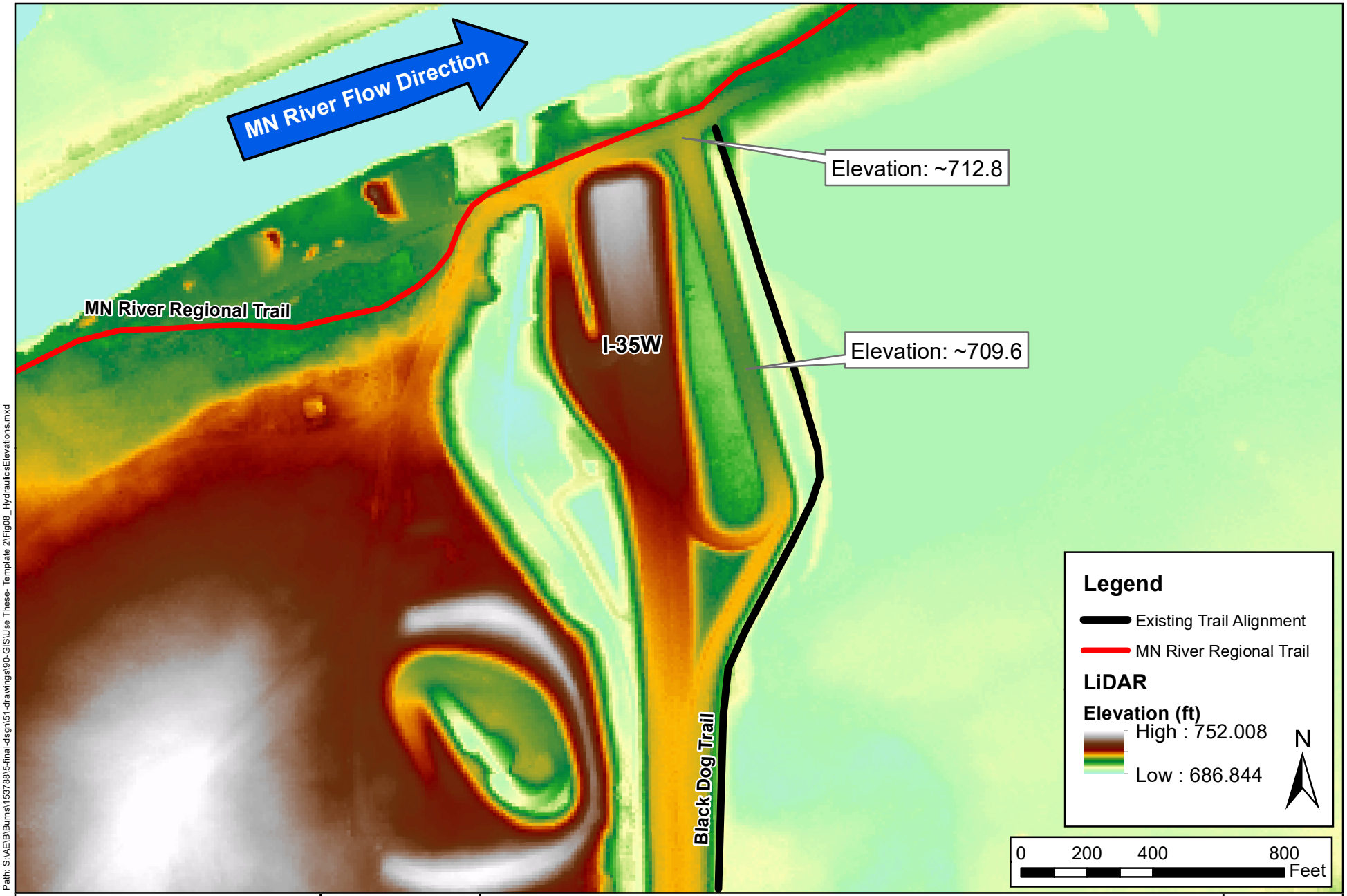

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Print Date: 2/6/2020

Map by: ejennings
Projection: NAD83 HARN Dakota_Ft
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RELAVENT ELEVATIONS

MN RIVER TRAIL FLOOD MITIGATION FEASABILITY STUDY
Burnsville, Dakota County, Minnesota

Figure 8

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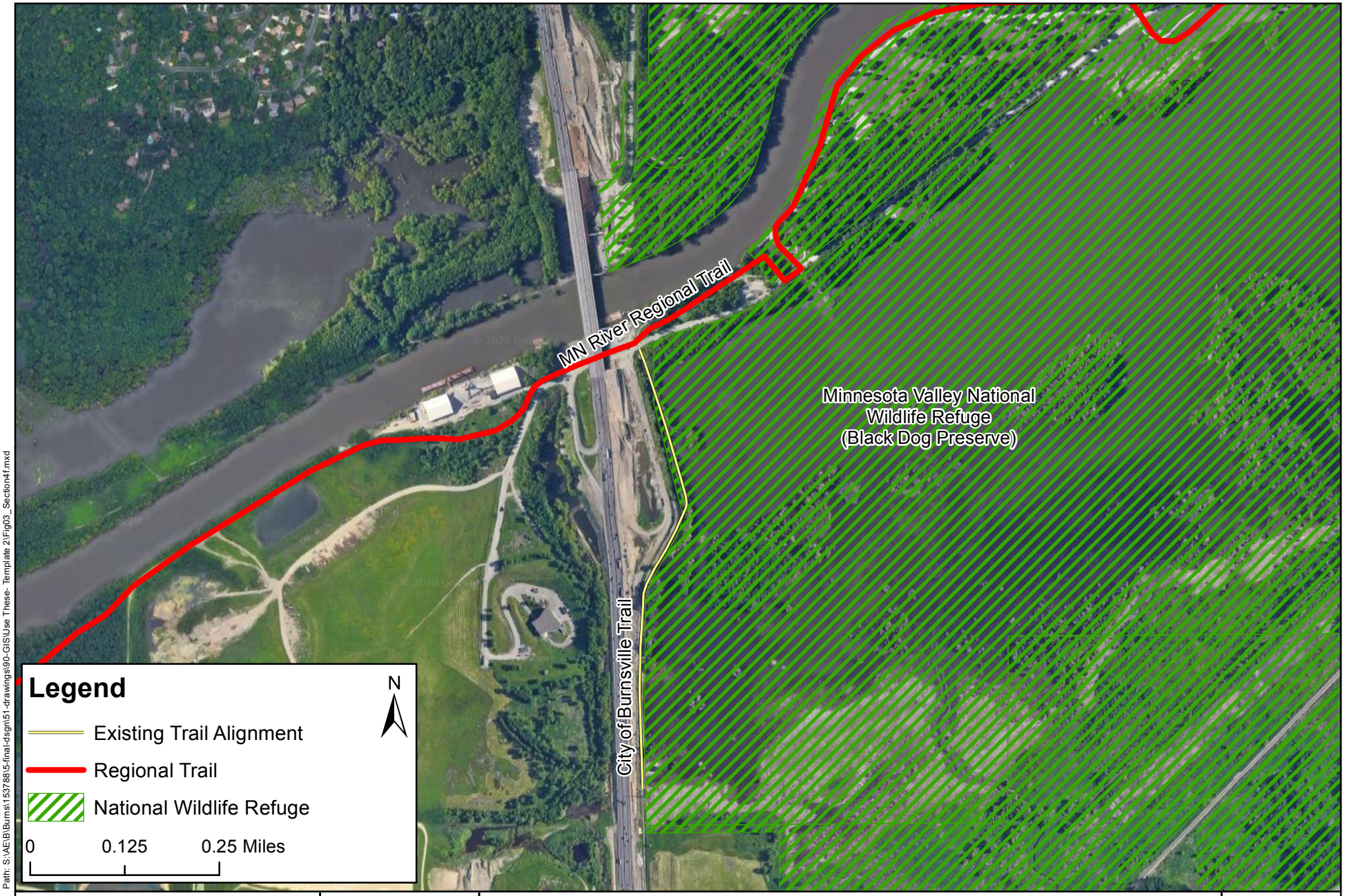

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Project: BURNS 153788
Print Date: 1/31/2020

Map by: rbeduhn
Projection: NAD83 HARN Dakota_Ft
Source: SEH, ESRI, Google, FWS, MnDNR

SECTION 4(f) RESOURCES

MN RIVER TRAIL FLOOD MITIGATION FEASABILITY STUDY
Burnsville, Dakota County, Minnesota

Figure 9

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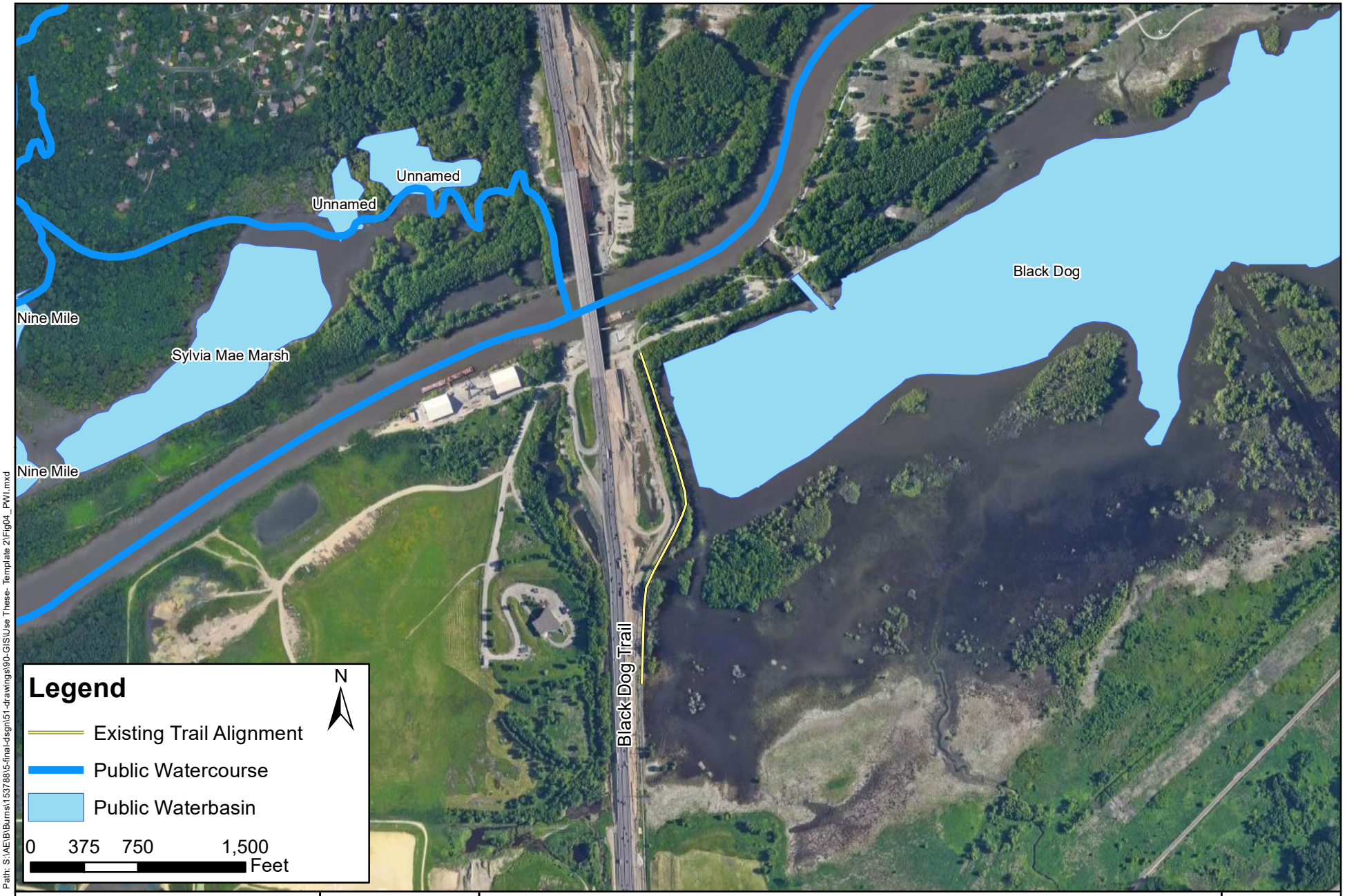

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Map by: ejennings
Projection: NAD83 HARN Dakota_Ft
Source: SEH, ESRI, Google, FWS, MnDNR

MN DNR PUBLIC WATERS INVENTORY

MN RIVER TRAIL FLOOD MITIGATION FEASABILITY STUDY
Burnsville, Dakota County, Minnesota

Figure 10

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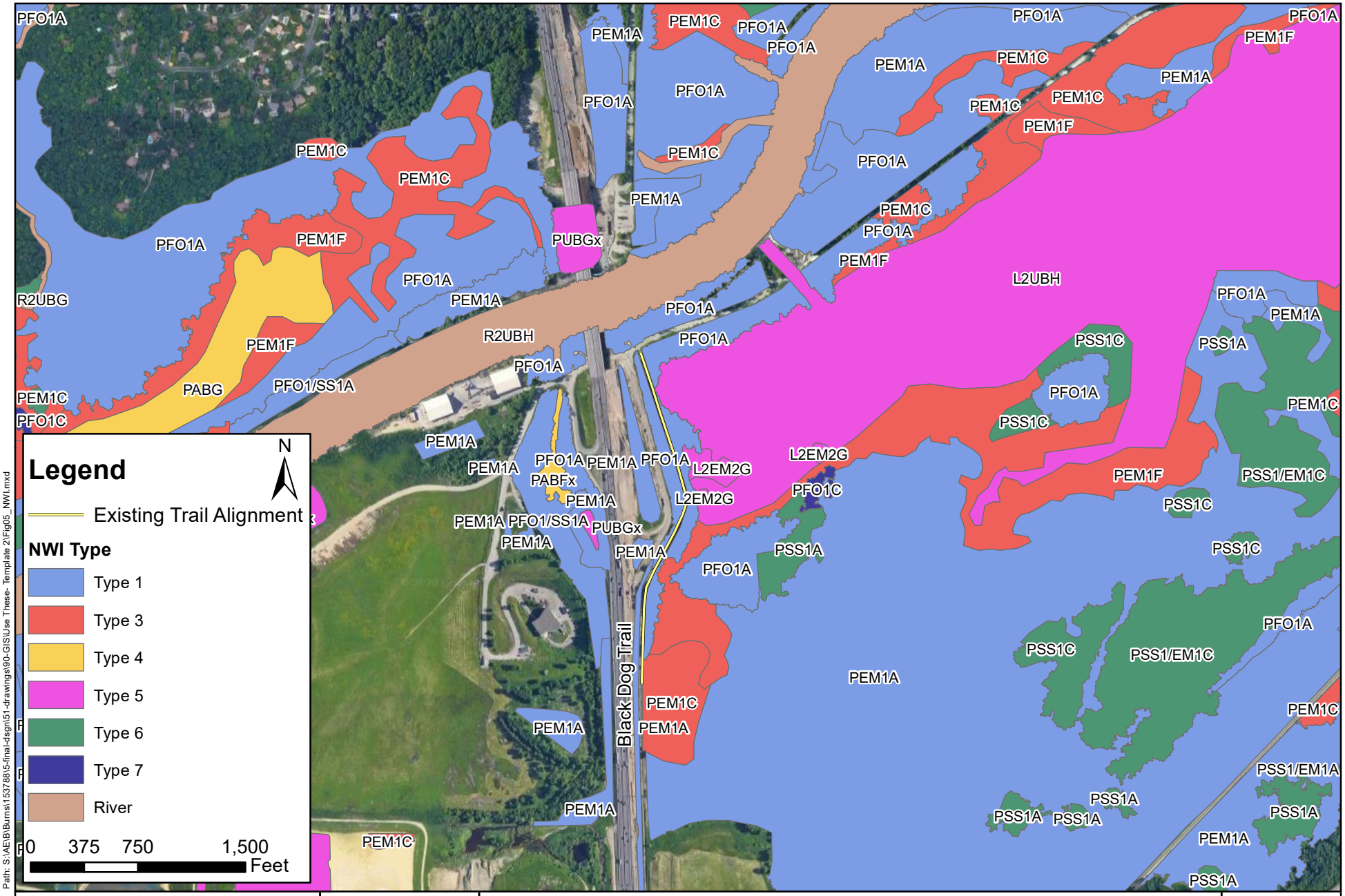

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NATIONAL WETLANDS INVENTORY

MN RIVER TRAIL FLOOD MITIGATION FEASABILITY STUDY
Burnsville, Dakota County, Minnesota

Figure 11

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Appendix A

Opinions of Probable Cost

Burnsville Trail Raise at Black Dog Lake
Concept 1 - Conventional Embankment

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
017113.01	Mobilization	LS	1	$ 15,000.00	$ 15,000.00
024133.01	Remove Bituminous Pavement	SY	650	$ 4.00	$ 2,600.00
024133.02	Sawcut Bituminous Pavement	LF	20	$ 15.00	$ 300.00
024133.02	Salvage 48" Chain link Fence Fabric Remove Posts	LF	1200	$ 7.00	$ 8,400.00
024133	Remove Pipe Culverts	LF	60	$ 8.00	$ 480.00
311100.01	Clearing and Grubbing	EA	11	$ 440.00	$ 4,840.00
312210	Granular Borrow (Includes 30% Shrinkage)	CY	2629	$ 11.00	$ 28,919.00
312310.01	Stripping	CY	644	$ 7.00	$ 4,508.00
312510.02	Silt Fence Heavy Duty	LF	2800	$ 5.00	$ 14,000.00
312510.03	Construction Entrance	EA	2	$ 2,500.00	$ 5,000.00
312510.05	Sediment Control Log	LF	300	$ 3.00	$ 900.00
313410	Geotextile Type 3	SY	75	$ 3.50	$ 262.50
313700	Riprap Cl. II	CY	38	$ 47.00	$ 1,786.00
321111.01	Subgrade Preparation Trail	RD STA	12	$ 3,000.00	$ 36,000.00
321122.01	Aggregate Base Class 5	Ton	528	$ 17.00	$ 8,976.00
321216.01	Type SPWEA240B Wear Course	Ton	161	$ 90.00	$ 14,490.00
321216.02	Type SPNWB230B Non-wear Course	Ton	161	$ 90.00	$ 14,490.00
323113	Install Salvage Chain Link Fence w/New Hardware	LF	1200	$ 22.00	$ 26,400.00
329100.01	Topsoil Borrow	CY	322	$ 20.00	$ 6,440.00
329212.01	Seeding (Seed Mixture MNDOT 36-211)	AC	0.5	$ 6,000.00	$ 3,000.00
329230.01	Erosion Control Blanket Cat. 3N Type Straw 2S	SY	2637	$ 3.00	$ 7,911.00
334100	Install Pipe Culvert (24" CSP)	LF	100	$ 60.00	$ 6,000.00
334100	24" CSP Apron	EA	2	$ 446.00	$ 892.00
CONTINGENCY @ 20%					**$ 42,318.90**
SUBTOTAL TRAIL MODIFICATIONS					**$ 253,913.40**

ENGINEERING, ADMIN AND LEGAL FEES @ 30%	**$ 76,174.02**

TOTAL	**$ 330,087.42**

Burnsville Trail Raise at Black Dog Lake
Concept 2 - Conventional Embankment/Reinforced Soil Slope

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
017113.01	Mobilization	LS	1	$ 43,000.00	$ 43,000.00
024133.01	Remove Bituminous Pavement	SY	650	$ 4.00	$ 2,600.00
024133.02	Sawcut Bituminous Pavement	LF	20	$ 15.00	$ 300.00
024133.02	Salvage 48" Chain link Fence Fabric Remove Posts	LF	1020	$ 7.00	$ 7,140.00
024133	Remove Pipe Culverts	LF	60	$ 8.00	$ 480.00
311100.01	Clearing and Grubbing	EA	11	$ 440.00	$ 4,840.00
312210	Granular Borrow (Includes 30% Shrinkage)	CY	908	$ 11.00	$ 9,988.00
312310.01	Stripping	CY	644	$ 7.00	$ 4,508.00
312510.02	Silt Fence Heavy Duty	LF	2800	$ 5.00	$ 14,000.00
312510.03	Construction Entrance	EA	2	$ 2,500.00	$ 5,000.00
312510.05	Sediment Control Log	LF	300	$ 3.00	$ 900.00
321111.01	Subgrade Preparation Trail	RD STA	12	$ 3,000.00	$ 36,000.00
321122.01	Aggregate Base Class 5	Ton	603	$ 17.00	$ 10,251.00
321216.01	Type SPWEA240B Wear Course	Ton	165	$ 90.00	$ 14,850.00
321216.02	Type SPNWB230B Non-wear Course	Ton	165	$ 90.00	$ 14,850.00
323113	Install Salvage Chain Link Fence w/New Hardware	LF	1200	$ 22.00	$ 26,400.00
323113	Chain Link Fence 48"	LF	650	$ 22.00	$ 14,300.00
323234	Reinforced Soil Slope Trail Section	LF	650	$ 590.00	$ 383,500.00
329100.01	Topsoil Borrow	CY	289	$ 20.00	$ 5,780.00
329212.01	Seeding (Seed Mixture MNDOT 36-211)	AC	0.5	$ 6,000.00	$ 3,000.00
329230.01	Erosion Control Blanket Cat. 3N Type Straw 2S	SY	2373	$ 3.00	$ 7,119.00
334100	Install Pipe Culvert (24" CMP)	LF	100	$ 60.00	$ 6,000.00
334100	24" CSP Apron	EA	2	$ 446.00	$ 892.00
CONTINGENCY @ 20%					**$ 123,139.60**
SUBTOTAL TRAIL MODIFICATIONS					**$ 738,837.60**

ENGINEERING, ADMIN AND LEGAL FEES @ 30%	**$ 221,651.28**

TOTAL	**$ 960,488.88**

Burnsville Trail Raise at Black Dog Lake
Concept 3 - Reinforced Soil Slope

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
017113.01	Mobilization	LS	1	$ 55,000.00	$ 55,000.00
024133.01	Remove Bituminous Pavement	SY	650	$ 4.00	$ 2,600.00
024133.02	Sawcut Bituminous Pavement	LF	20	$ 15.00	$ 300.00
024133.02	Salvage 48" Chain link Fence Fabric Remove Posts	LF	1200	$ 10.00	$ 12,000.00
024133	Remove Pipe Culverts	LF	60	$ 8.00	$ 480.00
311100.01	Clearing and Grubbing	EA	11	$ 440.00	$ 4,840.00
312310.01	Stripping	CY	644	$ 7.00	$ 4,508.00
312510.02	Silt Fence Heavy Duty	LF	2800	$ 5.00	$ 14,000.00
312510.03	Construction Entrance	EA	2	$ 2,500.00	$ 5,000.00
312510.05	Sediment Control Log	LF	300	$ 3.00	$ 900.00
321111.01	Subgrade Preparation Trail	RD STA	12	$ 3,000.00	$ 36,000.00
321122.01	Aggregate Base Class 5	Ton	630	$ 17.00	$ 10,710.00
321216.01	Type SPWEA240B Wear Course	Ton	165	$ 90.00	$ 14,850.00
321216.02	Type SPNWB230B Non-wear Course	Ton	165	$ 90.00	$ 14,850.00
323113	Install Salvage Chain Link Fence w/New Hardware	LF	1200	$ 22.00	$ 26,400.00
323113	Chain Link Fence 48"	LF	700	$ 22.00	$ 15,400.00
323234	Reinforced Soil Slope Trail Section	LF	950	$ 590.00	$ 560,500.00
329100.01	Topsoil Borrow	CY	257	$ 20.00	$ 5,140.00
329212.01	Seeding (Seed Mixture MNDOT 36-211)	AC	0.4	$ 6,000.00	$ 2,400.00
329230.01	Erosion Control Blanket Cat. 3N Type Straw 2S	SY	2110	$ 3.00	$ 6,330.00
024133	Install Pipe Culvert (24" CSP)	LF	100	$ 60.00	$ 6,000.00
334100	24" CSP Apron	EA	2	$ 446.00	$ 892.00
CONTINGENCY @ 20%					**$ 159,820.00**
SUBTOTAL TRAIL MODIFICATIONS					**$ 958,920.00**

ENGINEERING, ADMIN AND LEGAL FEES @ 30%	**$ 287,676.00**

TOTAL	**$ 1,246,596.00**

Burnsville Trail Raise at Black Dog Lake
Concept 4 - Conventional Embankment/Boardwalk

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
017113.01	Mobilization	LS	1	$ 82,000.00	$ 82,000.00
024133.01	Remove Bituminous Pavement	SY	650	$ 4.00	$ 2,600.00
024133.02	Sawcut Bituminous Pavement	LF	20	$ 15.00	$ 300.00
024133.02	Salvage 48" Chain link Fence Fabric Remove Posts	LF	1200	$ 10.00	$ 12,000.00
024133	Remove Pipe Culverts	LF	60	$ 8.00	$ 480.00
311100.01	Clearing and Grubbing	EA	11	$ 440.00	$ 4,840.00
312310.01	Stripping	CY	644	$ 7.00	$ 4,508.00
312510.02	Silt Fence Heavy Duty	LF	2800	$ 5.00	$ 14,000.00
312510.03	Construction Entrance	EA	2	$ 2,500.00	$ 5,000.00
312510.05	Sediment Control Log	LF	300	$ 3.00	$ 900.00
321111.01	Subgrade Preparation Trail	RD STA	5.5	$ 3,000.00	$ 16,500.00
321122.01	Aggregate Base Class 5	Ton	302	$ 17.00	$ 5,140.80
321216.01	Type SPWEA240B Wear Course	Ton	79	$ 90.00	$ 7,128.00
321216.02	Type SPNWB230B Non-wear Course	Ton	79	$ 90.00	$ 7,128.00
323113	Install Salvage Chain Link Fence w/New Hardware	LF	1200	$ 22.00	$ 26,400.00
	Boardwalk (Timber Deck w/ Guardrails)	LF	650	$ 1,500.00	$ 975,000.00
329100.01	Topsoil Borrow	CY	257	$ 20.00	$ 5,140.00
329212.01	Seeding (Seed Mixture MNDOT 36-211)	AC	0.4	$ 6,000.00	$ 2,400.00
329230.01	Erosion Control Blanket Cat. 3N Type Straw 2S	SY	2110	$ 3.00	$ 6,330.00
024133	Install Pipe Culvert (24" CSP)	LF	100	$ 60.00	$ 6,000.00
334100	24" CSP Apron	EA	2	$ 446.00	$ 892.00
CONTINGENCY @ 20%					**$ 236,937.36**
SUBTOTAL TRAIL MODIFICATIONS					**$ 1,421,624.16**

ENGINEERING, ADMIN AND LEGAL FEES @ 30%	**$ 426,487.25**

TOTAL	**$ 1,848,111.41**

Burnsville Trail Raise at Black Dog Lake
Concept 5 - Realigned Trail Conventional Embankment

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
017113.01	Mobilization	LS	1	$ 30,000.00	$ 30,000.00
024133.01	Remove Bituminous Pavement	SY	650	$ 4.00	$ 2,600.00
024133.02	Sawcut Bituminous Pavement	LF	20	$ 15.00	$ 300.00
024133.02	Salvage 48" Chain link Fence Fabric Remove Posts	LF	1200	$ 7.00	$ 8,400.00
311100.01	Clearing and Grubbing	ACRE	3.4	$ 500.00	$ 1,700.00
312210	Granular Borrow (Includes 30% Shrinkage)	CY	2340	$ 11.00	$ 25,740.00
312310.01	Stripping	CY	644	$ 7.00	$ 4,508.00
312510.02	Silt Fence Heavy Duty	LF	2800	$ 5.00	$ 14,000.00
312510.03	Construction Entrance	EA	2	$ 2,500.00	$ 5,000.00
312510.05	Sediment Control Log	LF	300	$ 3.00	$ 900.00
321111.01	Subgrade Preparation Trail	RD STA	12.5	$ 3,000.00	$ 37,500.00
321122.01	Aggregate Base Class 5	Ton	630	$ 17.00	$ 10,710.00
321216.01	Type SPWEA240B Wear Course	Ton	175	$ 90.00	$ 15,750.00
321216.02	Type SPNWB230B Non-wear Course	Ton	175	$ 90.00	$ 15,750.00
323113	Install Salvage Chain Link Fence w/New Hardware	LF	1200	$ 22.00	$ 26,400.00
	Concrete Median Barrier	LF	1250	$ 150.00	$ 187,500.00
329100.01	Topsoil Borrow	CY	322	$ 20.00	$ 6,440.00
329212.01	Seeding (Seed Mixture MNDOT 36-211)	AC	0.5	$ 6,000.00	$ 3,000.00
329230.01	Erosion Control Blanket Cat. 3N Type Straw 2S	SY	2637	$ 3.00	$ 7,911.00
CONTINGENCY @ 20%					**$ 80,821.80**
SUBTOTAL TRAIL MODIFICATIONS					**$ 484,930.80**

ENGINEERING, ADMIN AND LEGAL FEES @ 30%	**$ 145,479.24**

TOTAL	**$ 630,410.04**

Burnsville Trail Raise at Black Dog Lake
Concept 6 - Realigned Trail Reinforced Soil Slope

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
017113.01	Mobilization	LS	1	$ 85,000.00	$ 85,000.00
024133.01	Remove Bituminous Pavement	SY	650	$ 4.00	$ 2,600.00
024133.02	Sawcut Bituminous Pavement	LF	20	$ 15.00	$ 300.00
024133.02	Salvage 48" Chain link Fence Fabric Remove Posts	LF	1200	$ 7.00	$ 8,400.00
311100.01	Clearing and Grubbing	ACRE	3.4	$ 500.00	$ 1,700.00
312210	Granular Borrow (Includes 30% Shrinkage)	CY	1625	$ 11.00	$ 17,875.00
312310.01	Stripping	CY	515	$ 7.00	$ 3,606.40
312510.02	Silt Fence Heavy Duty	LF	2800	$ 5.00	$ 14,000.00
312510.03	Construction Entrance	EA	2	$ 2,500.00	$ 5,000.00
312510.05	Sediment Control Log	LF	300	$ 3.00	$ 900.00
321111.01	Subgrade Preparation Trail	RD STA	12.5	$ 3,000.00	$ 37,500.00
321122.01	Aggregate Base Class 5	Ton	630	$ 17.00	$ 10,710.00
321216.01	Type SPWEA240B Wear Course	Ton	175	$ 90.00	$ 15,750.00
321216.02	Type SPNWB230B Non-wear Course	Ton	175	$ 90.00	$ 15,750.00
323113	Install Salvage Chain Link Fence w/New Hardware	LF	1200	$ 22.00	$ 26,400.00
	Concrete Median Barrier	LF	1250	$ 150.00	$ 187,500.00
323113	Chain Link Fence 48"	LF	1250	$ 22.00	$ 27,500.00
323234	Reinforced Soil Slope Trail Section	LF	1250	$ 590.00	$ 737,500.00
329100.01	Topsoil Borrow	CY	258	$ 20.00	$ 5,152.00
329212.01	Seeding (Seed Mixture MNDOT 36-211)	AC	0.4	$ 6,000.00	$ 2,400.00
329230.01	Erosion Control Blanket Cat. 3N Type Straw 2S	SY	2110	$ 3.00	$ 6,328.80
CONTINGENCY @ 20%					**$ 242,374.44**
SUBTOTAL TRAIL MODIFICATIONS					**$ 1,454,246.64**

ENGINEERING, ADMIN AND LEGAL FEES @ 30%	**$ 436,273.99**

TOTAL	**$ 1,890,520.63**

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