



Application

04786 - 2016 Multiuse Trails and Bicycle Facilities

05348 - Hopkins to Chaska LRT Corridor Slope Restoration

Regional Solicitation - Bicycle and Pedestrian Facilities

Status: Submitted

Submitted Date: 07/15/2016 10:42 AM

Primary Contact

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	<small>City</small>	<small>State/Province</small>	<small>Postal Code/Zip</small>
Phone:*	612-348-2691		
	<small>Phone</small>	<small>Ext.</small>	
Fax:			
What Grant Programs are you most interested in?	Regional Solicitation - Bicycle and Pedestrian Facilities		

Organization Information

Name: HENNEPIN COUNTY

Jurisdictional Agency (if different):

Organization Type: County Government

Organization Website:

Address: 701 FOURTH AVE S #400

* MINNEAPOLIS Minnesota 55401-1362
City State/Province Postal Code/Zip

County: Hennepin

Phone:* 612-348-9260
Ext.

Fax:

PeopleSoft Vendor Number 0000028004A19

Project Information

Project Name Hopkins to Chaska LRT Corridor Slope Restoration

Primary County where the Project is Located Carver

Jurisdictional Agency (If Different than the Applicant): Hennepin County Regional Railroad Authority

Brief Project Description (Limit 2,800 characters; approximately 400 words)

The Hopkins to Chaska LRT Corridor Slope Restoration would restore an 80 foot vertical slope failure on the Hennepin County Regional Railroad Authority's Hopkins to Chaska LRT corridor in Chanhassen between Pioneer Trail and Highway 101. The damage happened in June 2014 during a federally designated disaster that caused millions of dollars in damage from flooding and erosion across the State of Minnesota.

Three Rivers Park District's Minnesota Rivers Bluffs LRT Regional Trail sits at the top of a constructed embankment on the corridor. The failure occurred at the edge of the trail, but it was impossible to know the structural integrity of the remaining slope so the trail was closed immediately and has remained closed since June 2014.

Restoration would reopen the regional trail that was originally constructed on the corridor 1994. The trail serves over 250,000 visits each year but currently has a 6-mile detour that includes bicycle and pedestrian travel on narrow shoulders along a major county road.

The slope failure is in a ravine where the trail used the rail corridor as a land bridge. Reconstruction of the slope is the lowest cost solution to reopen the trail and ensure public safety.

Include location, road name/functional class, type of improvement, etc.

TIP Description Guidance (will be used in TIP if the project is selected for funding)

CHANHASSEN, BETWEEN PIONEER TRAIL & HIGHWAY 101, RESTORE 80-FOOT SLOPE FAILURE TO REOPEN MN RIVER BLUFFS LRT REGIONAL TRAIL

Project Length (Miles)

1.42

Project Funding

Are you applying for funds from another source(s) to implement this project?

No

If yes, please identify the source(s)

Federal Amount \$1,420,800.00

Match Amount \$355,200.00

Minimum of 20% of project total

Project Total \$1,776,000.00

Match Percentage 20.0%

Minimum of 20%

Compute the match percentage by dividing the match amount by the project total

Source of Match Funds HCRRA; may include other partners such as Carver County, Three Rivers Park District and the City of Chanhassen

A minimum of 20% of the total project cost must come from non-federal sources; additional match funds over the 20% minimum can come from other federal sources

Preferred Program Year

Select one: 2020

For TDM projects, select 2018 or 2019. For Roadway, Transit, or Trail/Pedestrian projects, select 2020 or 2021.

Additional Program Years: 2017, 2018, 2019

Select all years that are feasible if funding in an earlier year becomes available.

Project Information

County, City, or Lead Agency Hennepin County Regional Railroad Authority

Zip Code where Majority of Work is Being Performed 55318

(Approximate) Begin Construction Date 06/01/2017

(Approximate) End Construction Date 10/31/2017

Name of Trail/Ped Facility: Minnesota Rivers Bluffs LRT Regional Trail

(i.e., CEDAR LAKE TRAIL)

TERMINI:(Termini listed must be within 0.3 miles of any work)

From: Pioneer Trail & MN Rivers Bluffs LRT Regional Trail
(Intersection or Address)

To: Highway 101 & MN River Bluffs LRT Regional Trail
(Intersection or Address)

*DO NOT INCLUDE LEGAL DESCRIPTION; INCLUDE NAME OF ROADWAY
IF MAJORITY OF FACILITY RUNS ADJACENT TO A SINGLE CORRIDOR*

Or At:

Primary Types of Work Slope reconstruction

*Examples: GRADE, AGG BASE, BIT BASE, BIT SURF,
SIDEWALK, SIGNALS, LIGHTING, GUARDRAIL, BIKE PATH,
PED RAMPS, BRIDGE, PARK AND RIDE, ETC.*

BRIDGE/CULVERT PROJECTS (IF APPLICABLE)

Old Bridge/Culvert No.:

New Bridge/Culvert No.:

Structure is Over/Under
(Bridge or culvert name):

Specific Roadway Elements

CONSTRUCTION PROJECT ELEMENTS/COST ESTIMATES	Cost
Mobilization (approx. 5% of total cost)	\$0.00
Removals (approx. 5% of total cost)	\$0.00
Roadway (grading, borrow, etc.)	\$0.00
Roadway (aggregates and paving)	\$0.00
Subgrade Correction (muck)	\$0.00
Storm Sewer	\$0.00
Ponds	\$0.00
Concrete Items (curb & gutter, sidewalks, median barriers)	\$0.00
Traffic Control	\$0.00
Striping	\$0.00
Signing	\$0.00
Lighting	\$0.00
Turf - Erosion & Landscaping	\$0.00
Bridge	\$0.00
Retaining Walls	\$0.00
Noise Wall (do not include in cost effectiveness measure)	\$0.00
Traffic Signals	\$0.00
Wetland Mitigation	\$0.00
Other Natural and Cultural Resource Protection	\$0.00
RR Crossing	\$0.00
Roadway Contingencies	\$0.00
Other Roadway Elements	\$0.00
Totals	\$0.00

Specific Bicycle and Pedestrian Elements

CONSTRUCTION PROJECT ELEMENTS/COST ESTIMATES	Cost
Path/Trail Construction	\$1,760,000.00

Sidewalk Construction	\$0.00
On-Street Bicycle Facility Construction	\$0.00
Right-of-Way	\$0.00
Pedestrian Curb Ramps (ADA)	\$0.00
Crossing Aids (e.g., Audible Pedestrian Signals, HAWK)	\$0.00
Pedestrian-scale Lighting	\$0.00
Streetscaping	\$0.00
Wayfinding	\$0.00
Bicycle and Pedestrian Contingencies	\$0.00
Other Bicycle and Pedestrian Elements	\$0.00
Totals	\$1,760,000.00

Specific Transit and TDM Elements

CONSTRUCTION PROJECT ELEMENTS/COST ESTIMATES	Cost
Fixed Guideway Elements	\$0.00
Stations, Stops, and Terminals	\$0.00
Support Facilities	\$0.00
Transit Systems (e.g. communications, signals, controls, fare collection, etc.)	\$0.00
Vehicles	\$0.00
Contingencies	\$0.00
Right-of-Way	\$0.00
Other Transit and TDM Elements	\$0.00
Totals	\$0.00

Transit Operating Costs

Number of Platform hours	0
Cost Per Platform hour (full loaded Cost)	\$0.00
Subtotal	\$0.00
Other Costs - Administration, Overhead, etc.	\$0.00

Totals

Total Cost	\$1,760,000.00
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Construction Cost Total	\$1,760,000.00
Transit Operating Cost Total	\$0.00

Requirements - All Projects

All Projects

1. The project must be consistent with the goals and policies in these adopted regional plans: Thrive MSP 2040 (2014), the 2040 Transportation Policy Plan, the 2040 Regional Parks Policy Plan (2015), and the 2040 Water Resources Policy Plan (2015).

Check the box to indicate that the project meets this requirement. Yes

2. The project must be consistent with the 2040 Transportation Policy Plan. Reference the 2040 Transportation Plan objectives and strategies that relate to the project.

Strategy C15. in Chapter 2, Transportation Strategies (p. 2.10), of the Thrive 2040 Transportation Policy Plan states, "Regional transportation partners should focus investments on completing Priority Regional Bicycle Transportation Corridors and on improving the larger Regional Bicycle Transportation Network." The Minnesota River Bluffs LRT Regional Trail is a designated Tier 1 Alignment on the Regional Bicycle Transportation Network, and is a link between a Tier 1 Priority Regional Bicycle Transportation Corridor and a Tier 2 Regional Bicycle Transportation Corridor. The Regional Bicycle Transportation Network is included in both the Transportation Policy Plan and the Regional Parks Policy Plan, both adopted in 2015.

List the goals, objectives, strategies, and associated pages:

The TPP also states that, "Tier 1, Priority Regional Bicycle Transportation Corridors and Alignments (as previously shown in Figure 7-1) should be given the highest priority for transportation funding; these are the corridors and alignments determined through the Regional Bicycle System Study (2014) to provide the highest transportation function by connecting the most regional activity centers through the developed urban and suburban areas of the region" (p. 7.22).

Restoration of this vital regional trail supports other strategies in the TPP, including but not limited to: those promoting preservation of existing infrastructure and existing right of way (A1 and C6), economic competitiveness (D4), and air quality (E2). As stated in the TPP, "According to Metropolitan Council estimate, there were over 11 million visits to the 300 miles of regional trail in 2012, which is a 69% increase in 10 years. This documented demand for on- and off-street bikeway facilities offers a significant opportunity for a modal

shift that would help to reduce congestion, improve air quality, improve personal health, and is an attractive and marketable component for making the Twin Cities a desirable place to live" (p. 7.4).

(Limit 2500 characters; approximately 750 words)

3. The project or the transportation problem/need that the project addresses must be in a local planning or programming document. Reference the name of the appropriate comprehensive plan, regional/statewide plan, capital improvement program, corridor study document [studies on trunk highway must be approved by the Minnesota Department of Transportation and the Metropolitan Council], or other official plan or program of the applicant agency [includes Safe Routes to School Plans] that the project is included in and/or a transportation problem/need that the project addresses.

The Minnesota River Bluffs LRT Regional Trail is an existing regional trail that serves over 250,000 trail visits per year. The regional trail is identified in the following comprehensive and systems plans:

Carver County Parks, Open Space, and Trail System Plan (amended 2015), Figure 6.8

List the applicable documents and pages:

Three Rivers Park District Vision Plan (2010), Figure 1

City of Chanhassen 2030 Comprehensive Plan (2008), Figure 6-1

City of Chaska 2030 Comprehensive Plan (2009), Figure 7.1

(Limit 2500 characters; approximately 750 words)

4. The project must exclude costs for studies, preliminary engineering, design, or construction engineering. Right-of-way costs are only eligible as part of bicycle/pedestrian projects, transit stations/stops, transit terminals, park-and-ride facilities, or pool-and-ride lots. Noise barriers, drainage projects, fences, landscaping, etc., are not eligible for funding as a standalone project, but can be included as part of the larger submitted project, which is otherwise eligible.

Check the box to indicate that the project meets this requirement. Yes

5. Applicants that are not cities or counties in the seven-county metro area with populations over 5,000 must contact the MnDOT Metro State Aid Office prior to submitting their application to determine if a public agency sponsor is required.

Check the box to indicate that the project meets this requirement. Yes

6. Applicants must not submit an application for the same project in more than one funding sub-category.

Check the box to indicate that the project meets this requirement. Yes

7. The requested funding amount must be more than or equal to the minimum award and less than or equal to the maximum award. The cost of preparing a project for funding authorization can be substantial. For that reason, minimum federal amounts apply. Other federal funds may be combined with the requested funds for projects exceeding the maximum award, but the source(s) must be identified in the application. Funding amounts by application category are listed below.

Multiuse Trails and Bicycle Facilities: \$250,000 to \$5,500,000

Pedestrian Facilities (Sidewalks, Streetscaping, and ADA): \$250,000 to \$1,000,000

Safe Routes to School: \$150,000 to \$1,000,000

Check the box to indicate that the project meets this requirement. Yes

8. The project must comply with the Americans with Disabilities Act.

Check the box to indicate that the project meets this requirement. Yes

9. The project must be accessible and open to the general public.

Check the box to indicate that the project meets this requirement. Yes

10. The owner/operator of the facility must operate and maintain the project for the useful life of the improvement.

Check the box to indicate that the project meets this requirement. Yes

11. The project must represent a permanent improvement with independent utility. The term independent utility means the project provides benefits described in the application by itself and does not depend on any construction elements of the project being funded from other sources outside the regional solicitation, excluding the required non-federal match. Projects that include traffic management or transit operating funds as part of a construction project are exempt from this policy.

Check the box to indicate that the project meets this requirement. Yes

12. The project must not be a temporary construction project. A temporary construction project is defined as work that must be replaced within five years and is ineligible for funding. The project must also not be staged construction where the project will be replaced as part of future stages. Staged construction is eligible for funding as long as future stages build on, rather than replace, previous work.

Check the box to indicate that the project meets this requirement. Yes

13. The project applicant must send written notification regarding the proposed project to all affected state and local units of government prior to submitting the application.

Check the box to indicate that the project meets this requirement. Yes

Requirements - Bicycle and Pedestrian Facilities Projects

1. All projects must relate to surface transportation. As an example, for multiuse trail and bicycle facilities, surface transportation is defined as primarily serving a commuting purpose and/or that connect two destination points. A facility may serve both a transportation purpose and a recreational purpose; a facility that connects people to recreational destinations may be considered to have a transportation purpose.

Check the box to indicate that the project meets this requirement. Yes

Multiuse Trails on Active Railroad Right-of-Way:

2. All multiuse trail projects that are located within right-of-way occupied by an active railroad must attach an agreement with the railroad that this right-of-way will be used for trail purposes.

Check the box to indicate that the project meets this requirement.

Safe Routes to School projects only:

3. All projects must be located within a two-mile radius of the associated primary, middle, or high school site.

Check the box to indicate that the project meets this requirement.

4. All schools benefitting from the SRTS program must conduct after-implementation surveys. These include the student travel tally form and the parent survey available on the National Center for SRTS website. The school(s) must submit the after-evaluation data to the National Center for SRTS within a year of the project completion date. Additional guidance regarding evaluation can be found at the MnDOT SRTS website.

Check the box to indicate that the applicant understands this requirement and will submit data to the National Center for SRTS within one year of project completion.

Requirements - Bicycle and Pedestrian Facilities Projects

Measure A: Project Location Relative to the RBTN

Select one:

Tier 1, Priority RBTN Corridor

Tier 1, RBTN Alignment Yes

Tier 2, RBTN Corridor

Tier 2, RBTN Alignment

Direct connection to an RBTN Tier 1 corridor or alignment

Direct connection to an RBTN Tier 2 corridor or alignment

OR

Project is not located on or directly connected to the RBTN, but is part of a local system and identified within an adopted county, city or regional parks implementing agency plan.

Upload Map 1468421423431_Project to RBTN Orientation Map.pdf

Measure A: Population Summary

Existing Population Within One Mile (Integer Only) 11594

Existing Employment Within One Mile (Integer Only) 2721

Upload the "Population Summary" map 1468421510710_Population Summary Map.pdf

Measure A: Project Location and Impact to Disadvantaged Populations

Select one:

Project located in Area of Concentrated Poverty with 50% or more of residents are people of color (ACP50):

Project located in Area of Concentrated Poverty:

Projects census tracts are above the regional average for population in poverty or population of color:

Project located in a census tract that is below the regional average for population in poverty or populations of color or includes children, people with disabilities, or the elderly:

The Minnesota River Bluffs LRT Regional Trail receives over 250,000 visits per year. Since its closure between Pioneer Trail and Highway 101 in Chanhassen in June 2014, trail users have had to use a 2-mile detour that uses narrow shoulders on a major county road.

Response (Limit 2,800 characters; approximately 400 words)

The proposed restoration project is not in an Area of Concentrated Poverty, nor is it in a targeted census tract. However, this trail is the primary connection for Carver County residents to 300 miles of regional trails.

The response should address the benefits, impacts, and mitigation for the populations affected by the project.

Upload Map

1468357546247_Socio-Economic Conditions Map.pdf

Measure B: Affordable Housing

City/Township	Segment Length in Miles (Population)
Chanhassen	1.42
	1

Total Project Length

Total Project Length (Total Population)	1.42
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Affordable Housing Scoring - To Be Completed By Metropolitan Council Staff

City/Township	Segment Length (Miles)	Total Length (Miles)	Score	Segment Length/Total Length	Housing Score Multiplied by Segment percent
		0	0	0	0

Affordable Housing Scoring - To Be Completed By Metropolitan Council Staff

Total Project Length (Miles)	1.42
Total Housing Score	0

Measure A: Gaps, Barriers and Continuity/Connections

Check all that apply:

Gap improvements can be on or off the RBTN and may include the following:

- Providing a missing link between existing or improved segments of a regional (i.e., RBTN) or local transportation network;

- Improving bikeability to better serve all ability and experience levels by:

- Providing a safer, more protected on-street facility;

- Improving crossings at busy intersections (signals, signage, pavement markings); OR

- Improving a bike route or providing a trail parallel to a highway or arterial roadway along a lower-volume neighborhood collector or local street. Barrier crossing improvements (on or off the RBTN) can include crossings (over or under) of rivers or streams, railroad corridors, freeways, or multi-lane highways, or enhanced routes to circumvent the barrier by channeling bicyclists to existing safe crossings or grade separations. (For new barrier crossing projects, data about the nearest parallel crossing (as described above) must be included in the application to be considered for the full allotment of points under this criterion).

Closes a transportation network gap and/or provides a facility that crosses or circumvents a physical barrier

Yes

Improves continuity and/or connections between jurisdictions (on or off the RBTN) (e.g., extending a specific bikeway facility treatment across jurisdictions to improve consistency and inherent bikeability)

Improves Continuity and/or Connections Between Jurisdictions

Yes

The Minnesota River Bluffs LRT Regional Trail is identified as a Tier 1 Alignment of the Regional Bicycle Transportation Network; however, this trail has been closed since June 2014 due to a slope failure during a federally recognized disaster. Trail users are currently forced to take a 6-mile detour on the narrow shoulders of a major county road.

The closure begins at the county line between Hennepin and Carver Counties, thereby preventing Carver County residents seamless access to the Regional Bicycle Transportation Network.

Response (Limit 2,800 characters; approximately 400 words)

Over the past several years, Carver County has improved connections on this regional trail ("MN River Bluffs LRT Regional Trail - Chaska Boulevard to Bluff Creek Drive") and extended it from downtown Chaska to the City of Carver ("MN River Bluffs LRT Regional Trail Extension - Chaska to Carver"). The trail closure in Chanhassen is a gap in the continuous regional trail network, which is especially regretful in light of recent improvements to the west.

Measure B: Project Improvements

Response (Limit 2,800 characters; approximately 400 words)

The Minnesota River Bluffs LRT Regional Trail is one of four Three Rivers Park District regional trails located on Hennepin County Regional Railroad Authority corridors. HCRRA's mission is to preserve abandoned railroad corridors for future transportation purposes, including trails. The inherent nature of railroad corridors results in built-in safety provisions to the regional trails located on the corridors, including flat grades and few road crossings. Flat grades make the trails accessible to a wide range of users and the limited number of road crossings decreases interaction with motor vehicles. Railroad corridors often traverse areas of urban environments not otherwise accessible, and can provide a peaceful trail experience in a natural setting that is unique to repurposed railroad corridors.

Restoration of the trail would also allow trail users to stop using the 6-mile detour (see attached map) that requires a $\frac{3}{4}$ mile section on the shoulders of Pioneer Trail between Highway 101 and Powers Boulevard. Three Rivers Park District's website cautions trail users that, "This is a busy roadway which may not be suitable for all ages and abilities."

Measure A: Multimodal Elements

Response (Limit 1,400 characters; approximately 200 words)

The proposed project would restore a major slope failure and reopen the Minnesota River Bluffs LRT Regional Trail. The trail has been serving multimodal trips since its construction in 1994. The trail also encourages multimodal trips by connecting to a large number of regional and local destinations via the regional trail system. Further, the trail connects to the regional transit system, including SouthWest Transit, SmartLink Transit, and Metro Transit. This corridor is also being preserved for future transit purposes, e.g., LRT. A vibrant regional trail on the corridor will support future transit and further increase future multimodal trips.

Transit Projects Not Requiring Construction

If the applicant is completing a transit or TDM application that is operations only, check the box and do not complete the remainder of the form. These projects will receive full points for the Risk Assessment.

Park-and-Ride and other transit construction projects require completion of the Risk Assessment below.

Check Here if Your Transit Project Does Not Require Construction

Measure A: Risk Assessment

1)Project Scope (5 Percent of Points)

Meetings or contacts with stakeholders have occurred Yes

100%

Stakeholders have been identified

40%

Stakeholders have not been identified or contacted

0%

2)Layout or Preliminary Plan (5 Percent of Points)

Layout or Preliminary Plan completed Yes

100%

Layout or Preliminary Plan started

50%

Layout or Preliminary Plan has not been started

0%

Anticipated date or date of completion 02/01/2016

3)Environmental Documentation (5 Percent of Points)

EIS

EA

PM

Document Status:

Document approved (include copy of signed cover sheet)

100%

Document submitted to State Aid for review

75%

date submitted

Document in progress; environmental impacts identified; review request letters sent

50%

Document not started

Yes

0%

Anticipated date or date of completion/approval

02/01/2017

4)Review of Section 106 Historic Resources (10 Percent of Points)

No known historic properties eligible for or listed in the National Register of Historic Places are located in the project area, and project is not located on an identified historic bridge

100%

Historic/archeological review under way; determination of no historic properties affected or no adverse effect anticipated

Yes

80%

Historic/archaeological review under way; determination of adverse effect anticipated

40%

Unsure if there are any historic/archaeological resources in the project area

0%

Anticipated date or date of completion of historic/archeological review:

02/01/2017

Project is located on an identified historic bridge

5)Review of Section 4f/6f Resources (10 Percent of Points)

4(f) Does the project impacts any public parks, public wildlife refuges, public golf courses, wild & scenic rivers or public private historic properties?

6(f) Does the project impact any public parks, public wildlife refuges, public golf courses, wild & scenic rivers or historic property that was purchased or improved with federal funds?

No Section 4f/6f resources located in the project area

Yes

100%

No impact to 4f property. The project is an independent bikeway/walkway project covered by the bikeway/walkway Negative Declaration statement; letter of support received

100%

Section 4f resources present within the project area, but no known adverse effects

80%

Project impacts to Section 4f/6f resources likely coordination/documentation has begun

50%

Project impacts to Section 4f/6f resources likely coordination/documentation has not begun

30%

Unsure if there are any impacts to Section 4f/6f resources in the project area

0%

6)Right-of-Way (15 Percent of Points)

Right-of-way, permanent or temporary easements not required

100%

Right-of-way, permanent or temporary easements has/have been acquired

100%

Right-of-way, permanent or temporary easements required, offers made

75%

Right-of-way, permanent or temporary easements required, appraisals made

50%

Right-of-way, permanent or temporary easements required, parcels identified

Yes

25%

Right-of-way, permanent or temporary easements required, parcels not identified

0%

Right-of-way, permanent or temporary easements identification has not been completed

0%

Anticipated date or date of acquisition

02/01/2017

7)Railroad Involvement (25 Percent of Points)

No railroad involvement on project

Yes

100%

Railroad Right-of-Way Agreement is executed (include signature page)

100%

Railroad Right-of-Way Agreement required; Agreement has been initiated

60%

Railroad Right-of-Way Agreement required; negotiations have begun

40%

Railroad Right-of-Way Agreement required; negotiations not begun

0%

Anticipated date or date of executed Agreement

8)Interchange Approval (15 Percent of Points)*

**Please contact Karen Scheffing at MnDOT (Karen.Scheffing@state.mn.us or 651-234-7784) to determine if your project needs to go through the Metropolitan Council/MnDOT Highway Interchange Request Committee.*

Project does not involve construction of a new/expanded interchange or new interchange ramps Yes

100%

Interchange project has been approved by the Metropolitan Council/MnDOT Highway Interchange Request Committee

100%

Interchange project has not been approved by the Metropolitan Council/MnDOT Highway Interchange Request Committee

0%

9)Construction Documents/Plan (10 Percent of Points)

Construction plans completed/approved (include signed title sheet)

100%

Construction plans submitted to State Aid for review

75%

Construction plans in progress; at least 30% completion Yes

50%

Construction plans have not been started

0%

Anticipated date or date of completion 04/01/2017

10)Letting

Anticipated Letting Date 06/01/2017

Measure A: Cost Effectiveness

Total Project Cost (entered in Project Cost Form): \$1,760,000.00

Enter Amount of the Noise Walls: \$0.00

Total Project Cost subtract the amount of the noise walls:	\$1,760,000.00
Points Awarded in Previous Criteria	
Cost Effectiveness	\$0.00

Other Attachments

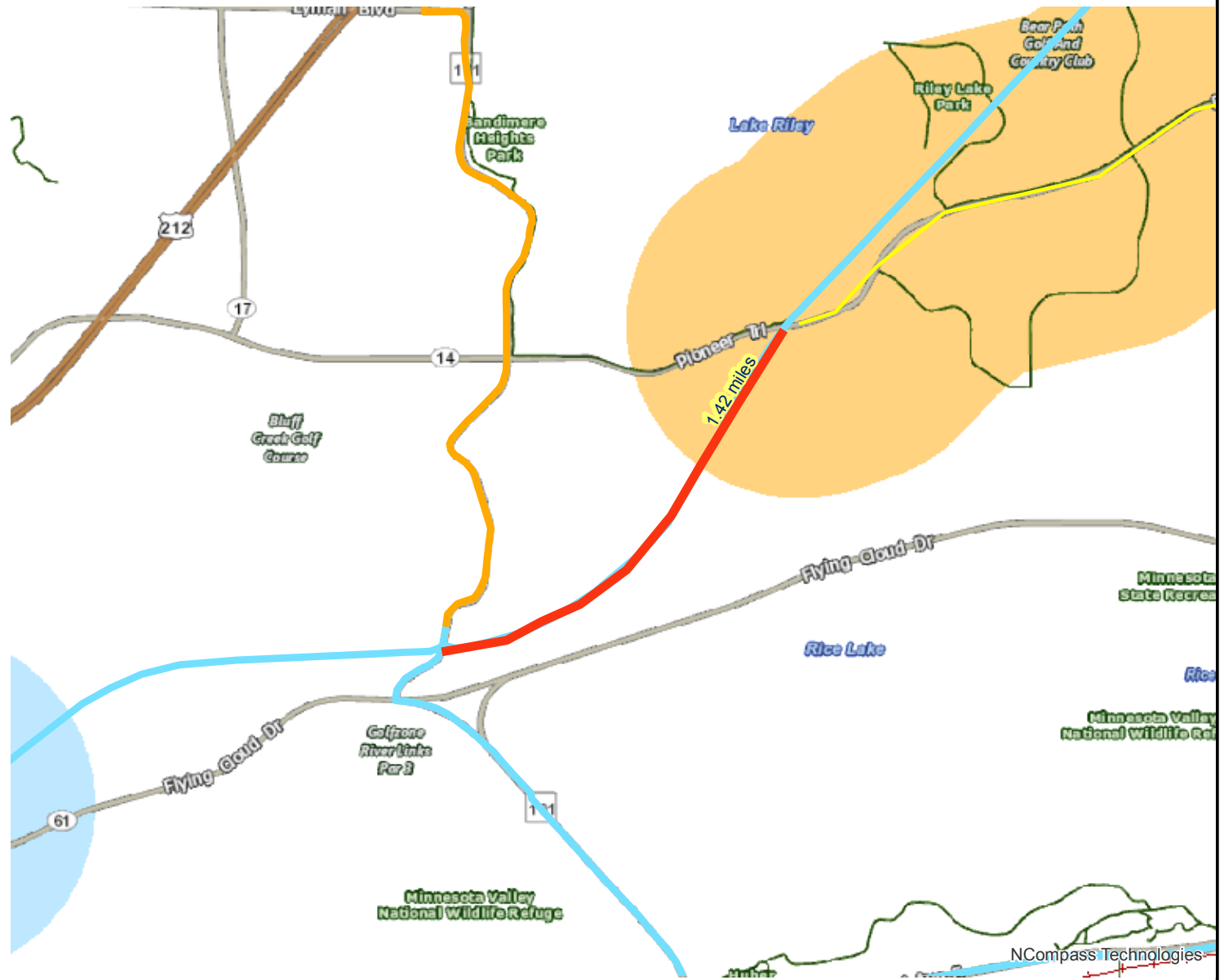


Trail damage immediately after storm event

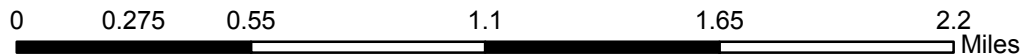
1.4 MB

File Name	Description	File Size
2016 Regional Solicitation letters of support.pdf	Five letters of support, including the City and County with jurisdiction and the trail agency that operates the regional trail on HCRRA's corridor	930 KB
Minnesota_River_Bluffs_LRT_Detour_Map.pdf	Trail Detour Map	467 KB
Population Summary Map.pdf	Project Location Map	346 KB
Preliminary Design and Cost Estimate.pdf	Technical Memo from engineering consultant that includes engineer's estimate and preliminary design.	5.6 MB

Project to RBTN Orientation



- Project
- RBTN Tier 2 Alignment
- RBTN Corridor Centerlines
- Principal Arterials
- RBTN Tier 1 Alignment
- Minor Arterials
- Railroads
- RBTN Tier 1
- RBTN Tier 2



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LandscapeRSA1



For complete disclaimer of accuracy, please visit
<http://giswebsite.metc.state.mn.us/gissitenew/notice.aspx>



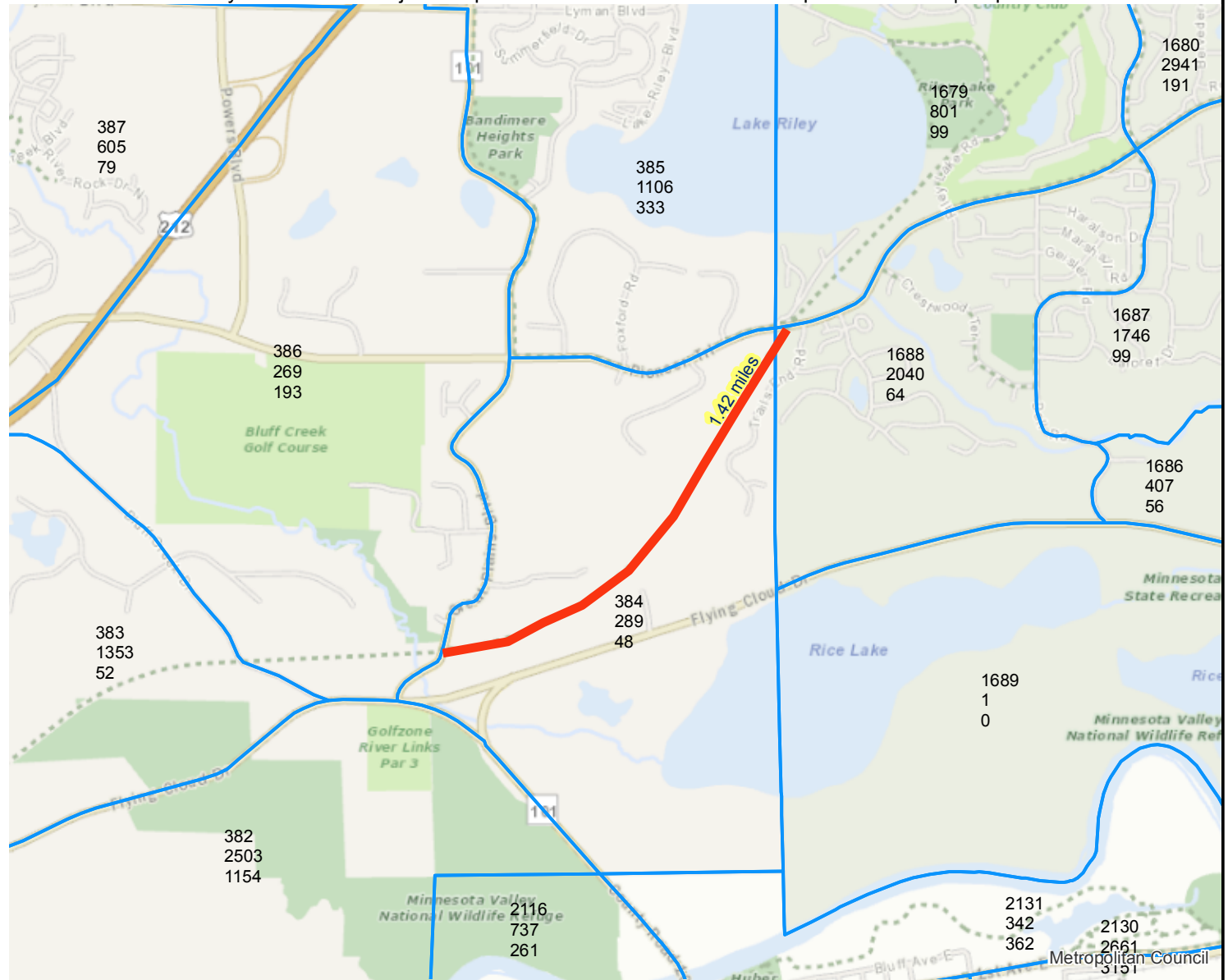
NCompass Technologies

Population Summary

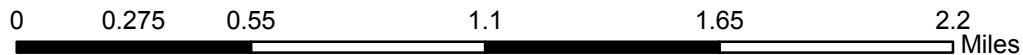
Multiuse Trails and Bicycle Facilities Project: Hopkins to Chaska LRT Corridor Slope Restoration | Map ID: 1467922936678

Results

Within ONE Mile of project:
 Total Population: 11594
 Total Employment: 2721



- Project
- 2010 TAZ



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 LandscapeRSA4

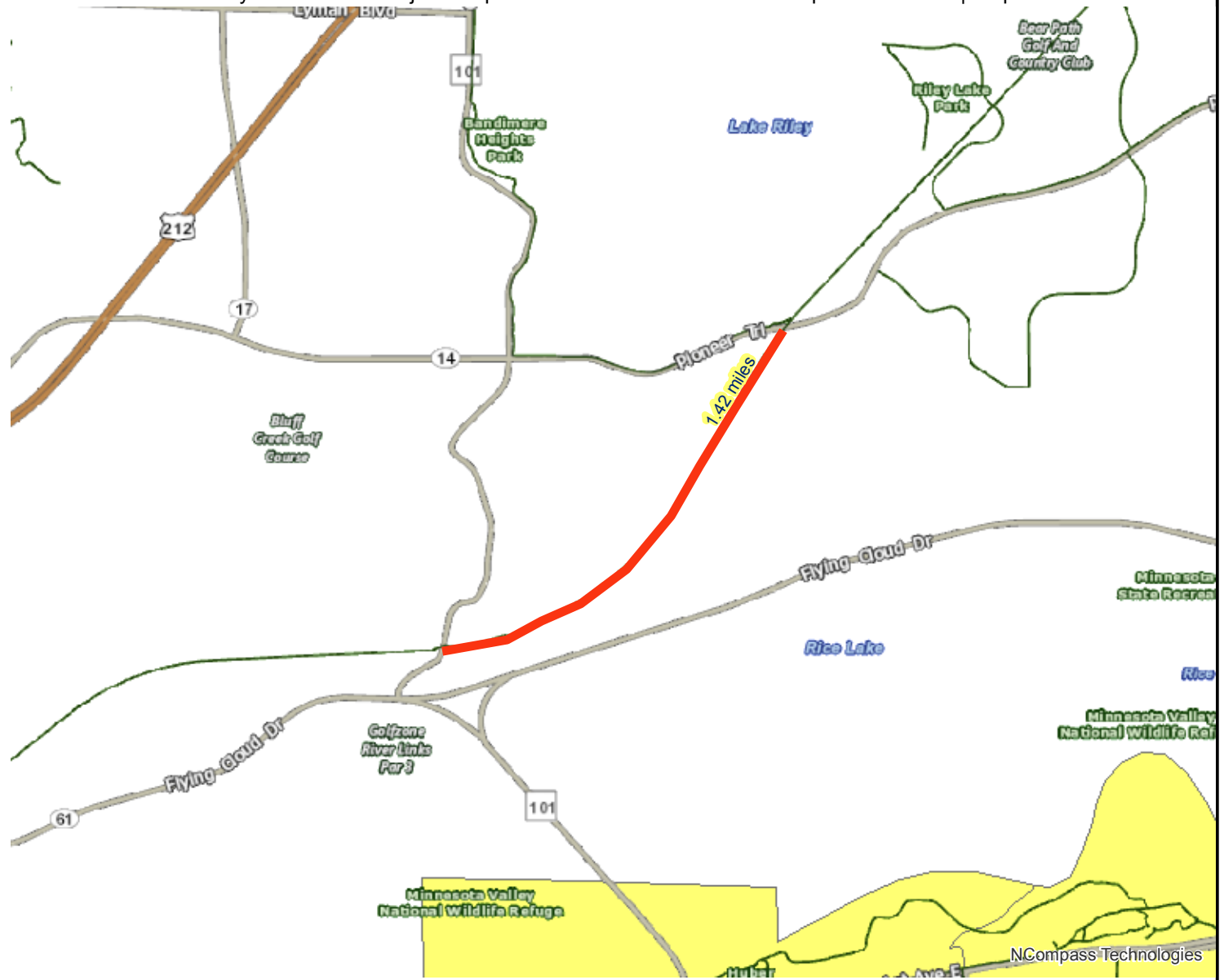






For complete disclaimer of accuracy, please visit
<http://giswebsite.metc.state.mn.us/gissitenew/notice.aspx>

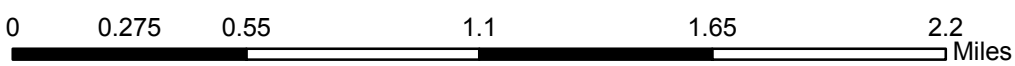


Results

Project located in a census tract that is below the regional average for population in poverty or populations of color, or includes children, people with disabilities, or the elderly:
(0 to 12 Points)



 Project	 Area of Concentrated Poverty
 Area of Concentrated Poverty > 50% residents of color	 Above reg'l avg conc of race/poverty



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LandscapeRSA2



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NCompass Technologies



July 7, 2016

Three Rivers
Park District
Board of
Commissioners

Joseph Gladke, P.E.
Assistant Director, Community Works
Hennepin County Regional Railroad Authority
701 Fourth Avenue South, Suite 400
Minneapolis, MN 55415

Penny Steele
District 1

RE: Letter of Support for Hennepin County Regional Railroad Authority's Regional Solicitation Application: Hopkins to Chaska LRT Corridor Slope Restoration

Jennifer DeJournett
District 2

Dear Mr. Gladke:

Three Rivers Park District supports Hennepin County Regional Railroad Authority's (HCRRA's) application for federal funding through the Metropolitan Council Regional Solicitation in the Multiuse Trails and Bicycle Facilities category for the Hopkins to Chaska LRT Corridor slope restoration.

Daniel Freeman
Vice Chair
District 3

HCRRA purchased the Hopkins to Chaska LRT corridor in 1990. Three Rivers Park District built the Minnesota River Bluffs LRT Regional Trail on the old railroad bed in 1994. As you are aware, the trail has been closed since the federally designated disaster that occurred in June 2104, and which has severed the primary arterial non-motorized transportation route from the Southwest sector of the region to the rest of the region.

John Gunyou
Chair
District 4

The Minnesota River Bluffs LRT Regional Trail is identified as a Tier 1 Alignment of the Regional Bicycle Transportation Network in the 2040 Transportation Policy Plan. The trail served over 250,000 visits per year before the storm event, but now trail users must take a six-mile detour using the narrow shoulders of a major county road.

John Gibbs
District 5

Steven Antolak
Appointed
At Large

Restoration of this slope would allow the trail to reopen and reestablish a broken link along a regional trail. If you have any questions, please contact me at 763-694-7632. Thank you.

Sincerely,

Gene Kay
Appointed
At Large

A handwritten signature in black ink, appearing to read "Jonathan Vlaming".

Jonathan Vlaming
Associate Superintendent
Three Rivers Park District

Boe Carlson
Superintendent

JCV/jjs



**CITY OF
CHANHASSEN**

7700 Market Boulevard
PO Box 147
Chanhassen, MN 55317

Administration

Phone: 952.227.1100
Fax: 952.227.1110

Building Inspections

Phone: 952.227.1180
Fax: 952.227.1190

Engineering

Phone: 952.227.1160
Fax: 952.227.1170

Finance

Phone: 952.227.1140
Fax: 952.227.1110

Park & Recreation

Phone: 952.227.1120
Fax: 952.227.1110

Recreation Center

2310 Coulter Boulevard
Phone: 952.227.1400
Fax: 952.227.1404

**Planning &
Natural Resources**

Phone: 952.227.1130
Fax: 952.227.1110

Public Works

7901 Park Place
Phone: 952.227.1300
Fax: 952.227.1310

Senior Center

Phone: 952.227.1125
Fax: 952.227.1110

Website

www.ci.chanhassen.mn.us

July 6, 2016

Joseph Gladke, P.E.
Assistant Director, Community Works
Hennepin County Regional Railroad Authority
701 Fourth Avenue South, Suite 400
Minneapolis, MN 55415

RE: Letter of Support for Hennepin County Regional Railroad Authority's Regional Solicitation Application: Hopkins to Chaska LRT Corridor Slope Restoration

Dear Mr. Gladke:

The City of Chanhassen supports Hennepin County Regional Railroad Authority's (HCRRA's) application for federal funding through the Metropolitan Council Regional Solicitation in the Multiuse Trails and Bicycle Facilities category for the Hopkins to Chaska LRT Corridor slope restoration.

HCRRA purchased the Hopkins to Chaska LRT corridor in 1990. Three Rivers Park District built the Minnesota River Bluffs LRT regional trail on the old railroad bed in 1994. The corridor experienced an 80-foot slope failure during a federally designated disaster in June 2104, requiring the closure of the trail between CSAH 1 and Highway 101 in Chanhassen.

The Minnesota River Bluffs LRT regional trail is identified as a Tier 1 Alignment of the Regional Bicycle Transportation Network in the 2040 Transportation Policy Plan. The trail served over 250,000 visits per year before the storm event, but now trail users must take a six-mile detour using the narrow shoulders of a major county road.

Restoration of this slope would allow the trail to reopen and reestablish a broken link along a regional trail. Please accept this letter as our support of the project. If you have any questions, please contact me at 952-227-1119. Thank you.

Sincerely,

Todd Gerhardt
City Manager, City of Chanhassen



Chaska

July 6, 2016

Joseph Gladke, P.E.
Assistant Director, Community Works
Hennepin County Regional Railroad Authority
701 Fourth Avenue South, Suite 400
Minneapolis, MN 55415

RE: Letter of Support for Hennepin County Regional Railroad Authority's Regional Solicitation Application: Hopkins to Chaska LRT Corridor Slope Restoration

Dear Mr. Gladke:

The City of Chaska supports Hennepin County Regional Railroad Authority's (HCRRA's) application for federal funding through the Metropolitan Council Regional Solicitation in the Multiuse Trails and Bicycle Facilities category for the Hopkins to Chaska LRT Corridor slope restoration.

HCRRA purchased the Hopkins to Chaska LRT corridor in 1990. Three Rivers Park District built the Minnesota River Bluffs LRT regional trail on the old railroad bed in 1994. The corridor experienced an 80-foot slope failure during a federally designated disaster in June 2104, requiring the closure of the trail between CSAH 1 and Highway 101 in Chanhassen.

The Minnesota River Bluffs LRT regional trail is identified as a Tier 1 Alignment of the Regional Bicycle Transportation Network in the 2040 Transportation Policy Plan. The trail served over 250,000 visits per year before the storm event, but now trail users must take a six-mile detour using the narrow shoulders of a major county road.

Restoration of this slope would allow the trail to reopen and reestablish a broken link along a regional trail. Please accept this letter as our support of the project. If you have any questions, please contact me at 952-227-7523. Thank you.

Sincerely,

Mark Windschitl
Mayor, City of Chaska
MW/dw



Carver County Public Works

11360 Highway 212
Suite 1
Cologne, MN 55322-8016
Phone (952) 466-5200 Fax (952) 466-5223

Administration
Operations
Program Delivery
Parks

July 6, 2016

Joseph Gladke, P.E.
Assistant Director, Community Works
Hennepin County Regional Railroad Authority
701 Fourth Avenue South, Suite 400
Minneapolis, MN 55415

RE: Letter of Support for Hennepin County Regional Railroad Authority's Regional Solicitation
Application: Hopkins to Chaska LRT Corridor Slope Restoration

Dear Mr. Gladke:

Carver County supports Hennepin County Regional Railroad Authority's (HCRRA's) application for federal funding through the Metropolitan Council Regional Solicitation in the Multiuse Trails and Bicycle Facilities category for the Hopkins to Chaska LRT Corridor slope restoration.

HCRRA purchased the Hopkins to Chaska LRT corridor in 1990. Three Rivers Park District built the Minnesota River Bluffs LRT regional trail on the old railroad bed in 1994. The corridor experienced an 80-foot slope failure during a federally designated disaster in June 2104, requiring the closure of the trail between CSAH 1 and Highway 101 in Chanhassen.

The Minnesota River Bluffs LRT regional trail is identified as a Tier 1 Alignment of the Regional Bicycle Transportation Network in the 2040 Transportation Policy Plan. The trail served over 250,000 visits per year before the storm event, but now trail users must take a six-mile detour using the narrow shoulders of a major county road.

Restoration of this slope would allow the trail to reopen and reestablish a broken link along a regional trail. Please accept this letter as our support of the project. If you have any questions, please contact me at 952-466-5200. Thank you.

Sincerely,

Lyndon Robjant
Carver County
Public Works Director

July 7, 2016

Joseph Gladke, P.E.
Assistant Director, Community Works
Hennepin County Regional Railroad Authority
701 Fourth Avenue South, Suite 400
Minneapolis, MN 55415

RE: Letter of Support for Hennepin County Regional Railroad Authority's Regional Solicitation
Application: Hopkins to Chaska LRT Corridor Slope Restoration

Dear Mr. Gladke:

The Eastern Carver County Linking Trail Committee supports Hennepin County Regional Railroad Authority's (HCRRA's) application for federal funding through the Metropolitan Council Regional Solicitation in the Multiuse Trails and Bicycle Facilities category for the Hopkins to Chaska LRT Corridor slope restoration.

HCRRA purchased the Hopkins to Chaska LRT corridor in 1990. Three Rivers Park District built the Minnesota River Bluffs LRT regional trail on the old railroad bed in 1994. The corridor experienced an 80-foot slope failure during a federally designated disaster in June 2104, requiring the closure of the trail between CSAH 1 and Highway 101 in Chanhassen.

The Minnesota River Bluffs LRT regional trail is identified as a Tier 1 Alignment of the Regional Bicycle Transportation Network in the 2040 Transportation Policy Plan. The trail served over 250,000 visits per year before the storm event, but now trail users must take a six-mile detour using the narrow shoulders of a major county road.

Restoration of this slope would allow the trail to reopen and reestablish a broken link along a regional trail. Please accept this letter as our support of the project. If you have any questions, please contact me at 612 723 3174. Thank you.

Sincerely,

s/

Robert J. Moeller

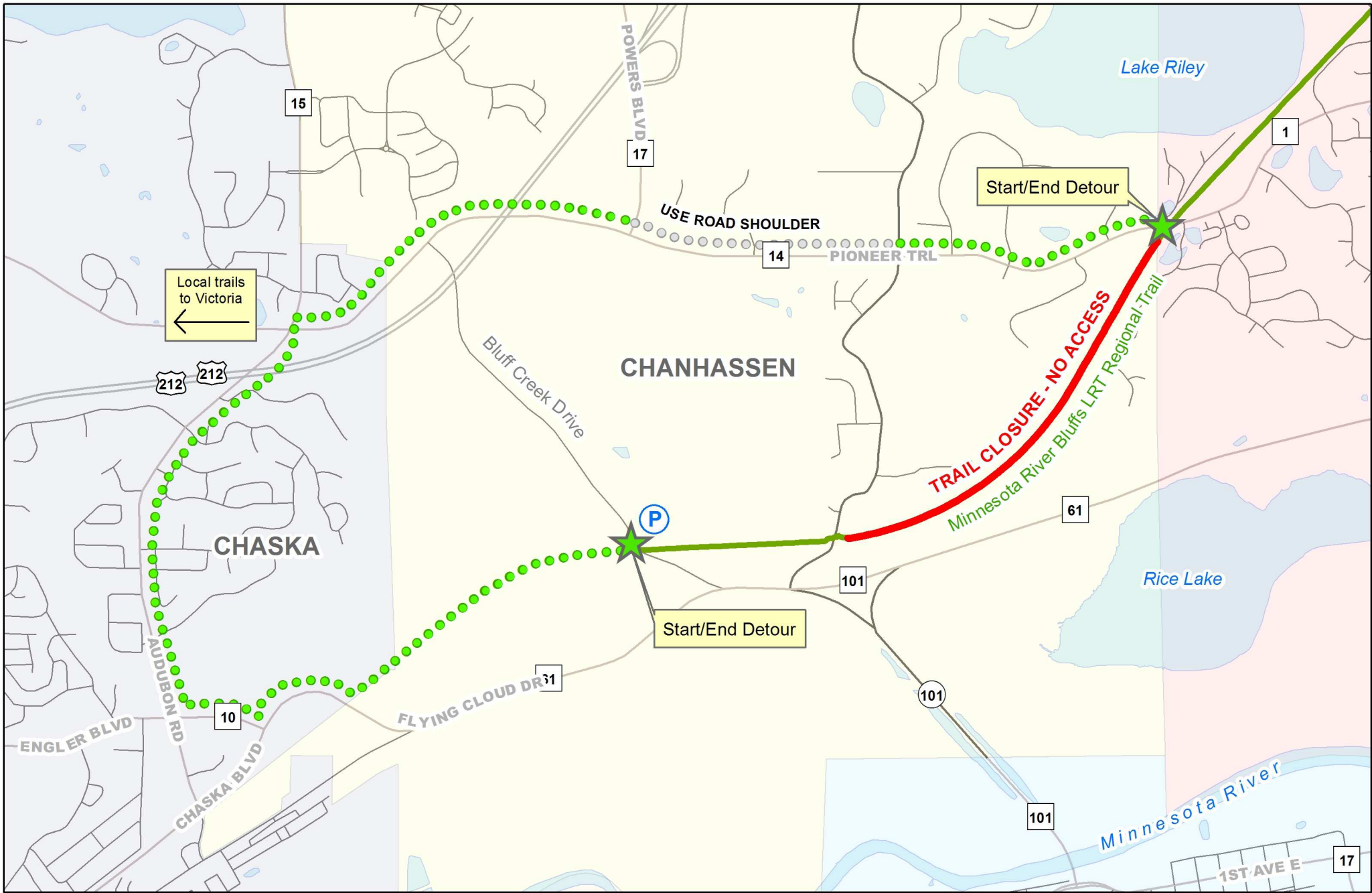
Commissioner, District B, Metropolitan Council Parks and Open Spaces Commission

Chair, Eastern Carver County Linking Trail Committee

110711 Kings Lane, Suite 100


Chaska, MN 55318

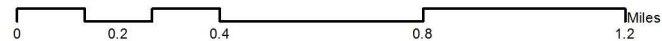
o) 952 448 8885; f) 952 448 9846, c) 612 723 3174



Minnesota River Bluffs LRT Regional Trail

Trail Detour - 5.7 miles

 Local trails

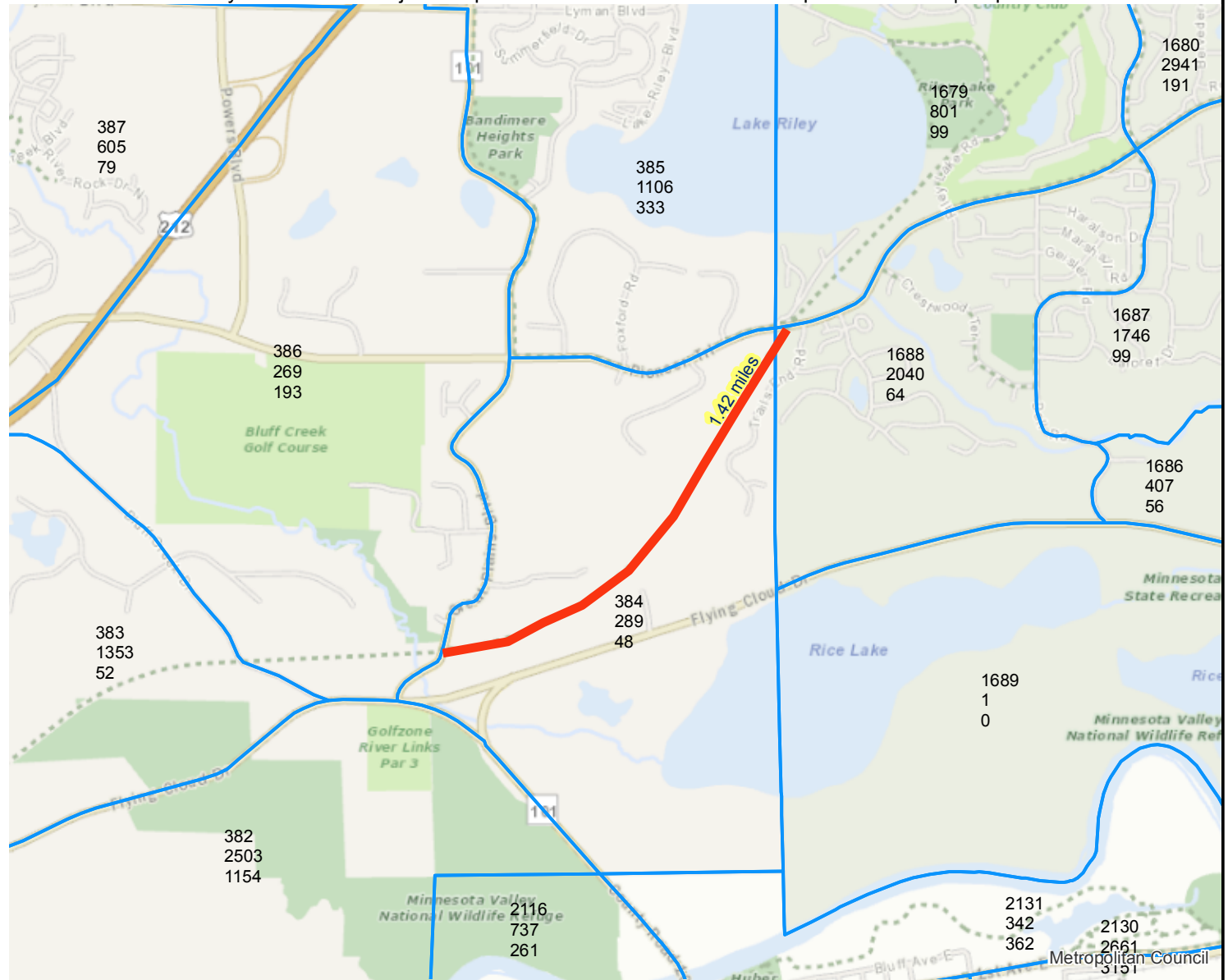


Population Summary

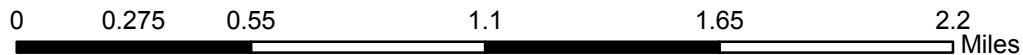
Multiuse Trails and Bicycle Facilities Project: Hopkins to Chaska LRT Corridor Slope Restoration | Map ID: 1467922936678

Results

Within ONE Mile of project:
 Total Population: 11594
 Total Employment: 2721



- Project
- 2010 TAZ



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Technical Memorandum

To: Jessica Galatz and Dean Michalko, P.E
From: Joel Swenson, P.E.
Subject: Task 2 – Preliminary Design and Cost Estimate for the North Pipe Crossing, Downstream Toe, and South Pipe Crossing Damage Areas
Date: January 29, 2016
Project: 23101014

Introduction

Barr Engineering Co. (Barr), under contract with Hennepin County Regional Railroad Authority (HCRRA), has completed a preliminary design and cost estimate (Task 2) for the damage along the Minnesota River Bluffs LRT Regional Trail in Carver County, Minnesota. The trail damage was assessed as part of Task 1 [Reference 1] and sent to the Federal Emergency Management Agency (FEMA) to aid in completing the Project Worksheet (PW) # HCR001G. These areas are shown on **Figure 1**. Additional photos of the damage at each of these areas are provided in **Attachment A**.

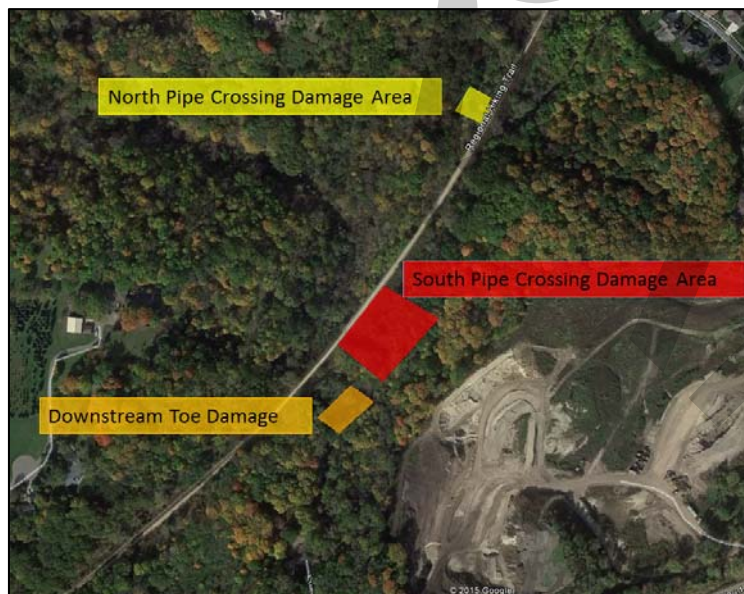


Figure 1 Approximate Damage Areas

It was determined that if these areas were left unrepaired impacts to the trail would likely occur. Therefore, HCRRA and Barr proceeded with Task 2 where repair solutions were provided for each of the three damage areas, as described below, based on field investigations and preliminary engineering design. Additional discussion of the damage at each area and details for the proposed repairs are provided in **Attachment B**.

- North Pipe Crossing Damage
 - FEMA: Site 2 (Culvert #1)

To: Jessica Galatz and Dean Michalko, P.E.
From: Joel Swenson, P.E.
Subject: Task 2 – Preliminary Design and Cost Estimate for the North Pipe Crossing, Downstream Toe, and South Pipe Crossing Damage Areas
Date: January 29, 2016
Page: 2
Project: 23101014

- Solution: Installation of two concrete drop structures placed near the existing north pipe outlet allowing water to drop 10 to 15 feet between each structure and extending the pipe to the toe of the reconstructed slope.
- Downstream Toe Damage
 - FEMA: Site 3
 - Solution: To be covered in the South Pipe Crossing Repair
- South Pipe Crossing Damage
 - FEMA: Site 1 (Landslide)
 - Solution: Fill with staged construction and extend the existing 5 foot diameter corrugated metal arch pipe (CMAP) approximately 300 feet. The CMAP will be supported with a deep foundation and grade beam. Due to the low shear strength and high compressibility of the underlying soil, it is not recommended to construct the full height of the embankment at one time. Phased, or staged, construction is recommended. For this approach, groundwater pressures will need to be monitored during construction. A plan view of the fill extents is shown in **Large Figure 1**.
 - The cross-section in **Figure 2** shows the existing embankment, proposed slopes, and approximate elevation of each construction stage.

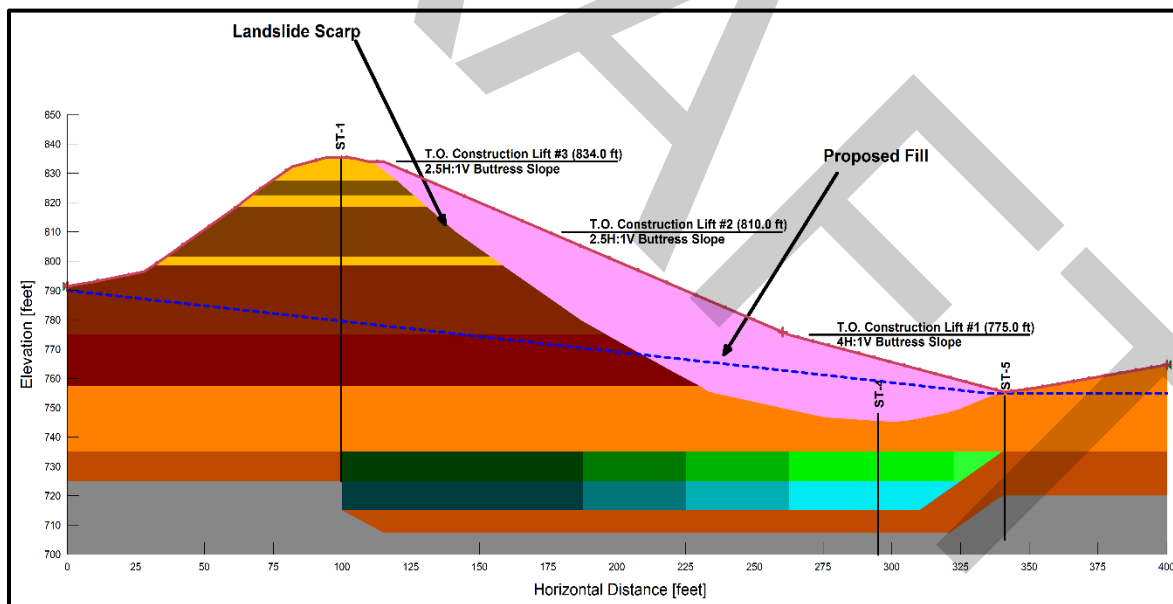


Figure 2 Schematic of the proposed fill during staged construction

Cost

A preliminary cost analysis for each of the repair options was performed and is summarized in **Table 1**. The cost estimates provided are based on AACE (American Association of Cost Engineers) guidance, using Class 3 estimating definition. This estimate incorporates a 20% contingency but does not include costs for construction land easement purchases, permitting, and wetland impacts.

To: Jessica Galatz and Dean Michalko, P.E.
From: Joel Swenson, P.E.
Subject: Task 2 – Preliminary Design and Cost Estimate for the North Pipe Crossing, Downstream Toe, and South Pipe Crossing Damage Areas
Date: January 29, 2016
Page: 3
Project: 23101014

Table 1 Preliminary cost estimate for repair of damage areas

Area	Description of Repair	Cost (with contingency)
South Pipe Crossing	Fill with staged construction	\$1,680,000
North Pipe Crossing	Pipe extension, filling void, erosion control	\$96,000
Southwestern Toe	Filling void and erosion control	To be covered in the South Pipe Crossing repair

Closing

I hereby certify that this technical memorandum was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the State of Minnesota.

Joel Swenson, MN P.E.
Geotechnical Engineer
Registration Number: 47933

Date_____

LARGE FIGURE
ATTACHMENT A
ATTACHMENT B

References

[1] Barr Engineering Co. *Task 1 – Trail Damage Assessment Technical Memorandum*. February 17, 2015.

Large Figure

DRAFT

CADD USER: Brian Hughes FILE: M:\DESIGN\23101014.00\2310101400_DESIGN-LARGE FIGURE 1.DWG PLOT SCALE: 1:2 PLOT DATE: 1/28/2016 12:41 PM
 BARR M:\AutoCAD 2011\Support\enu\Template\Barr_2011_Template.dwg Plot at 1 10/05/2010 14:03:50



1 PLAN: SOUTH PIPE CROSSING
 0 50 100
 SCALE IN FEET

LEGEND:

	EXISTING PROPERTY LINES
	EXISTING CONSERVATION EASEMENT
	PROPOSED ACCESS EASEMENT
	PROPOSED CONTOURS

PRELIMINARY
 DRAFT
 1/28/2016

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION

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

PRINTED NAME: _____
 SIGNATURE: _____
 DATE: _____ LICENSE # _____

CLIENT	BID	CONSTRUCTION	RELEASED TO/FOR	A	B	C	0	1	2	3	DATE RELEASED

BARR

Project Office:
 BARR ENGINEERING CO.
 4700 WEST 77TH STREET
 MINNEAPOLIS, MN.
 55435-4803

Corporate Headquarters:
 Minneapolis, Minnesota
 Ph: 1-800-632-2277

Scale	AS SHOWN
Date	04/15/15
Drawn	JAM4
Checked	
Designed	KNA
Approved	

HENNEPIN COUNTY
 MINNEAPOLIS, MINNESOTA

HCRA LANDSLIDE
 CHANHASSEN, MINNESOTA
 LARGE FIGURE 1

BARR PROJECT No.	23101014.00
CLIENT PROJECT No.	
DWG. No.	
REV.	

DRAFT

Attachment A

Photographs

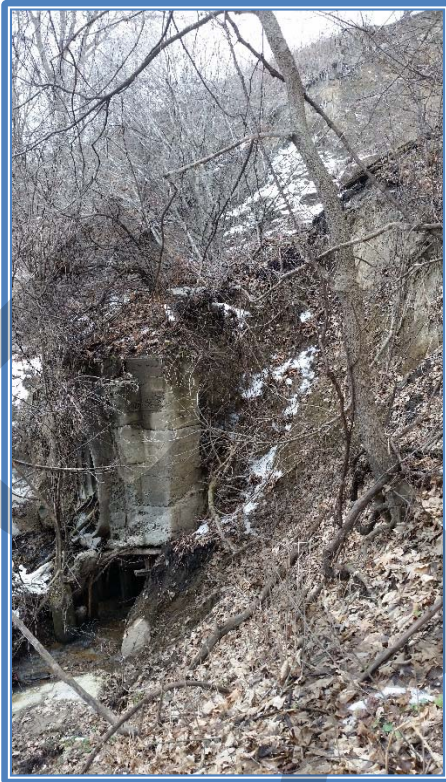
South Pipe Crossing Damage



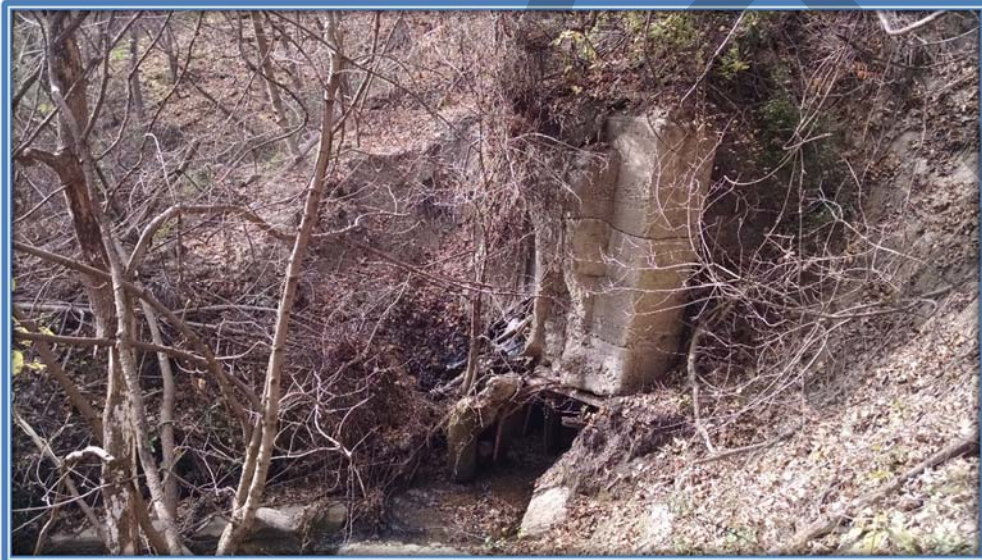
Photograph 1 South Pipe Crossing Damage (looking down-slope from trail)



Photograph 2 South Pipe Crossing Damage (looking down-slope from trail)



Photograph 3 South Pipe Crossing Damage (headwall)



Photograph 4 South Pipe Crossing Damage (headwall damage)



Photograph 5 South Pipe Crossing Damage (headwall damage)



Photograph 6 South Pipe Crossing Damage (CMP exiting toe of slope)



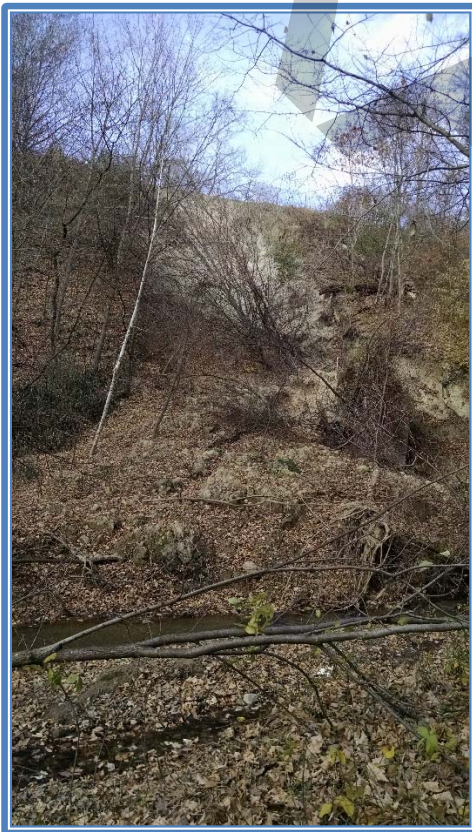
Photograph 7 South Pipe Crossing Damage (looking up-slope from toe)



Photograph 8 South Pipe Crossing Damage (looking up-slope from toe)



Photograph 9 South Pipe Crossing Damage (looking up-slope from toe)



Photograph 10 South Pipe Crossing Damage (looking up-slope from toe)

North Pipe Crossing Damage



Photograph 11 North Pipe Crossing Damage (looking up-slope from toe)



Photograph 12 North Pipe Crossing Damage (looking up-slope from toe)



Photograph 13 North Pipe Crossing Damage (looking up-slope from toe)



Photograph 14 North Pipe Crossing Damage (looking down from side slope)



Photograph 15 North Pipe Crossing Damage (looking up-slope from toe)



Photograph 16 North Pipe Crossing Damage (looking up-slope from toe)



Photograph 17 North Pipe Crossing Damage (looking up-slope from toe)

Downstream Toe Damage



Photograph 18 Northeast Toe Damage



Photograph 19 Northeast Toe Damage



Photograph 20 Southwest Toe Damage

Attachment B

Damage Details, Repair Discussion, and Cost Explanation

DRAFT

Attachment B

To: Jessica Galatz and Dean Michalko, P.E.
From: Joel Swenson, P.E.
Subject: Attachment B – Damage Details, Repair Discussion, and Cost Explanation
Date: January 29, 2016
Project: 23101014

Damage Details and Repair Discussion

North Pipe Crossing Damage [FEMA Site #2]

The failure is located where an 18 inch iron and reinforced concrete storm sewer pipe exits the embankment. The failure scarp is approximately 25 feet from the trail and has not yet impacted the trail. However, it is likely that the additional loss of soil around the pipe, and at the toe of the slope, will result in a failure that impacts the trail surface.

Description of Damage

The size of the failure, assuming the original slope angle was similar to that of the ground around it, is 60 feet long by 35 feet wide and 12 feet deep. According to our survey and high-definition laser scanning information, assuming that the damaged slope was continuous across the void, approximately 220 cubic yards of in-place fill are needed to reestablish the slope to its original condition. The following captions show the extent of the damage for the North Pipe Crossing where erosion has extended into the embankment toe (**Photograph 1**), causing a progressive failure of the storm sewer pipe, and loss of soil upslope from the pipe outlet (**Photograph 2**).

Proposed Repair

The proposed repair for this scarp area is:

1. Place drop structure and extend pipe, place erosion control materials
 - The repair requires removing debris from the toe, placing two precast concrete drop structures, extending the 18 inch pipe with 24 inch diameter pipe to the new toe of slope, importing fill to correct the slope, and then placing turf-reinforcement mats and rip-rap to stabilize the slope face and prevent future toe scour.

To: Jessica Galatz and Dean Michalko, P.E.
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Subject: Attachment B – Damage Details, Repair Discussion, and Cost Explanation
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Photograph 1



Photograph 2

Downstream Toe Damage [FEMA Site #3]

Two erosion areas were identified southwest and downstream from the large slide area (South Pipe Crossing). Analysis of the northeastern area shows the pre-erosion slope conditions were more stable (had a higher factor of safety) than the current toe conditions. The global stability of the slope at this location has a factor of safety of approximately 1.20. Slope stability modeling results for the southwestern area are similar to the northeastern area in that further soil loss will eventually lead to a failure that would impact the trail surface. Global stability analysis of the embankment at this location shows a factor of safety just above 1.0. At both toe damage locations, it is likely that further erosion will continue to occur. These toe damage areas decrease the overall stability of the trail embankment due to the loss of supporting material, and left unrepaired, increase the likelihood of a larger slope failure that would impact the trail surface.

Description of Damage

The approximate size of the Northeast Toe Damage area (**Photograph 3**) is 50 feet long, 10 to 20 feet wide, and approximately 8 feet deep. The approximate size of the Southwest Toe Damage area (**Photograph 4**) is 125 feet long, 20 to 30 feet wide, and 8 feet deep. According to our survey and scanning information, and assuming that the damaged slope was continuous across the area, approximately 100 and 450 cubic yards of in-place fill, respectively, are needed to reestablish the slope to its original condition.

To: Jessica Galatz and Dean Michalko, P.E.
From: Joel Swenson, P.E.
Subject: Attachment B – Damage Details, Repair Discussion, and Cost Explanation
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Photograph 3



Photograph 4

Proposed Repair

The Northeast Toe Damage area will be covered with fill by the South Pipe Crossing repair. The proposed design to repair the Southwest Toe Damage areas is:

1. Replace soil lost to erosion and fortify with erosion prevention measures
 - This process would involve removing debris, importing fill or using borrow material from other portions of the site to re-establish grade. Scour prevention and erosion control measures would be placed (turf-reinforcement mats and rip-rap). The stream

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will need to be relocated from the existing alignment (away from the current toe of the slope) to reestablish the toe of slope.

South Pipe Crossing Damage [FEMA Site #1]

The South Pipe Crossing Damage area is the largest slope failure along the trail, having the greatest impact to the trail. A tension crack was observed extending from the edge of the observed failure at the edge of the trail northeast along the trail to the nearby park bench, a length of approximately 150 feet.

The embankment is approximately 80 to 90 feet tall with a slope angle of 1.7H:1V to 1.8H:1V adjacent to the damage. The existing slope adjacent to the slide does not meet the stability criteria associated with the standard of practice for geotechnical factors of safety. Therefore, filling the void in the embankment left by the slide and reconstructing the slope to its original angle staying within the existing right of way cannot be designed and constructed to the geotechnical engineering standard of practice with soil or geotextiles¹. Flattening the slope (mass grading), rather than a series of soldier pile walls, was deemed less expensive and appropriate for this repair.

Various alternatives were analyzed to stabilize the South Pipe Crossing area. The alternatives consisted of light weight fill, rammed-aggregate piers, soil nailing, and fill with staged construction. The most cost effective solution, fill with staged construction, has been chosen to stabilize the South Pipe Crossing. Due to the low shear strength and high compressibility of the underlying soil, the full height of the embankment will not be able to be constructed at one time. Therefore a phased, or staged, construction is required. Groundwater pressures will need to be monitored to determine the allotted time interval needed to allow for improvement in the undrained strength due to consolidation, which is required for the stability of the increased height in the next stage.

Description of Damage

The slide area is about 45 feet wide, approximately 110 feet long with a head scarp 8 feet deep. Damage consisted of partial loss of trail surface, damage to the corrugated metal pipe (CMP) concrete headwall, and erosion at the base of the CMP headwall exposing timber piling supporting the structure. Approximately half of the outlet headwall appears to have been destroyed by debris from the slide. **Photograph 5** shows the extent of the South Pipe Crossing Damage.

Proposed Repair

The proposed design to repair the South Pipe Crossing Damage area is:

1. Fill with staged construction - fill to establish a flatter slope with a phased construction required for improvement in the undrained strength of the underlying native soils due to consolidation

¹ Efforts were made to develop a repair option that would remain on HCRRA property. The issue is that the current slope is unstable and cannot be replaced back to its original angle of grade without huge costs associated with the repair. Slopes of 2.0H:1V with lightweight fill, geotextile reinforcement, and RAP foundation improvements were evaluated for this repair option. The factor of safety recommendation is met for long term condition; however it does not meet the recommended safety factor during construction without temporarily lowering the trail to facilitate geotextile reinforcement anchor lengths. Temporarily lowering the trail will result in tree removal on the western side of the slope. For these reasons, this option was not considered viable.

To: Jessica Galatz and Dean Michalko, P.E.
From: Joel Swenson, P.E.
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Photograph 5

- Remove debris from toe, abandon the existing CMP headwall in place, extend the 74 inch by 90 inch CMP to the new toe of slope, reestablish the channel, import fill to flatten the slope to 2.5H:1V and 4H:1V (encompassing the extents of the landslide and tension crack extending to the park bench), and place erosion control materials (turf-reinforcement mats and rip-rap).
- This repair will be performed using a staged construction approach. The first lift (Lift #1) will place fill at a 4H:1V slope to an elevation of 775 feet. Lift #2 will be constructed to an elevation of approximately 810 feet and Lift #3 to an elevation of 834 feet connecting to the trail surface at the top of the embankment. Lift #2 and #3 will be placed at a slope of 2.5H:1V.

Preliminary Cost Estimate

A preliminary cost analysis for each of the repair options was performed. This cost estimate is considered a Class 3 estimate [Reference 1; Reference 2] based on a 40% completed project definition to support full project funding requests. This estimate includes assumed costs for construction land easement purchases, permitting, and wetland impacts. It is assumed that this preliminary cost will go through an iterative process whereby successive estimates are prepared until a final estimate closes the process. Considerations for each design option to repair the North Pipe Damage Area and the Downstream Toe Damage Area were broken into the following categories:

To: Jessica Galatz and Dean Michalko, P.E.
From: Joel Swenson, P.E.
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- I. Repair costs that would be applied to each option. These include:
 - o Construction Access and Easements
 - Assumed to be included in the South Pipe Crossing cost
 - o Permitting for Access
 - Assumed to be included in the South Pipe Crossing cost
 - o Mobilization
 - Assumed to be part of the South Pipe Crossing cost
 - o Final Design – engineering hours
 - Assumed to be a percentage of the repair cost
- II. Repair options which would include:
 - o Removing debris from the toe of the slope
 - o Clearing
 - o Tree removal
 - o Importing and Placing Fill
 - o Extending Pipes (Adding a drop structure to the North Pipe Crossing)
 - o Final grading and shaping
 - o Turf-reinforcement mats
 - o Riprap and filter design and placement

Considerations to fix the South Pipe Damage Area were broken into the following five categories:

- I. Repair costs that would be applied to each option. These include:
 - o Construction Access and Easements
 - Assumed to be a percentage of the total cost
 - o Permitting for Access
 - Assumed to be a percentage of the total cost
 - o Potential Wetland Impacts
 - Assumed to be a percentage of the total cost
 - o Final Design – engineering hours
 - Assumed to be a percentage of the total cost
- II. Pre-construction costs which would include:
 - o Removing debris from the toe of the slope
 - Approximately 400 cubic yards
 - o Clearing
 - Lump sum cost assumed for each option
 - o Tree removal
 - Removal cost per tree
 - o Mobilization
 - Assumed to be a percentage of the repair cost
 - o Access road construction
 - Assumed to be a percentage of the repair cost
- III. Headwall and/or culvert cost:
 - o Headwall flowable fill in void
 - o Connecting to and extending the CMP culvert

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- Channel excavation
- Channel reconstruction

IV. Costs to repair each option:

- The embankment is approximately 80 to 90 feet tall with a slope angle of 1.7H:1V to 1.8H:1V, challenging access and construction
- Importing and placing fill to natural grade
- Importing and placing fill for regarded slope
- Extended construction timeline and remobilization cost

V. Restoration and aesthetics which include:

- Final grading and shaping
 - Assumed to be a percentage of the repair cost
- Erosion control
 - Assumed to be a percentage of the repair cost
- Vegetation
 - Assumed to be a percentage of the repair cost

North Pipe Crossing Damage

The scarp forming as a result of erosion around the 18 inch iron and reinforced concrete storm sewer pipe exiting the embankment is undercutting the toe of the slope and could eventually result in a slope failure that impacts the trail surface. One repair option would be to import fill material to reestablish the slope to its original condition. The pipe would then need to be extended and erosion mats placed to prevent further damage. The cost of this option, including a concrete drop structure, is \$80,000 based on a preliminary opinion of construction costs, which could vary up to \$96,000 assuming a 20% contingency. A summary of the cost is provided in **Large Table 1**. If this area was left unrepaired there is a high likelihood of a larger slope failure that would impact the trail.

Our preliminary design and cost estimate included the materials and installation of two concrete drop structures. The concrete drop structures consist of manhole risers placed near the existing north pipe outlet allowing water to drop 10 to 15 feet between each structure and the addition of pipe from the concrete drop structure to the toe of the reconstructed slope. Our opinion of cost for materials and installation of the concrete drop structures is \$8,000. The difference in our preliminary cost estimate between installing the concrete drop structures and restoring the steel pipe to exit the embankment above the toe of the slope as it was before the damage is \$8,000. In general, the rip structure and pipe flared end section costs are approximately equal between the two options.

Downstream Toe Damage

To stabilize this area and embankment above these scarps, it is best to restore the slope by importing fill or borrow material to reestablish the slopes to their original conditions, which had a marginal safety factor prior to the damage. Scour prevention and erosion control should then be placed to prevent further erosion from occurring. The cost to repair the southwestern toe damage area is \$51,000 based on a preliminary opinion of construction costs, which could vary up to \$61,000 assuming a 20% contingency. The northeastern toe damage will be covered in the South Pipe Crossing Damage repair. A summary of the cost is provided in **Large Table 1**. If left unrepaired, the toe scarps will continue to erode the embankment and will decrease the overall stability of the slope due to the loss of supporting material.

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South Pipe Crossing Damage

The design to repair the South Pipe Crossing Damage will include importing fill material to flatten the slope to 2.5H:1V and 4H:1V, abandoning the existing CMP headwall in place, extending the 74 inch by 90 inch CMP to the new toe of slope, reestablishing the channel, and placing erosion control materials (turf-reinforcement mats and rip-rap). This repair will be performed using a staged construction approach. The total cost of this option is around \$1,344,000 based on a preliminary opinion of construction costs, which could vary up to \$1,680,000 with a 20% contingency. Assumptions and category discussions are provided above. A summary of the costs are provided in **Large Table 1**.

References

- [1] American Society for Testing and Materials (ASTM). *Standard Classification for Cost Estimate Classification System*, Designation E2516-11.
- [2] Association for the Advancement of Cost Engineering (AACE). *Cost Estimate Classification System*. ASCE International Recommended Practice No. 17R-97. November 29, 2011.

Large Table 1. Preliminary Opinion of Construction Costs for HCRRA Chanhassen Landslide

SOUTH PIPE CROSSING DAMAGE

Fill with staged construction*		COST	20% CONTINGENCY	TOTAL COST
		\$1,394,000	\$285,000	\$1,680,000
Item	ITEM DESCRIPTION	COST	20% CONTINGENCY	TOTAL COST
I	Repair costs applied to each option	\$233,150	\$46,630	\$279,800
Item	ITEM DESCRIPTION	COST	20% CONTINGENCY	TOTAL COST
II	Pre-construction costs	\$96,832	\$19,366	\$116,200
Item	ITEM DESCRIPTION	COST	20% CONTINGENCY	TOTAL COST
III	Headwall / Culvert	\$152,178	\$30,436	\$182,600
Item	ITEM DESCRIPTION	COST	20% CONTINGENCY	TOTAL COST
IVa	Fill	\$624,988	\$124,998	\$750,000
Item	ITEM DESCRIPTION	COST	20% CONTINGENCY	TOTAL COST
IVb	Staged Construction	\$125,600	\$31,400	\$157,000
Item	ITEM DESCRIPTION	COST	20% CONTINGENCY	TOTAL COST
V	Restoration and Aesthetics	\$161,575	\$32,315	\$193,900

NORTH PIPE CROSSING DAMAGE

Pipe Extension, Filling Void, Erosion Control		COST	20% CONTINGENCY	TOTAL COST
		\$80,000	\$16,000	\$96,000
Item	ITEM DESCRIPTION	COST	20% CONTINGENCY	TOTAL COST
I	Pre-construction costs	\$7,238	\$1,448	\$8,700
Item	ITEM DESCRIPTION	COST	20% CONTINGENCY	TOTAL COST
II	Repair costs	\$72,381	\$14,476	\$86,900

SOUTHWESTERN TOE DAMAGE

Filling Void and Erosion Control		COST	20% CONTINGENCY	TOTAL COST
		\$51,000	\$10,000	\$61,000
Item	ITEM DESCRIPTION	COST	20% CONTINGENCY	TOTAL COST
I	Pre-construction costs	\$6,059	\$1,212	\$7,300
Item	ITEM DESCRIPTION	COST	20% CONTINGENCY	TOTAL COST
II	Repair costs	\$44,670	\$8,934	\$53,600

Notes	
1)	The opinion of probable construction cost provided in this table has been developed on the basis of Barr's experience and qualifications and represents our best judgment as experienced and qualified professionals familiar with the project.
2)	Estimated quantities are based on survey data and high-definition laser scanning information performed in 2011.
3)	Since we have no control over the cost of labor, materials, equipment, or services furnished by others, or over the contractor's methods of determining prices, or over competitive bidding or market conditions, Barr cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from this opinion of probable construction cost.
4)	The purpose of the cost estimate is to provide preliminary prices for each repair option for comparison purposes in order to determine which repair option will be most economical and feasible for the project.
5)	The accuracy (+20% contingency) is an estimation of the degree to which the final cost outcome could vary from the estimated cost. This accuracy range is based on a Class 3 estimate [Reference ASTM E2516-11 and AACE No. 18R-97].
6)	Restoration costs include armoring the channel slopes with TRM above the 100 year flood elevation and applying riprap and filter across the bottom of the channel up to 1-foot above the 100yr flood elevation, final grading and shaping, erosion control, and vegetation replacement.
*	Obtaining temporary or construction easements, permitting, and potential wetland impacts are included in this cost.