



Application

04751 - 2016 Roadway Expansion

04932 - 77th Street Extension and TH77 Underpass

Regional Solicitation - Roadways Including Multimodal Elements

Status: Submitted

Submitted Date: 07/14/2016 10:10 PM

Primary Contact

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What Grant Programs are you most interested in? Regional Solicitation - Roadways Including Multimodal Elements

Organization Information

Name: RICHFIELD,CITY OF

Jurisdictional Agency (if different):

Organization Type:

City

Organization Website:

Address:

6700 PORTLAND AVE S

*

RICHFIELD

Minnesota

55423

City

State/Province

Postal Code/Zip

County:

Hennepin

Phone:*

612-861-9700

Ext.

Fax:

PeopleSoft Vendor Number

0000004028A1

Project Information

Project Name

77th Street Extension and TH 77 Underpass

Primary County where the Project is Located

Hennepin

Jurisdictional Agency (If Different than the Applicant):

MnDOT (Portion)

The proposed 77th Street underpass connects 77th Street east and west of TH 77 to eliminate a gap in the Minor Reliever network to I-494 (Figure 1). The project will connect Bloomington and Longfellow Avenues. The project includes the following elements as shown on Figure 2:

1. Construct 0.36 mile of a new four-lane divided road connecting 77th Street to the realigned Longfellow Avenue on the east side of Trunk Highway (TH) 77
2. Construct new bridge on TH 77 carrying TH 77 over 77th Street
3. Reconstruct the southbound TH 77 to westbound I-494 ramp, including a new bridge over 77th Street
4. Reconstruct the westbound I-494 to northbound TH 77 ramp, including a new bridge over 77th Street
5. Construct a new segment of roadway (Richfield Parkway) between 77th Street and 76th Street, including 16 parking spaces on the west side
6. Construct a cul-de-sac to close the west frontage road along TH 77 north of 77th Street
7. Construct a cul-de-sac to close the north frontage road along I-494 south of 77th Street
8. Construct multiuse regional trail along the west side of Richfield Parkway, and along the north side of 77th Street (links to Nine Mile Creek and Nokomis-Minnesota River Regional Trails)
9. Construct sidewalk along the east side of Richfield Parkway and along the south side of 77th Street

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

The project will address regional traffic issues on the I-494 corridor through Richfield and Bloomington. The I-494 Corridor Study (1990s) acknowledged that there is a limited ability to expand I-494. The study identified 77th Street as part of an arterial system to carry short- to medium-length trips in the I-494 corridor. The City of Richfield has since reconstructed 77th Street from I-35W to Cedar Avenue. The project is the last link in the system. The need for a connection across TH 77 has also been identified by Three Rivers Park District as part of the Nine Mile Creek Regional Trail and the Nokomis-Minnesota River Regional Trail (formerly Intercity Regional Trail) to provide pedestrian/bicycle connectivity from Richfield to Bloomington.

The project will have several benefits, including:

- Keeps short- to medium-length trips off I-494, freeing up capacity for longer regional trips

- Provides access for existing commercial development and future redevelopment adjacent to I-494, the airport, and the Mall of America influence area

- Provides secondary access to air freight businesses along Longfellow Avenue

- Provides a connection under TH 77, a major barrier to pedestrian/bicycle travel

- Fills a gap in the sidewalk and trail network

- Improves access to Metro Transit South Bus Garage

- Allows rerouting of bus routes to shorten travel time for transit riders (currently have to access the

freeway system to cross TH 77)

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)

Richfield, 77th Street from Bloomington Ave to Longfellow Ave, Construct 77th Street Extension under TH 77 and reconstruct TH 77 ramps

Project Length (Miles)

0.36

Project Funding

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

Yes

If yes, please identify the source(s)

State Bonding via Local Road Improvement Program

Federal Amount

\$7,000,000.00

Match Amount

\$8,115,000.00

Minimum of 20% of project total

Project Total

\$15,115,000.00

Match Percentage

53.69%

Minimum of 20%

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

Source of Match Funds

State/Local Funds

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:

2018, 2019

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

Project Information: Roadway Projects

County, City, or Lead Agency

City of Richfield

Functional Class of Road

A Minor Arterial

Road System

MSAS

TH, CSAH, MSAS, CO. RD., TWP. RD., CITY STREET

Road/Route No.

108

i.e., 53 for CSAH 53

Name of Road

77th Street

Example; 1st ST., MAIN AVE

Zip Code where Majority of Work is Being Performed 55423
 (Approximate) Begin Construction Date 04/25/2018
 (Approximate) End Construction Date 06/29/2020

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

From: 77th St & Bloomington Ave
 (Intersection or Address)
 To: 77th St & Longfellow Ave
 (Intersection or Address)

DO NOT INCLUDE LEGAL DESCRIPTION

Or At N/A

Primary Types of Work

grading, agg base, bit surface, sidewalk, multi-use trail, ped ramps, bridges, lighting, retaining wall

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

BRIDGE/CULVERT PROJECTS (IF APPLICABLE)

Old Bridge/Culvert No.: N/A
 New Bridge/Culvert No.: 27R35, 27R36, 27R37, 27R38
 Structure is Over/Under TH 77 and Ramps over 77th Street
 (Bridge or culvert name):

Specific Roadway Elements

CONSTRUCTION PROJECT ELEMENTS/COST ESTIMATES	Cost
Mobilization (approx. 5% of total cost)	\$515,000.00
Removals (approx. 5% of total cost)	\$280,000.00
Roadway (grading, borrow, etc.)	\$1,825,000.00
Roadway (aggregates and paving)	\$675,000.00
Subgrade Correction (muck)	\$0.00
Storm Sewer	\$675,000.00
Ponds	\$100,000.00
Concrete Items (curb & gutter, sidewalks, median barriers)	\$300,000.00
Traffic Control	\$205,000.00
Striping	\$20,000.00
Signing	\$85,000.00
Lighting	\$240,000.00
Turf - Erosion & Landscaping	\$100,000.00
Bridge	\$7,090,000.00

Retaining Walls	\$365,000.00
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	\$2,000,000.00
Other Roadway Elements	\$170,000.00
Totals	\$14,645,000.00

Specific Bicycle and Pedestrian Elements

CONSTRUCTION PROJECT ELEMENTS/COST ESTIMATES	Cost
Path/Trail Construction	\$150,000.00
Sidewalk Construction	\$65,000.00
On-Street Bicycle Facility Construction	\$0.00
Right-of-Way	\$0.00
Pedestrian Curb Ramps (ADA)	\$15,000.00
Crossing Aids (e.g., Audible Pedestrian Signals, HAWK)	\$0.00
Pedestrian-scale Lighting	\$100,000.00
Streetscaping	\$125,000.00
Wayfinding	\$15,000.00
Bicycle and Pedestrian Contingencies	\$0.00
Other Bicycle and Pedestrian Elements	\$0.00
Totals	\$470,000.00

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	\$15,115,000.00
Construction Cost Total	\$15,115,000.00
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.

Goal A, Objective B; page 2.17

Strategy B6; page 2.23

Goal C, Objective A; page 2.24

Goal C, Objective B; page 2.24

Goal C, Objective C; page 2.24

Goal C, Objective D; page 2.24

Goal C, Objective E; page 2.24

Strategy C1; page 2.24

Strategy C2; page 2.24

Strategy C9; page 2.32

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

Strategy C15; page 2.36

Strategy C16; page 2.36

Strategy C17; page 2.37

Strategy C19; page 2.37

Goal D, Objective A; page 2.38

Goal D, Objective B; page 2.38

Goal D, Objective C; page 2.38

Strategy D3; page 2.39

Strategy D4; page 2.40

Strategy D5; page 2.40

Goal E, Objective C; page 2.42

Goal E, Objective D; page 2.42

Strategy E3; page 2.44

Strategy E4; page 2.44

Strategy E5; page 2.45

Strategy E7; page 2.47

Goal F, Objective A; page 2.48

Goal F, Objective C; page 2.48

Goal F, Objective D; page 2.48

Strategy F2; page 2.49

Strategy F3; page 2.50

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.

City of Richfield Comprehensive Plan, Chapter 6, page 6-15; Appendix 6E, page Appendix-14

City of Richfield 494 Corridor Land Use Plan (Comprehensive Plan Supplement), Exhibit D-7d

City of Richfield Capital Improvement Budget and Plan, 2016-2020, page 53

List the applicable documents and pages:

Three Rivers Park District Nine Mile Creek Master Plan, pages 38-40

City of Richfield Bicycle Master Plan, page 29

City of Richfield ADA Transition Plan, pages 3-4

See "Referenced Planning Documents" in "Other Attachments" for these pages.

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 elements in more than one funding application 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.

Roadway Expansion: \$1,000,000 to \$7,000,000

Roadway Reconstruction/ Modernization: \$1,000,000 to \$7,000,000

Roadway System Management \$250,000 to \$7,000,000

Bridges Rehabilitation/ Replacement: \$1,000,000 to \$7,000,000

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

Roadways Including Multimodal Elements

1. All roadway and bridge projects must be identified as a Principal Arterial (Non-Freeway facilities only) or A-Minor Arterial as shown on the latest TAB approved roadway functional classification map.

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

Roadway Expansion and Reconstruction/Modernization projects only:

2. The project must be designed to meet 10-ton load limit standards.

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

Bridge Rehabilitation/Replacement projects only:

3. Projects requiring a grade-separated crossing of a Principal Arterial freeway must be limited to the federal share of those project costs identified as local (non-MnDOT) cost responsibility using MnDOT's Cost Participation for Cooperative Construction Projects and Maintenance Responsibilities manual. In the case of a federally funded trunk highway project, the policy guidelines should be read as if the funded trunk highway route is under local jurisdiction.

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

4. The bridge must carry vehicular traffic. Bridges can carry traffic from multiple modes. However, bridges that are exclusively for bicycle or pedestrian traffic must apply under one of the Bicycle and Pedestrian Facilities application categories. Rail-only bridges are ineligible for funding.

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

5. The length of the bridge must equal or exceed 20 feet.

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

6. The bridge must have a sufficiency rating less than 80 for rehabilitation projects and less than 50 for replacement projects. Additionally, the bridge must also be classified as structurally deficient or functionally obsolete.

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

Requirements - Roadways Including Multimodal Elements

Expander/Augmentor/Non-Freeway Principal Arterial

Select one:

Area 0
Project Length 0
Average Distance 0
Upload Map

Reliever: Relieves a Principle Arterial that is a Freeway Facility

Facility being relieved I-494
Number of hours per day volume exceeds capacity (based on the Congestion Report) 4.0

Reliever: Relives a Principle Arterial that is a Non-Freeway Facility

Facility being relieved
Number of hours per day volume exceeds capacity (based on the table below) 0

Non-Freeway Facility Volume/Capacity Table

Hour	NB/EB Volume	SB/WB Volume	Capacity	Volume exceeds capacity
12:00am - 1:00am			0	
1:00am - 2:00am			0	
2:00am - 3:00am			0	
3:00am - 4:00am			0	
4:00am - 5:00am			0	
5:00am - 6:00am			0	
6:00am - 7:00am			0	
7:00am - 8:00am			0	
8:00am - 9:00am			0	
9:00am - 10:00am			0	
10:00am - 11:00am			0	
11:00am - 12:00pm			0	
12:00pm - 1:00pm			0	
1:00pm - 2:00pm			0	
2:00pm - 3:00pm			0	

3:00pm - 4:00pm	0
4:00pm - 5:00pm	0
5:00pm - 6:00pm	0
6:00pm - 7:00pm	0
7:00pm - 8:00pm	0
8:00pm - 9:00pm	0
9:00pm - 10:00pm	0
10:00pm - 11:00pm	0
11:00pm - 12:00am	0

Measure B: Project Location Relative to Jobs, Manufacturing, and Education

Existing Employment within 1 Mile:	33034
Existing Manufacturing/Distribution-Related Employment within 1 Mile:	4798
Existing Students:	1551
Upload Map	1464971221542_RegEconomyMap-Richfield.pdf

Measure C: Current Heavy Commercial Traffic

Location:	77th Street at TH 77 Underpass
Current daily heavy commercial traffic volume:	1456
Date heavy commercial count taken:	New Roadway HC Estimate from Traffic Model

Measure D: Freight Elements

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

The project will result in significant freight efficiency benefits. The project will construct a ten-ton roadway extension of 77th Street that will provide an alternative route to access the freeway network for freight movements around the Minneapolis-Saint Paul International Airport, which is identified in the TPP as one of two air/truck freight terminals within the region. Two freight-related businesses (DHL Express and Air General, Inc.) are located adjacent to the west of the project area along 77th Street. Currently, freight transported by truck can access the airport via the TH 77/66th Street Interchange and at the I-494/34th Avenue Interchange. By providing a third access point to the freeway network via 77th Street, the project would support redundancy on the freight network for time-sensitive goods transported via the airport. Compared to the existing access, the project would also be anticipated to provide more direct access to westbound I-494 for freight movements. Additionally, project design has accounted for truck turning movements between 77th Street and the proposed segment of Richfield Parkway, and includes a 300-foot-long left- and right-turn lane at Longfellow Avenue to help facilitate the movement of trucks near the airport.

Measure A: Current Daily Person Throughput

Location	77th Street Underpass (traffic model estimate)
Current AADT Volume	11200
Existing Transit Routes on the Project	515, 540
<i>For New Roadways only, list transit routes that will be moved to the new roadway</i>	
Upload Transit Map	1466605158805_TransitMap-Richfield.pdf

Response: Current Daily Person Throughput

Average Annual Daily Transit Ridership	2541.0
Current Daily Person Throughput	17101.0

Measure B: 2040 Forecast ADT

Use Metropolitan Council model to determine forecast (2040) ADT volume No

If checked, METC Staff will provide Forecast (2040) ADT volume 0

OR

Identify the approved county or city travel demand model to determine forecast (2040) ADT volume Metropolitan Council 2040 Regional Travel Demand Model

Forecast (2040) ADT volume 13900

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): Yes

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:

Benefits:

- The 77th Street underpass will improve circulation and connectivity for residents of the project area by providing more direct access to major regional destinations across all modes. A housing inventory identified this area as having the second largest concentration of rental units in the city and suggested the area is susceptible to disinvestment due in part to a lack of connectivity. By providing an improved connection across two major barriers (TH 77 and I-494), the project will provide a shorter and more convenient route between the project area and the MSP Airport and South Loop District of Bloomington (including the Mall of America), large centers for employment, education, entertainment, and shopping. The additional trail and sidewalk will provide non-motorized users with a safer and more convenient connection to these areas. Currently, individuals in the project area who rely on walking or bicycling must travel west to 12th Avenue, cross I-494, turn east on American Boulevard, and cross under TH 77 in order to access the airport, Mall of America, or other destinations. The project would shorten these trips by one mile or more, which would be a substantial benefit for less mobile or less confident user groups including children, people with disabilities, and the elderly. The proposed multi-use trail would also provide users with a new connection to the Minnesota River Recreational Area (via the Nine Mile Creek Regional Trail). The project will also enable more direct transit routes and connections in and around the project area, improving convenience and travel times for low-income and minority populations who rely on transit, and will improve access to the South Loop, Airport, and the broader regional transit network via the Blue Line LRT.
- The project will improve drainage within Washington Park, allowing for additional use of soccer fields within the park and a recreational

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

benefit for disadvantaged populations in the area.
 Negative impacts and mitigation:

- Permanent right of way acquisition for the project will be limited to the Motel 6 located north of 77th Street; therefore, it is not anticipated that the project will result in any residential relocation.
- By altering the vertical alignment of TH 77 and the existing ramps, the project may result in increased noise levels in and around the project area. Noise impacts resulting from the project will be mitigated according to MnDOT policy.
- The project will construct a portion of the Richfield Parkway within Washington Park in proximity to several existing apartment buildings. Richfield Parkway will include a sidewalk on the east side and multi-use trail on the west side. Drainage improvements will allow more of the park to be used for soccer fields and other activities.

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

Upload Map

1467814353477_Socio-EconMap-Richfield.pdf

Measure B: Affordable Housing

City/Township	Segment Length in Miles (Population)
City of Richfield	0.36
	0

Total Project Length

Total Project Length (Total Population)	0.36
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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
City of Richfield	0.36	0.36	76.0	1.0	76.0

0

76

1

76

Affordable Housing Scoring - To Be Completed By Metropolitan Council Staff

Total Project Length (Miles)	0.36
Total Housing Score	76.0

Measure A: Infrastructure Age

Year of Original Roadway Construction or Most Recent Reconstruction	Segment Length	Calculation	Calculation 2
2003.0	0.24	480.72	907.019
1990.0	0.03	59.7	112.642
1999.0	0.26	519.74	980.642
	1	1060	2000

Average Construction Year

Weighted Year	2000.303
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Total Segment Length (Miles)

Total Segment Length	0.53
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Measure A: Vehicle Delay Reduction

Total Peak Hour Delay Per Vehicle Without The Project	Total Peak Hour Delay Per Vehicle With The Project	Total Peak Hour Delay Per Vehicle Reduced by Project	Volume (Vehicles Per Hour)	Total Peak Hour Delay Reduced by the Project (Seconds)	EXPLANATION of methodology used to calculate railroad crossing delay, if applicable:	Synchro or HCM Reports
123.7	114.9	8.8	17498.0	153982.4	N/A	1468418716702_Measure 5A and Measure 5B Documentation.pdf

Total Delay

Total Peak Hour Delay Reduced

153982.4

Measure B: Roadway projects that do not include new roadway segments or railroad grade-separation elements

Total (CO, NOX, and VOC) Peak Hour Emissions Per Vehicle without the Project (Kilograms):	Total (CO, NOX, and VOC) Peak Hour Emissions Per Vehicle with the Project (Kilograms):	Total (CO, NOX, and VOC) Peak Hour Emissions Reduced Per Vehicle by the Project (Kilograms):	Volume (Vehicles Per Hour):	Total (CO, NOX, and VOC) Peak Hour Emissions Reduced by the Project (Kilograms):
0	0		0	0

Total

Total Emissions Reduced:

0

[Upload Synchro Report](#)

Measure B: Roadway projects that are constructing new roadway segments, but do not include railroad grade-separation elements (for Roadway Expansion applications only):

Total (CO, NOX, and VOC) Peak Hour Emissions Per Vehicle without the Project (Kilograms):	Total (CO, NOX, and VOC) Peak Hour Emissions Per Vehicle with the Project (Kilograms):	Total (CO, NOX, and VOC) Peak Hour Emissions Reduced Per Vehicle by the Project (Kilograms):	Volume (Vehicles Per Hour):	Total (CO, NOX, and VOC) Peak Hour Emissions Reduced by the Project (Kilograms):
23.2	19.8	3	17498.0	52494.0
23	20		17498	52494

Total Parallel Roadways

Emissions Reduced on Parallel Roadways

52494.0

[Upload Synchro Report](#)

1468418774592_Measure 5A and Measure 5B Documentation.pdf

New Roadway Portion:

Cruise speed in miles per hour with the project:	40.0
Vehicle miles traveled with the project:	403.2
Total delay in hours with the project:	0
Total stops in vehicles per hour with the project:	0
Fuel consumption in gallons:	0
Total (CO, NOX, and VOC) Peak Hour Emissions Reduced or Produced on New Roadway (Kilograms):	0

EXPLANATION of methodology and assumptions used:(Limit 1,400 characters; approximately 200 words)

For this portion of the analysis, it was assumed that the cruise speed equals the design speed of 40 mph and that the vehicle miles traveled are equal to the product of the peak hour volume (1,120 vehicles) and the length of the new segment (0.36 miles). Operations analysis performed for the project has demonstrated that no vehicle delays or vehicle stops are anticipated to occur on the new roadway; therefore, both items were left as zero.

Total (CO, NOX, and VOC) Peak Hour Emissions Reduced by the Project (Kilograms):	52494.0
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Measure B: Roadway projects that include railroad grade-separation elements

Cruise speed in miles per hour without the project:	0
Vehicle miles traveled without the project:	0
Total delay in hours without the project:	0
Total stops in vehicles per hour without the project:	0
Cruise speed in miles per hour with the project:	0
Vehicle miles traveled with the project:	0
Total delay in hours with the project:	0
Total stops in vehicles per hour with the project:	0
Fuel consumption in gallons (F1)	0
Fuel consumption in gallons (F2)	0
Fuel consumption in gallons (F3)	0
Total (CO, NOX, and VOC) Peak Hour Emissions Reduced by the Project (Kilograms):	0

EXPLANATION of methodology and assumptions used:(Limit 1,400 characters; approximately 200 words)

Measure A: Benefit of Crash Reduction

Crash Modification Factor Used:

Analysis was based on the methodology for new roadways. See documentation in "Other Attachments."

(Limit 700 Characters; approximately 100 words)

Rationale for Crash Modification Selected:

Analysis was based on the methodology for new roadways. See documentation in "Other Attachments."

(Limit 1400 Characters; approximately 200 words)

Project Benefit (\$) from B/C Ratio:

870300.0

Worksheet Attachment

1468329411919_HSIP Benefit Cost Worksheet.pdf

Roadway projects that include railroad grade-separation elements:

Current AADT volume:

0

Average daily trains:

0

Crash Risk Exposure eliminated:

0

Measure A: Multimodal Elements and Existing Connections

Bicycle/pedestrian elements:

The project includes sidewalk and multiuse trail that will remove a major barrier to pedestrian and bicycle circulation in the area by providing an underpass under TH 77. Sidewalk will be constructed along the south side of 77th Street, connecting with existing sidewalk at both eastern and western project termini. Sidewalk will also be constructed along the east side of the proposed Richfield Parkway between 76th Street and 77th Street. Multiuse trail will be constructed along the north side of 77th Street and along the west side of Richfield Parkway. The trail will connect to the existing segments of the Nine Mile Creek and Nokomis-Minnesota River Regional Trails, as well as the trail within Washington Park. The trail along Richfield Parkway and 77th Street to the east will serve as an alternative route option for the extension of the Nine Mile Creek Regional Trail (see Figure 3), which will eventually continue east to the Minnesota Valley National Wildlife Refuge. By providing a crossing under TH 77, the project will create a safer, more convenient route for non-motorized users, reducing trips by more than a mile in some cases, and providing access to a number of regional destinations and the broader regional trail network. The sidewalk, trail, curb ramps, and crosswalks constructed as part of the project will be ADA-compliant and will be comfortable for a wide range of ages and abilities. The city will provide year-round maintenance so the trail can be used safely.

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

Transit elements:

Currently, there is a stop for Metro Transit Bus Route 515 at the junction of 77th Street and Longfellow Avenue. While the project does not

include any specific transit amenities, Metro Transit has indicated that they will reroute one or two local bus routes to use the 77th Street Underpass in order to make the routes more efficient. The Metro Transit south bus garage is located on the east side of TH 77 just to the south of the terminus of this project. This connection will provide more direct connections for buses returning to the bus garage as well as active routes.

Existing bicycle/pedestrian connections:

Within the project area, there is currently sidewalk on the south side of 77th Street between Bloomington Avenue and the TH 77 frontage road. There is also sidewalk along the west side of the frontage road. There are multiuse trails running north-south and east-west within Washington Park. North of the project area, regional trails are present along the north side of 76th Street (Nine Mile Creek Regional Trail) and the east side of the TH 77 frontage road (Nokomis-Minnesota River Regional Trail). East of TH 77, there is sidewalk along the south side of 77th Street east of Longfellow Avenue.

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

3)Environmental Documentation (5 Percent of Points)

EIS

EA

PM

Yes

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

Yes

50%

Document not started

0%

Anticipated date or date of completion/approval

10/02/2017

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: 08/01/2016

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

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 Yes

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 Yes

50%

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

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 12/31/2016

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 01/01/2018

10) Letting

Anticipated Letting Date 02/01/2018

Measure A: Cost Effectiveness

Total Project Cost (entered in Project Cost Form):	\$15,115,000.00
Enter Amount of the Noise Walls:	\$0.00
Total Project Cost subtract the amount of the noise walls:	\$15,115,000.00
Points Awarded in Previous Criteria	
Cost Effectiveness	\$0.00

Other Attachments

File Name	Description	File Size
16-11211r-77th St STP Resolution.pdf	Richfield City Council Resolution	50 KB
2016 77th Underpass LOS MAC.pdf	MAC Letter of Support	554 KB
Figure 1 - Project Location.pdf	Figure 1 - Project Location	324 KB
Figure 2 - Concept Layout.pdf	Figure 2 - Concept Layout	1.3 MB
Figure 3 - Nine Mile Creek Trail - Bloomington Segment Map.pdf	Figure 3 - Nine Mile Creek Trail - Bloomington Segment Map	1.6 MB
Metro Transit letter of support.pdf	Metro Transit Letter of Support	296 KB
Referenced Planning Documents.pdf	Referenced Planning Documents	3.0 MB
RoadwayAreaMap-Richfield.pdf	Roadway Area Map	204 KB
Safety Analysis Documentation.pdf	Safety Analysis Documentation	281 KB
Three Rivers Letter of Support.pdf	Three Rivers Park District Letter of Support	135 KB

Regional Economy

Roadway Expansion Project: 77th Street Extension | Map ID: 1464725525073

Results

WITHIN ONE MI of project:

Totals by City:

Bloomington

Population: 6708
 Employment: 28794
 Mfg and Dist Employment: 2672

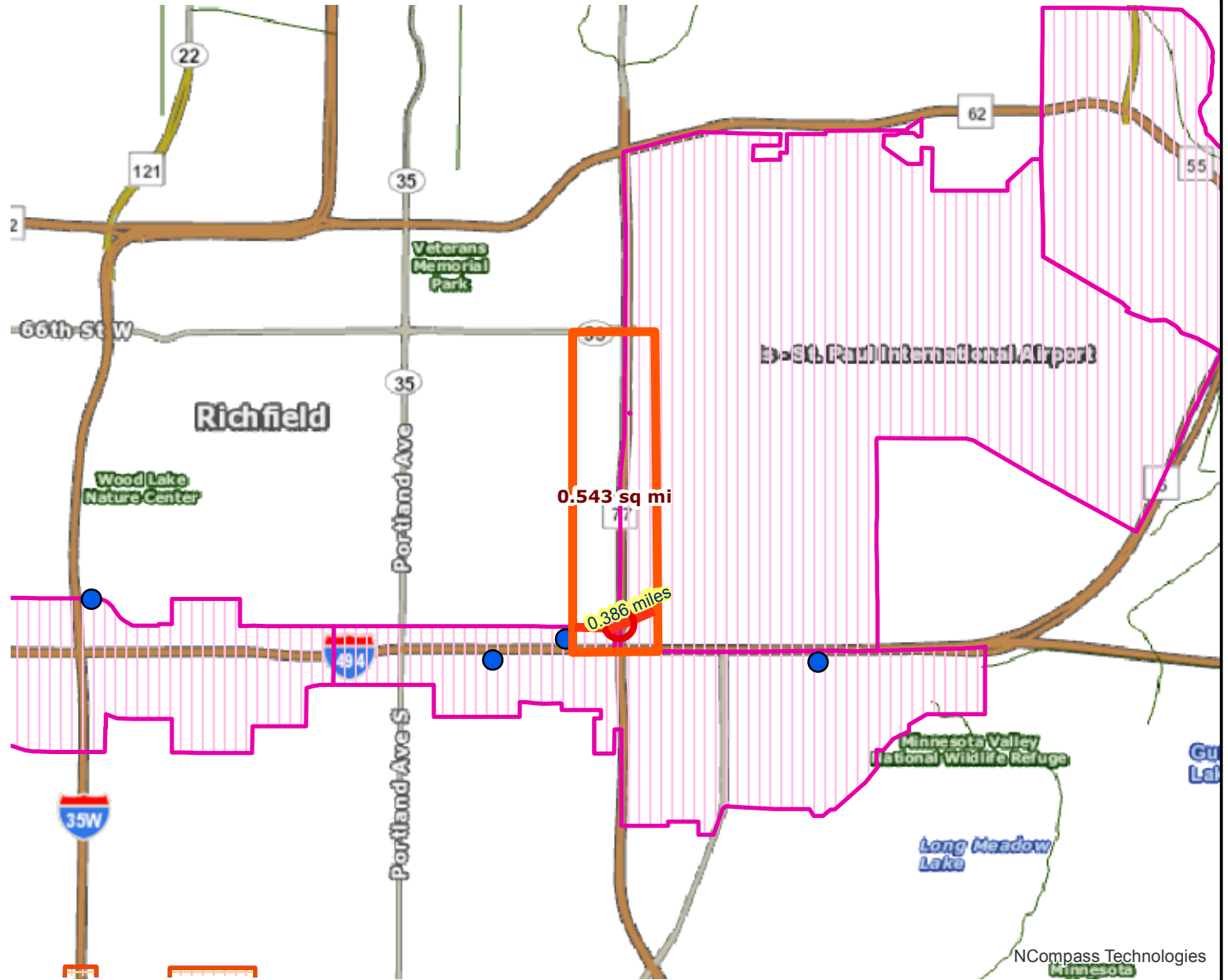
Fort Snelling (unorg.)

Population: 0
 Employment: 3025
 Mfg and Dist Employment: 1780

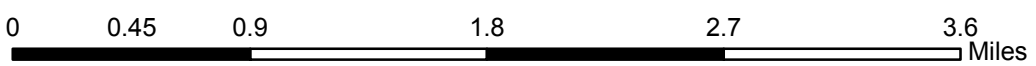
Richfield

Population: 9979
 Employment: 1215
 Mfg and Dist Employment: 346

Postsecondary Students:
 1551



- Project Points
- Project Area
- Manufacturing/Distribution Centers
- Job Concentration Centers
- Project
- PostSecondary Education Centers



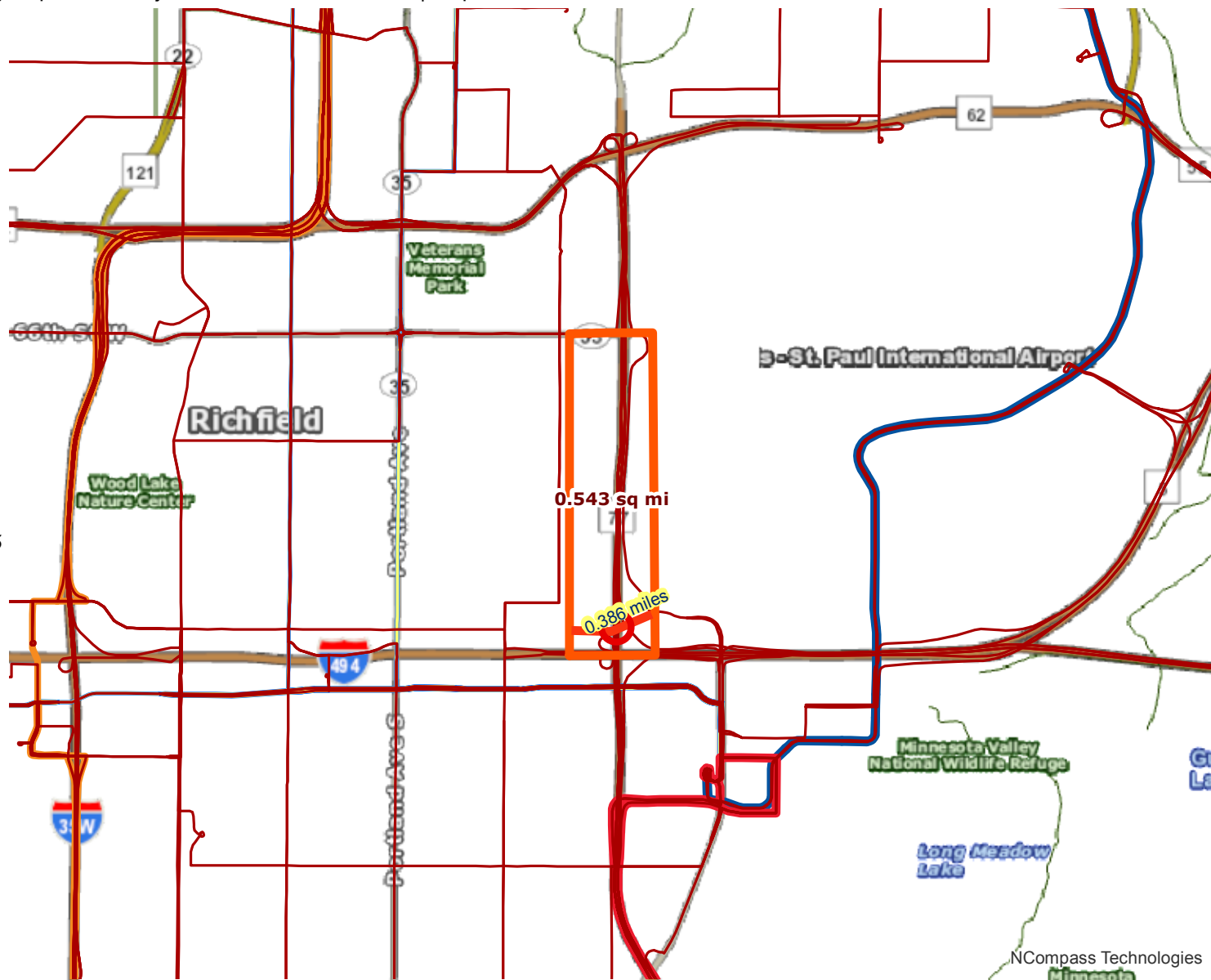
Created: 5/31/2016
 LandscapeRSA5



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



NCompass Technologies
 Minnesota

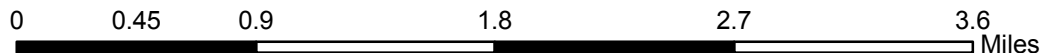


Results

Transit with a Direct Connection to project:
 440 470 472 475 476 477 478 479 491 492 515

*indicates Planned Alignments

	Project Points		Transit Routes		Red Line		BRT, Orange Line
	Project Area		Blue Line		Arterial BRT		
	Project Area		Blue Line		Arterial BRT		



Created: 5/31/2016
 LandscapeRSA3



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<http://giswebsite.metc.state.mn.us/gissitenew/notice.aspx>









NCompass Technologies
 Minnesota

Results

Project located **IN**
 Area of Concentrated Poverty
 with 50% or more of residents
 are people of color (ACP50):
 (0 to 30 Points)



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



Created: 5/31/2016
 LandscapeRSA2



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<http://giswebsite.metc.state.mn.us/gissitenew/notice.aspx>

NCompass Technologies



Methodology used for Measure 5A, Congestion Reduction, and Measure 5B, Emissions

77th Street Extension and TH 77 Underpass – Regional Solicitation Application

Introduction

The purpose of this attachment is to document the calculation process for the 77th Street Extension and Underpass project in the City of Richfield for the Metropolitan Council Regional Solicitation application process. While the provided methodology and guidance have been followed in the main body of the application (and the Synchro and HCS reports are provided at the end of this attachment), this attachment provides set of alternative congestion reduction and emissions calculations for this project that differ from the stated process in the application and are believed to better represent the benefits of the project. The deviation from the standard process is due to the fact that this project involves construction of a new roadway, which involves a system-wide change in traffic flow rather than congestion reduction due to improvements on existing roadways which generally do not change traffic flow on a system-wide level.

Measure 5A, Congestion Reduction

The project proposes to construct a segment of new roadway. The procedure for delay estimation asks that parallel roadways be evaluated. Previous modeling efforts on the corridor show that the 77th Street corridor attracts 5,700 vehicles from three roadways in the area: 66th Street, I-494, and American Blvd; however, the estimated opening day ADT on the corridor is 11,200. This shows that the closest roadways do not fully capture the traffic coming to the corridor. Calculating the delay savings on these corridors will not, therefore, provide a complete picture of the delay savings due to the new roadway. A more comprehensive approach is to use the regional travel demand model and compare the network vehicle hours of travel in the peak hour with and without the 77th Street underpass (see **Table 1**).

Table 1: Peak Hour Total Vehicle Hours Traveled

	VHT
No Build	184,402
Build	184,052
Variance	-350

Based on this analysis, the total peak hour delay reduced would be **1,260,000** seconds, substantially larger than the 153,982.4 seconds presented in the main portion of the application (based on Synchro and HCS reports).

Measure 5B, Emissions

The issue referenced above also applies to the calculation of emissions reductions. Based on the provided methodology, the emissions avoided on these three individual parallel roadways is much less than the emissions avoided across the network when numbers from the regional travel demand model

are used because the closest roadways do not fully account for redirected traffic to the new roadway. Therefore, a more appropriate approach to estimate the emissions reductions due to the project will be using the travel demand model, which accounts for all of the redirected traffic. The emissions calculations below were based on the total system vehicle delay for the peak hour from the Metropolitan Council's regional Travel Demand Model with and without the 77th Street underpass. Vehicle emission rates from Synchro were used to calculate the emission reductions based on total vehicle delay. The calculations for the emissions are as follows:

Fuel consumed in gallons (due to total vehicle delay): $0.7329 \times \text{Total Vehicle Delay (hours)}$

CO emissions = $69.9 \text{ grams/gallon} \times \text{fuel consumed (gallons)}$

NOx emissions = $13.6 \text{ grams/gallon} \times \text{fuel consumed (gallons)}$

VOC emissions = $16.2 \text{ grams/gallon} \times \text{fuel consumed (gallons)}$

Inserting the vehicle delay from the travel demand model, the emissions are calculated to be:

Before project:

Fuel consumed = $0.7329 \times 184,402 = 135,148$ gallons

CO emissions = $69.9 \times 135,148 = 9,446,861$ grams = 9,447 kg

NOx emissions = $13.6 \times 135,148 = 1,838,012$ grams = 1,838 kg

VOC emissions = $16.2 \times 135,148 = 2,189,398$ grams = 2,189 kg

After project:

Fuel consumed = $0.7329 \times 184,052 = 134,892$ gallons

CO emissions = $69.9 \times 134,892 = 9,428,951$ grams = 9,429 kg

NOx emissions = $13.6 \times 134,892 = 1,834,531$ grams = 1,834 kg

VOC emissions = $16.2 \times 134,892 = 2,185,250$ grams = 2,185 kg

Change in emissions due to project:

CO emissions: $9,429 \text{ kg} - 9,447 \text{ kg} = -18 \text{ kg}$ (18 kg reduction)

NOx emissions: $1,834 \text{ kg} - 1,838 \text{ kg} = -4 \text{ kg}$ (4 kg reduction)

VOC emissions: $2,185 \text{ kg} - 2,189 \text{ kg} = -4 \text{ kg}$ (4 kg reduction)

These reductions sum to a total emissions reduction of **26 kg**, substantially larger than the 3.4 kg presented in the main portion of the application (based on Synchro and HCS reports).

3: 12th Ave S & American Blvd

Direction	All
Future Volume (vph)	2634
Total Delay / Veh (s/v)	18
CO Emissions (kg)	3.87
NOx Emissions (kg)	0.75
VOC Emissions (kg)	0.90

6: Thunderbird Rd & American Blvd

Direction	All
Future Volume (vph)	1369
Total Delay / Veh (s/v)	25
CO Emissions (kg)	2.74
NOx Emissions (kg)	0.53
VOC Emissions (kg)	0.64

9: 24th Ave S & American Blvd

Direction	All
Future Volume (vph)	2819
Total Delay / Veh (s/v)	22
CO Emissions (kg)	3.16
NOx Emissions (kg)	0.61
VOC Emissions (kg)	0.73

14: 77 West Ramp & 66th St

Direction	All
Future Volume (vph)	2273
Total Delay / Veh (s/v)	20
CO Emissions (kg)	1.98
NOx Emissions (kg)	0.39
VOC Emissions (kg)	0.46

17: 77 East Ramp & 66th St

Direction	All
Future Volume (vph)	1596
Total Delay / Veh (s/v)	18
CO Emissions (kg)	1.36
NOx Emissions (kg)	0.26
VOC Emissions (kg)	0.31

3: 12th Ave S & American Blvd

Direction	All
Future Volume (vph)	2212
Total Delay / Veh (s/v)	19
CO Emissions (kg)	3.25
NOx Emissions (kg)	0.63
VOC Emissions (kg)	0.75

6: Thunderbird Rd & American Blvd

Direction	All
Future Volume (vph)	1152
Total Delay / Veh (s/v)	25
CO Emissions (kg)	2.30
NOx Emissions (kg)	0.45
VOC Emissions (kg)	0.53

9: 24th Ave S & American Blvd

Direction	All
Future Volume (vph)	2366
Total Delay / Veh (s/v)	17
CO Emissions (kg)	2.46
NOx Emissions (kg)	0.48
VOC Emissions (kg)	0.57

14: 77 West Ramp & 66th St

Direction	All
Future Volume (vph)	2159
Total Delay / Veh (s/v)	10
CO Emissions (kg)	1.48
NOx Emissions (kg)	0.29
VOC Emissions (kg)	0.34

17: 77 East Ramp & 66th St

Direction	All
Future Volume (vph)	1517
Total Delay / Veh (s/v)	24
CO Emissions (kg)	1.40
NOx Emissions (kg)	0.27
VOC Emissions (kg)	0.32

HCS 2010 Freeway Facilities

Project Properties

Analyst	Sudheer Dhulipala	Freeway Name	I-494 Existing	Analysis Period	PM Peak
Analysis Date	7/5/2016 1:56:39 PM	From	12th Ave	Version Date	10/10/2012
Agency	WSB & Associates, Inc.	To	24th Ave		
Location	Bloomington	Analysis Direction	EB		
User Notes					
File Name	C:\Users\sdhulipala\AppData\Local\Temp\preview.xml				

Facility-wide Values

Jam Density (pc/h/ln)	190	Time Period Duration (min)	15	Facility Length (mi)	0.99400
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Segment Input Data

Time Period 1

Mainline Data										
Seg #	From	To	Type	Length	Terrain	Adj. Demand	% Trucks	% RVs	# Lanes	FFS
1	a	b	Basic Segment	850	Level	5787	2.00	0.00	3	65
2	b	c	Weaving	1070	Level	6807	2.00	0.00	3	65
3	c	d	Basic Segment	560	Level	5140	2.65	0.00	3	65
4	d	e	Weaving	500	Level	5411	2.62	0.00	3	65
5	e	f	Off Ramp	900	Level	5153	2.65	0.00	3	65
6	f	g	Basic Segment	1370	Level	5032	2.71	0.00	4	65

RampData							
Seg #	Type	Adj. Demand	% Trucks	% RVs	Lanes	Accel/Decel Length	FFS
5	Off Ramp	121	0.00	0.00	1	450	40

Weaving Segment Data											
Seg #	Ramp to Ramp Prop.	On-Ramp					Off-Ramp				
		Adj. Demand	% Trucks	% RVs	Lanes	FFS	Adj. Demand	% Trucks	% RVs	Lanes	FFS
2	0.050	1020	2.00	0.00	1	40	1667	0.00	0.00	1	40
4	0.050	271	2.00	0.00	1	40	258	2.00	0.00	1	40

Time Period Independent Weaving Segment Data

Seg #	Configuration	Short Length	# Weaving Lanes	Min. Lane Changes Freeway-Ramp	Min. Lane Changes Ramp-Freeway	Min. Lane Changes Ramp-Ramp
2	1070	2	1	1	0	
4	500	2	1	1	0	

Time Period Results

Time Period 1

Seg #	From	To	Type	Adj. Demand	Vol. Served	Capacity (pc/h)	Capacity (veh/h)	d/c Ratio	v/c ratio	Queue Length (ft)	Avg. Speed (mi/h)	Density (pc/mi/ln)	Density (veh/mi/ln)	Avg. Travel Time (min/veh)	Free-Flow Travel Time (min/veh)	Mainline Delay (min/veh)	System Delay (min/veh)	VMT Demand (veh-min)	VMT Volume (veh-min)	VHT (veh-hrs)	VHD (veh-hrs)	LOS
1	a	b	Basic Segment	5787	4800	7050	6980	0.83	0.69	850	18.3	87.4	86.5	0.53	0.15	0.4	0.4	232.9	193.2	10.5	7.6	F
2	b	c	Weaving	6807	5760	5821	5763	1.18	1.00	0	40.0	52.0	51.5	0.30	0.19	0.1	0.6	344.9	291.8	7.3	2.8	E
3	c	d	Basic Segment	5140	4380	7050	6958	0.74	0.63	0	58.3	25.4	25.0	0.11	0.10	0.0	0.0	136.3	116.1	2.0	0.2	C
4	d	e	Weaving	5411	4620	6370	6288	0.86	0.73	0	52.2	35.0	34.6	0.11	0.09	0.0	0.0	128.1	109.4	2.1	0.4	E
5	e	f	Off Ramp	5153	4380	7050	6958	0.74	0.63	0	59.6	24.8	24.5	0.17	0.16	0.0	0.0	219.6	186.6	3.1	0.3	C
6	f	g	Basic Segment	5032	4320	9400	9274	0.54	0.47	0	64.1	17.1	16.8	0.24	0.24	0.0	0.0	326.4	280.2	4.4	0.1	B

Overall Results

Segment	Segment Type	Maximum d/c Ratio	Avg. Speed (mi/h)	Density (pc/mi/ln)	Density (veh/mi/ln)	Avg. Travel Time (min/veh)	Free-Flow Travel Time (min/veh)	VMT Demand (veh-min)	VMT Volume (veh-min)	VHT (veh-hrs)	VHD (veh-hrs)
a-b	Basic	0.83	18.3	87.4	86.5	0.53	0.15	0,232.9	0,193.2	10.55	7.58
b-c	Weaving	1.18	40.0	52.0	51.5	0.30	0.19	0,344.9	0,291.8	7.30	2.81
c-d	Basic	0.74	58.3	25.4	25.0	0.11	0.10	0,136.3	0,116.1	1.99	0.20
d-e	Weaving	0.86	52.2	35.0	34.6	0.11	0.09	0,128.1	0,109.4	2.10	0.41
e-f	OffRamp	0.74	59.6	24.8	24.5	0.17	0.16	0,219.6	0,186.6	3.13	0.26
f-g	Basic	0.54	64.1	17.1	16.8	0.24	0.24	0,326.4	0,280.2	4.37	0.06
Freeway			40.0	37.7	37.3	1.46	0.92	1,388.2	1,177.4	0,029.4	0,011.3

Density-Based LOS by Segment						
Segment	1	2	3	4	5	6
Time Step	Basic	Weaving	Basic	Weaving	Off Ramp	Basic
1	F	E	C	E	C	B

Demand-Based LOS by Segment						
Time Step	1	2	3	4	5	6
1	.	F

HCS 2010 Freeway Facilities

Project Properties

Analyst	Sudheer Dhulipala	Freeway Name	I-494 Proposed	Analysis Period	PM Peak
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File Name	C:\Users\sdhulipala\AppData\Local\Temp\preview.xml				

Facility-wide Values

Jam Density (pc/h/ln)	190	Time Period Duration (min)	15	Facility Length (mi)	0.99400
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Segment Input Data

Time Period 1

Mainline Data										
Seg #	From	To	Type	Length	Terrain	Adj. Demand	% Trucks	% RVs	# Lanes	FFS
1	a	b	Basic Segment	850	Level	5498	2.00	0.00	3	65
2	b	c	Weaving	1070	Level	6467	2.00	0.00	3	65
3	c	d	Basic Segment	560	Level	4883	2.65	0.00	3	65
4	d	e	Weaving	500	Level	5140	2.62	0.00	3	65
5	e	f	Off Ramp	900	Level	4899	2.65	0.00	3	65
6	f	g	Basic Segment	1370	Level	4784	2.71	0.00	4	65

RampData							
Seg #	Type	Adj. Demand	% Trucks	% RVs	Lanes	Accel/Decel Length	FFS
5	Off Ramp	115	0.00	0.00	1	450	40

Weaving Segment Data											
Seg #	Ramp to Ramp Prop.	On-Ramp					Off-Ramp				
		Adj. Demand	% Trucks	% RVs	Lanes	FFS	Adj. Demand	% Trucks	% RVs	Lanes	FFS
2	0.050	969	2.00	0.00	1	40	1584	0.00	0.00	1	40
4	0.050	257	2.00	0.00	1	40	241	2.00	0.00	1	40

Time Period Independent Weaving Segment Data

Seg #	Configuration	Short Length	# Weaving Lanes	Min. Lane Changes Freeway-Ramp	Min. Lane Changes Ramp-Freeway	Min. Lane Changes Ramp-Ramp
2	1070	2	1	1	0	
4	500	2	1	1	0	

Time Period Results

Time Period 1

Seg #	From	To	Type	Adj. Demand	Vol. Served	Capacity (pc/h)	Capacity (veh/h)	d/c Ratio	v/c ratio	Queue Length (ft)	Avg. Speed (mi/h)	Density (pc/mi/ln)	Density (veh/mi/ln)	Avg. Travel Time (min/veh)	Free-Flow Travel Time (min/veh)	Mainline Delay (min/veh)	System Delay (min/veh)	VMT Demand (veh-min)	VMT Volume (veh-min)	VHT (veh-hrs)	VHD (veh-hrs)	LOS
1	a	b	Basic Segment	5498	4800	7050	6980	0.79	0.69	850	18.7	85.6	84.8	0.52	0.15	0.4	0.4	221.3	193.2	10.3	7.4	F
2	b	c	Weaving	6467	5760	5821	5763	1.12	1.00	0	41.1	48.1	47.6	0.30	0.19	0.1	0.2	327.6	291.8	7.1	2.6	E
3	c	d	Basic Segment	4883	4380	7050	6958	0.70	0.63	0	58.6	25.2	24.9	0.11	0.10	0.0	0.0	129.5	116.1	2.0	0.2	C
4	d	e	Weaving	5140	4620	6372	6290	0.82	0.73	0	52.8	32.9	32.4	0.11	0.09	0.0	0.0	121.7	109.4	2.1	0.4	D
5	e	f	Off Ramp	4899	4380	7050	6958	0.70	0.63	0	59.7	24.8	24.5	0.17	0.16	0.0	0.0	208.8	186.6	3.1	0.3	C
6	f	g	Basic Segment	4784	4260	9400	9274	0.52	0.46	0	64.2	16.8	16.6	0.24	0.24	0.0	0.0	310.3	276.3	4.3	0.1	B

Overall Results

Segment	Segment Type	Maximum d/c Ratio	Avg. Speed (mi/h)	Density (pc/mi/ln)	Density (veh/mi/ln)	Avg. Travel Time (min/veh)	Free-Flow Travel Time (min/veh)	VMT Demand (veh-min)	VMT Volume (veh-min)	VHT (veh-hrs)	VHD (veh-hrs)
a-b	Basic	0.79	18.7	85.6	84.8	0.52	0.15	0,221.3	0,193.2	10.34	7.36
b-c	Weaving	1.12	41.1	48.1	47.6	0.30	0.19	0,327.6	0,291.8	7.10	2.61
c-d	Basic	0.70	58.6	25.2	24.9	0.11	0.10	0,129.5	0,116.1	1.98	0.19
d-e	Weaving	0.82	52.8	32.9	32.4	0.11	0.09	0,121.7	0,109.4	2.07	0.39
e-f	OffRamp	0.70	59.7	24.8	24.5	0.17	0.16	0,208.8	0,186.6	3.13	0.26
f-g	Basic	0.52	64.2	16.8	16.6	0.24	0.24	0,310.3	0,276.3	4.31	0.06
Freeway			40.6	36.4	36.0	1.44	0.92	1,319.2	1,173.5	0,028.9	0,010.9

Density-Based LOS by Segment						
Segment	1	2	3	4	5	6
Time Step	Basic	Weaving	Basic	Weaving	Off Ramp	Basic
1	F	E	C	D	C	B

Demand-Based LOS by Segment						
Time Step	1	2	3	4	5	6
1	.	F

HCS 2010 Freeway Facilities

Project Properties

Analyst	Sudheer Dhulipala	Freeway Name	I-494 Existing	Analysis Period	PM Peak
Analysis Date	7/12/2016 1:22:19 PM	From	24th Ave	Version Date	10/10/2012
Agency	WSB & Associates, Inc.	To	12th Ave		
Location	Bloomington	Analysis Direction	WB		
User Notes					
File Name	C:\Users\sdhulipala\AppData\Local\Temp\preview.xml				

Facility-wide Values

Jam Density (pc/h/ln)	190	Time Period Duration (min)	15	Facility Length (mi)	0.99800
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Segment Input Data

Time Period 1

Mainline Data										
Seg #	From	To	Type	Length	Terrain	Adj. Demand	% Trucks	% RVs	# Lanes	FFS
1	a	b	Basic Segment	1275	Level	3812	0.00	0.00	3	65
2	b	c	On Ramp	1030	Level	4222	0.00	0.00	3	65
3	c	d	Weaving	480	Level	4254	0.00	0.00	3	65
4	d	e	Basic Segment	1015	Level	3551	0.00	0.00	3	65
5	e	f	Weaving	521	Level	4737	0.00	0.00	3	65
6	f	g	Basic Segment	950	Level	4160	0.00	0.00	3	65

RampData							
Seg #	Type	Adj. Demand	% Trucks	% RVs	Lanes	Accel/Decel Length	FFS
2	On Ramp	410	0.00	0.00	1	1000	40

Weaving Segment Data											
Seg #	Ramp to Ramp Prop.	On-Ramp					Off-Ramp				
		Adj. Demand	% Trucks	% RVs	Lanes	FFS	Adj. Demand	% Trucks	% RVs	Lanes	FFS
3	0.050	32	0.00	0.00	1	40	703	0.00	0.00	1	40
5	0.050	1186	0.00	0.00	1	40	577	0.00	0.00	1	40

Time Period Independent Weaving Segment Data

Seg #	Configuration	Short Length	# Weaving Lanes	Min. Lane Changes Freeway-Ramp	Min. Lane Changes Ramp-Freeway	Min. Lane Changes Ramp-Ramp
3	480	2	1	1	0	
5	521	2	1	1	0	

Time Period Results

Time Period 1

Seg #	From	To	Type	Adj. Demand	Vol. Served	Capacity (pc/h)	Capacity (veh/h)	d/c Ratio	v/c ratio	Queue Length (ft)	Avg. Speed (mi/h)	Density (pc/mi/ln)	Density (veh/mi/ln)	Avg. Travel Time (min/veh)	Free-Flow Travel Time (min/veh)	Mainline Delay (min/veh)	System Delay (min/veh)	VMT Demand (veh-min)	VMT Volume (veh-min)	VHT (veh-hrs)	VHD (veh-hrs)	LOS
1	a	b	Basic Segment	3812	3812	7050	7050	0.54	0.54	0	65.0	19.5	19.5	0.22	0.22	0.0	0.0	230.1	230.1	3.5	0.0	C
2	b	c	On Ramp	4222	4222	7050	7050	0.60	0.60	0	59.2	23.8	23.8	0.20	0.18	0.0	0.0	205.9	205.9	3.5	0.3	C
3	c	d	Weaving	4254	4254	6185	6185	0.69	0.69	0	52.1	27.2	27.2	0.10	0.08	0.0	0.0	96.7	96.7	1.9	0.4	C
4	d	e	Basic Segment	3551	3551	7050	7050	0.50	0.50	0	61.2	19.4	19.4	0.19	0.18	0.0	0.0	170.7	170.7	2.8	0.2	C
5	e	f	Weaving	4737	4737	5771	5771	0.82	0.82	0	45.3	34.9	34.9	0.13	0.09	0.0	0.0	116.9	116.9	2.6	0.8	D
6	f	g	Basic Segment	4160	4160	7050	7050	0.59	0.59	0	59.0	23.5	23.5	0.18	0.17	0.0	0.0	187.1	187.1	3.2	0.3	C

Overall Results

Segment	Segment Type	Maximum d/c Ratio	Avg. Speed (mi/h)	Density (pc/mi/ln)	Density (veh/mi/ln)	Avg. Travel Time (min/veh)	Free-Flow Travel Time (min/veh)	VMT Demand (veh-min)	VMT Volume (veh-min)	VHT (veh-hrs)	VHD (veh-hrs)
a-b	Basic	0.54	65.0	19.5	19.5	0.22	0.22	0,230.1	0,230.1	3.54	0.00
b-c	OnRamp	0.60	59.2	23.8	23.8	0.20	0.18	0,205.9	0,205.9	3.48	0.31
c-d	Weaving	0.69	52.1	27.2	27.2	0.10	0.08	0,096.7	0,096.7	1.85	0.37
d-e	Basic	0.50	61.2	19.4	19.4	0.19	0.18	0,170.7	0,170.7	2.79	0.16
e-f	Weaving	0.82	45.3	34.9	34.9	0.13	0.09	0,116.9	0,116.9	2.58	0.78
f-g	Basic	0.59	59.0	23.5	23.5	0.18	0.17	0,187.1	0,187.1	3.17	0.29
Freeway			57.8	23.3	23.3	1.03	0.92	1,007.3	1,007.3	0,017.4	0,001.9

Density-Based LOS by Segment						
Segment	1	2	3	4	5	6
Time Step	Basic	On Ramp	Weaving	Basic	Weaving	Basic
1	C	C	C	C	D	C

Demand-Based LOS by Segment						
Time Step	1	2	3	4	5	6
1	-	-	-	-	-	-

HCS 2010 Freeway Facilities

Project Properties

Analyst	Sudheer Dhulipala	Freeway Name	I-494 Proposed	Analysis Period	PM Peak
Analysis Date	7/12/2016 1:22:19 PM	From	24th Ave	Version Date	10/10/2012
Agency	WSB & Associates, Inc.	To	12th Ave		
Location	Bloomington	Analysis Direction	WB		
User Notes					
File Name	C:\Users\sdhulipala\AppData\Local\Temp\preview.xml				

Facility-wide Values

Jam Density (pc/h/In)	190	Time Period Duration (min)	15	Facility Length (mi)	0.99800
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Segment Input Data

Time Period 1

Mainline Data										
Seg #	From	To	Type	Length	Terrain	Adj. Demand	% Trucks	% RVs	# Lanes	FFS
1	a	b	Basic Segment	1275	Level	3621	0.00	0.00	3	65
2	b	c	On Ramp	1030	Level	4011	0.00	0.00	3	65
3	c	d	Weaving	480	Level	4041	0.00	0.00	3	65
4	d	e	Basic Segment	1015	Level	3373	0.00	0.00	3	65
5	e	f	Weaving	521	Level	4500	0.00	0.00	3	65
6	f	g	Basic Segment	950	Level	3952	0.00	0.00	3	65

RampData							
Seg #	Type	Adj. Demand	% Trucks	% RVs	Lanes	Accel/Decel Length	FFS
2	On Ramp	390	0.00	0.00	1	1000	40

Weaving Segment Data											
Seg #	Ramp to Ramp Prop.	On-Ramp					Off-Ramp				
		Adj. Demand	% Trucks	% RVs	Lanes	FFS	Adj. Demand	% Trucks	% RVs	Lanes	FFS
3	0.050	30	0.00	0.00	1	40	668	0.00	0.00	1	40
5	0.050	1127	0.00	0.00	1	40	548	0.00	0.00	1	40

Time Period Independent Weaving Segment Data

Seg #	Configuration	Short Length	# Weaving Lanes	Min. Lane Changes Freeway-Ramp	Min. Lane Changes Ramp-Freeway	Min. Lane Changes Ramp-Ramp
3	480	2	1	1	0	
5	521	2	1	1	0	

Time Period Results

Time Period 1

Seg #	From	To	Type	Adj. Demand	Vol. Served	Capacity (pc/h)	Capacity (veh/h)	d/c Ratio	v/c ratio	Queue Length (ft)	Avg. Speed (mi/h)	Density (pc/mi/ln)	Density (veh/mi/ln)	Avg. Travel Time (min/veh)	Free-Flow Travel Time (min/veh)	Mainline Delay (min/veh)	System Delay (min/veh)	VMT Demand (veh-min)	VMT Volume (veh-min)	VHT (veh-hrs)	VHD (veh-hrs)	LOS
1	a	b	Basic Segment	3621	3621	7050	7050	0.51	0.51	0	65.0	18.6	18.6	0.22	0.22	0.0	0.0	218.6	218.6	3.4	0.0	C
2	b	c	On Ramp	4011	4011	7050	7050	0.57	0.57	0	59.4	22.5	22.5	0.20	0.18	0.0	0.0	195.6	195.6	3.3	0.3	C
3	c	d	Weaving	4041	4041	6185	6185	0.65	0.65	0	52.7	25.5	25.5	0.10	0.08	0.0	0.0	91.8	91.8	1.7	0.3	C
4	d	e	Basic Segment	3373	3373	7050	7050	0.48	0.48	0	61.3	18.3	18.3	0.19	0.18	0.0	0.0	162.1	162.1	2.6	0.1	C
5	e	f	Weaving	4500	4500	5771	5771	0.78	0.78	0	46.1	32.6	32.6	0.13	0.09	0.0	0.0	111.0	111.0	2.4	0.7	D
6	f	g	Basic Segment	3952	3952	7050	7050	0.56	0.56	0	59.2	22.2	22.2	0.18	0.17	0.0	0.0	177.8	177.8	3.0	0.3	C

Overall Results

Segment	Segment Type	Maximum d/c Ratio	Avg. Speed (mi/h)	Density (pc/mi/ln)	Density (veh/mi/ln)	Avg. Travel Time (min/veh)	Free-Flow Travel Time (min/veh)	VMT Demand (veh-min)	VMT Volume (veh-min)	VHT (veh-hrs)	VHD (veh-hrs)
a-b	Basic	0.51	65.0	18.6	18.6	0.22	0.22	0,218.6	0,218.6	3.36	0.00
b-c	OnRamp	0.57	59.4	22.5	22.5	0.20	0.18	0,195.6	0,195.6	3.29	0.28
c-d	Weaving	0.65	52.7	25.5	25.5	0.10	0.08	0,091.8	0,091.8	1.74	0.33
d-e	Basic	0.48	61.3	18.3	18.3	0.19	0.18	0,162.1	0,162.1	2.64	0.15
e-f	Weaving	0.78	46.1	32.6	32.6	0.13	0.09	0,111.0	0,111.0	2.41	0.70
f-g	Basic	0.56	59.2	22.2	22.2	0.18	0.17	0,177.8	0,177.8	3.00	0.27
Freeway			58.2	22.0	22.0	1.02	0.92	0,956.9	0,956.9	0,016.4	0,001.7

Density-Based LOS by Segment						
Segment	1	2	3	4	5	6
Time Step	Basic	On Ramp	Weaving	Basic	Weaving	Basic
1	C	C	C	C	D	C

Demand-Based LOS by Segment						
Time Step	1	2	3	4	5	6
1	-	-	-	-	-	-

Methodology used for Measure 5A, Congestion Reduction, and Measure 5B, Emissions

77th Street Extension and TH 77 Underpass – Regional Solicitation Application

Introduction

The purpose of this attachment is to document the calculation process for the 77th Street Extension and Underpass project in the City of Richfield for the Metropolitan Council Regional Solicitation application process. While the provided methodology and guidance have been followed in the main body of the application (and the Synchro and HCS reports are provided at the end of this attachment), this attachment provides set of alternative congestion reduction and emissions calculations for this project that differ from the stated process in the application and are believed to better represent the benefits of the project. The deviation from the standard process is due to the fact that this project involves construction of a new roadway, which involves a system-wide change in traffic flow rather than congestion reduction due to improvements on existing roadways which generally do not change traffic flow on a system-wide level.

Measure 5A, Congestion Reduction

The project proposes to construct a segment of new roadway. The procedure for delay estimation asks that parallel roadways be evaluated. Previous modeling efforts on the corridor show that the 77th Street corridor attracts 5,700 vehicles from three roadways in the area: 66th Street, I-494, and American Blvd; however, the estimated opening day ADT on the corridor is 11,200. This shows that the closest roadways do not fully capture the traffic coming to the corridor. Calculating the delay savings on these corridors will not, therefore, provide a complete picture of the delay savings due to the new roadway. A more comprehensive approach is to use the regional travel demand model and compare the network vehicle hours of travel in the peak hour with and without the 77th Street underpass (see **Table 1**).

Table 1: Peak Hour Total Vehicle Hours Traveled

	VHT
No Build	184,402
Build	184,052
Variance	-350

Based on this analysis, the total peak hour delay reduced would be **1,260,000** seconds, substantially larger than the 153,982.4 seconds presented in the main portion of the application (based on Synchro and HCS reports).

Measure 5B, Emissions

The issue referenced above also applies to the calculation of emissions reductions. Based on the provided methodology, the emissions avoided on these three individual parallel roadways is much less than the emissions avoided across the network when numbers from the regional travel demand model

are used because the closest roadways do not fully account for redirected traffic to the new roadway. Therefore, a more appropriate approach to estimate the emissions reductions due to the project will be using the travel demand model, which accounts for all of the redirected traffic. The emissions calculations below were based on the total system vehicle delay for the peak hour from the Metropolitan Council's regional Travel Demand Model with and without the 77th Street underpass. Vehicle emission rates from Synchro were used to calculate the emission reductions based on total vehicle delay. The calculations for the emissions are as follows:

Fuel consumed in gallons (due to total vehicle delay): $0.7329 \times \text{Total Vehicle Delay (hours)}$

CO emissions = $69.9 \text{ grams/gallon} \times \text{fuel consumed (gallons)}$

NOx emissions = $13.6 \text{ grams/gallon} \times \text{fuel consumed (gallons)}$

VOC emissions = $16.2 \text{ grams/gallon} \times \text{fuel consumed (gallons)}$

Inserting the vehicle delay from the travel demand model, the emissions are calculated to be:

Before project:

Fuel consumed = $0.7329 \times 184,402 = 135,148$ gallons

CO emissions = $69.9 \times 135,148 = 9,446,861$ grams = 9,447 kg

NOx emissions = $13.6 \times 135,148 = 1,838,012$ grams = 1,838 kg

VOC emissions = $16.2 \times 135,148 = 2,189,398$ grams = 2,189 kg

After project:

Fuel consumed = $0.7329 \times 184,052 = 134,892$ gallons

CO emissions = $69.9 \times 134,892 = 9,428,951$ grams = 9,429 kg

NOx emissions = $13.6 \times 134,892 = 1,834,531$ grams = 1,834 kg

VOC emissions = $16.2 \times 134,892 = 2,185,250$ grams = 2,185 kg

Change in emissions due to project:

CO emissions: $9,429 \text{ kg} - 9,447 \text{ kg} = -18 \text{ kg}$ (18 kg reduction)

NOx emissions: $1,834 \text{ kg} - 1,838 \text{ kg} = -4 \text{ kg}$ (4 kg reduction)

VOC emissions: $2,185 \text{ kg} - 2,189 \text{ kg} = -4 \text{ kg}$ (4 kg reduction)

These reductions sum to a total emissions reduction of **26 kg**, substantially larger than the 3.4 kg presented in the main portion of the application (based on Synchro and HCS reports).

3: 12th Ave S & American Blvd

Direction	All
Future Volume (vph)	2634
Total Delay / Veh (s/v)	18
CO Emissions (kg)	3.87
NOx Emissions (kg)	0.75
VOC Emissions (kg)	0.90

6: Thunderbird Rd & American Blvd

Direction	All
Future Volume (vph)	1369
Total Delay / Veh (s/v)	25
CO Emissions (kg)	2.74
NOx Emissions (kg)	0.53
VOC Emissions (kg)	0.64

9: 24th Ave S & American Blvd

Direction	All
Future Volume (vph)	2819
Total Delay / Veh (s/v)	22
CO Emissions (kg)	3.16
NOx Emissions (kg)	0.61
VOC Emissions (kg)	0.73

14: 77 West Ramp & 66th St

Direction	All
Future Volume (vph)	2273
Total Delay / Veh (s/v)	20
CO Emissions (kg)	1.98
NOx Emissions (kg)	0.39
VOC Emissions (kg)	0.46

17: 77 East Ramp & 66th St

Direction	All
Future Volume (vph)	1596
Total Delay / Veh (s/v)	18
CO Emissions (kg)	1.36
NOx Emissions (kg)	0.26
VOC Emissions (kg)	0.31

3: 12th Ave S & American Blvd

Direction	All
Future Volume (vph)	2212
Total Delay / Veh (s/v)	19
CO Emissions (kg)	3.25
NOx Emissions (kg)	0.63
VOC Emissions (kg)	0.75

6: Thunderbird Rd & American Blvd

Direction	All
Future Volume (vph)	1152
Total Delay / Veh (s/v)	25
CO Emissions (kg)	2.30
NOx Emissions (kg)	0.45
VOC Emissions (kg)	0.53

9: 24th Ave S & American Blvd

Direction	All
Future Volume (vph)	2366
Total Delay / Veh (s/v)	17
CO Emissions (kg)	2.46
NOx Emissions (kg)	0.48
VOC Emissions (kg)	0.57

14: 77 West Ramp & 66th St

Direction	All
Future Volume (vph)	2159
Total Delay / Veh (s/v)	10
CO Emissions (kg)	1.48
NOx Emissions (kg)	0.29
VOC Emissions (kg)	0.34

17: 77 East Ramp & 66th St

Direction	All
Future Volume (vph)	1517
Total Delay / Veh (s/v)	24
CO Emissions (kg)	1.40
NOx Emissions (kg)	0.27
VOC Emissions (kg)	0.32

HCS 2010 Freeway Facilities

Project Properties

Analyst	Sudheer Dhulipala	Freeway Name	I-494 Existing	Analysis Period	PM Peak
Analysis Date	7/5/2016 1:56:39 PM	From	12th Ave	Version Date	10/10/2012
Agency	WSB & Associates, Inc.	To	24th Ave		
Location	Bloomington	Analysis Direction	EB		
User Notes					
File Name	C:\Users\sdhulipala\AppData\Local\Temp\preview.xml				

Facility-wide Values

Jam Density (pc/h/ln)	190	Time Period Duration (min)	15	Facility Length (mi)	0.99400
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Segment Input Data

Time Period 1

Mainline Data										
Seg #	From	To	Type	Length	Terrain	Adj. Demand	% Trucks	% RVs	# Lanes	FFS
1	a	b	Basic Segment	850	Level	5787	2.00	0.00	3	65
2	b	c	Weaving	1070	Level	6807	2.00	0.00	3	65
3	c	d	Basic Segment	560	Level	5140	2.65	0.00	3	65
4	d	e	Weaving	500	Level	5411	2.62	0.00	3	65
5	e	f	Off Ramp	900	Level	5153	2.65	0.00	3	65
6	f	g	Basic Segment	1370	Level	5032	2.71	0.00	4	65

RampData							
Seg #	Type	Adj. Demand	% Trucks	% RVs	Lanes	Accel/Decel Length	FFS
5	Off Ramp	121	0.00	0.00	1	450	40

Weaving Segment Data											
Seg #	Ramp to Ramp Prop.	On-Ramp					Off-Ramp				
		Adj. Demand	% Trucks	% RVs	Lanes	FFS	Adj. Demand	% Trucks	% RVs	Lanes	FFS
2	0.050	1020	2.00	0.00	1	40	1667	0.00	0.00	1	40
4	0.050	271	2.00	0.00	1	40	258	2.00	0.00	1	40

Time Period Independent Weaving Segment Data

Seg #	Configuration	Short Length	# Weaving Lanes	Min. Lane Changes Freeway-Ramp	Min. Lane Changes Ramp-Freeway	Min. Lane Changes Ramp-Ramp
2	1070	2	1	1	0	
4	500	2	1	1	0	

Time Period Results

Time Period 1

Seg #	From	To	Type	Adj. Demand	Vol. Served	Capacity (pc/h)	Capacity (veh/h)	d/c Ratio	v/c ratio	Queue Length (ft)	Avg. Speed (mi/h)	Density (pc/mi/ln)	Density (veh/mi/ln)	Avg. Travel Time (min/veh)	Free-Flow Travel Time (min/veh)	Mainline Delay (min/veh)	System Delay (min/veh)	VMT Demand (veh-min)	VMT Volume (veh-min)	VHT (veh-hrs)	VHD (veh-hrs)	LOS
1	a	b	Basic Segment	5787	4800	7050	6980	0.83	0.69	850	18.3	87.4	86.5	0.53	0.15	0.4	0.4	232.9	193.2	10.5	7.6	F
2	b	c	Weaving	6807	5760	5821	5763	1.18	1.00	0	40.0	52.0	51.5	0.30	0.19	0.1	0.6	344.9	291.8	7.3	2.8	E
3	c	d	Basic Segment	5140	4380	7050	6958	0.74	0.63	0	58.3	25.4	25.0	0.11	0.10	0.0	0.0	136.3	116.1	2.0	0.2	C
4	d	e	Weaving	5411	4620	6370	6288	0.86	0.73	0	52.2	35.0	34.6	0.11	0.09	0.0	0.0	128.1	109.4	2.1	0.4	E
5	e	f	Off Ramp	5153	4380	7050	6958	0.74	0.63	0	59.6	24.8	24.5	0.17	0.16	0.0	0.0	219.6	186.6	3.1	0.3	C
6	f	g	Basic Segment	5032	4320	9400	9274	0.54	0.47	0	64.1	17.1	16.8	0.24	0.24	0.0	0.0	326.4	280.2	4.4	0.1	B

Overall Results

Segment	Segment Type	Maximum d/c Ratio	Avg. Speed (mi/h)	Density (pc/mi/ln)	Density (veh/mi/ln)	Avg. Travel Time (min/veh)	Free-Flow Travel Time (min/veh)	VMT Demand (veh-min)	VMT Volume (veh-min)	VHT (veh-hrs)	VHD (veh-hrs)
a-b	Basic	0.83	18.3	87.4	86.5	0.53	0.15	0,232.9	0,193.2	10.55	7.58
b-c	Weaving	1.18	40.0	52.0	51.5	0.30	0.19	0,344.9	0,291.8	7.30	2.81
c-d	Basic	0.74	58.3	25.4	25.0	0.11	0.10	0,136.3	0,116.1	1.99	0.20
d-e	Weaving	0.86	52.2	35.0	34.6	0.11	0.09	0,128.1	0,109.4	2.10	0.41
e-f	OffRamp	0.74	59.6	24.8	24.5	0.17	0.16	0,219.6	0,186.6	3.13	0.26
f-g	Basic	0.54	64.1	17.1	16.8	0.24	0.24	0,326.4	0,280.2	4.37	0.06
Freeway			40.0	37.7	37.3	1.46	0.92	1,388.2	1,177.4	0,029.4	0,011.3

Density-Based LOS by Segment						
Segment	1	2	3	4	5	6
Time Step	Basic	Weaving	Basic	Weaving	Off Ramp	Basic
1	F	E	C	E	C	B

Demand-Based LOS by Segment						
Time Step	1	2	3	4	5	6
1	-	F	-	-	-	-

HCS 2010 Freeway Facilities

Project Properties

Analyst	Sudheer Dhulipala	Freeway Name	I-494 Proposed	Analysis Period	PM Peak
Analysis Date	7/5/2016 1:56:39 PM	From	12th Ave	Version Date	10/10/2012
Agency	WSB & Associates, Inc.	To	24th Ave		
Location	Bloomington	Analysis Direction	EB		
User Notes					
File Name	C:\Users\sdhulipala\AppData\Local\Temp\preview.xml				

Facility-wide Values

Jam Density (pc/h/ln)	190	Time Period Duration (min)	15	Facility Length (mi)	0.99400
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Segment Input Data

Time Period 1

Mainline Data										
Seg #	From	To	Type	Length	Terrain	Adj. Demand	% Trucks	% RVs	# Lanes	FFS
1	a	b	Basic Segment	850	Level	5498	2.00	0.00	3	65
2	b	c	Weaving	1070	Level	6467	2.00	0.00	3	65
3	c	d	Basic Segment	560	Level	4883	2.65	0.00	3	65
4	d	e	Weaving	500	Level	5140	2.62	0.00	3	65
5	e	f	Off Ramp	900	Level	4899	2.65	0.00	3	65
6	f	g	Basic Segment	1370	Level	4784	2.71	0.00	4	65

RampData							
Seg #	Type	Adj. Demand	% Trucks	% RVs	Lanes	Accel/Decel Length	FFS
5	Off Ramp	115	0.00	0.00	1	450	40

Weaving Segment Data											
Seg #	Ramp to Ramp Prop.	On-Ramp					Off-Ramp				
		Adj. Demand	% Trucks	% RVs	Lanes	FFS	Adj. Demand	% Trucks	% RVs	Lanes	FFS
2	0.050	969	2.00	0.00	1	40	1584	0.00	0.00	1	40
4	0.050	257	2.00	0.00	1	40	241	2.00	0.00	1	40

Time Period Independent Weaving Segment Data

Seg #	Configuration	Short Length	# Weaving Lanes	Min. Lane Changes Freeway-Ramp	Min. Lane Changes Ramp-Freeway	Min. Lane Changes Ramp-Ramp
2	1070	2	1	1	0	
4	500	2	1	1	0	

Time Period Results

Time Period 1

Seg #	From	To	Type	Adj. Demand	Vol. Served	Capacity (pc/h)	Capacity (veh/h)	d/c Ratio	v/c ratio	Queue Length (ft)	Avg. Speed (mi/h)	Density (pc/mi/ln)	Density (veh/mi/ln)	Avg. Travel Time (min/veh)	Free-Flow Travel Time (min/veh)	Mainline Delay (min/veh)	System Delay (min/veh)	VMT Demand (veh-min)	VMT Volume (veh-min)	VHT (veh-hrs)	VHD (veh-hrs)	LOS
1	a	b	Basic Segment	5498	4800	7050	6980	0.79	0.69	850	18.7	85.6	84.8	0.52	0.15	0.4	0.4	221.3	193.2	10.3	7.4	F
2	b	c	Weaving	6467	5760	5821	5763	1.12	1.00	0	41.1	48.1	47.6	0.30	0.19	0.1	0.2	327.6	291.8	7.1	2.6	E
3	c	d	Basic Segment	4883	4380	7050	6958	0.70	0.63	0	58.6	25.2	24.9	0.11	0.10	0.0	0.0	129.5	116.1	2.0	0.2	C
4	d	e	Weaving	5140	4620	6372	6290	0.82	0.73	0	52.8	32.9	32.4	0.11	0.09	0.0	0.0	121.7	109.4	2.1	0.4	D
5	e	f	Off Ramp	4899	4380	7050	6958	0.70	0.63	0	59.7	24.8	24.5	0.17	0.16	0.0	0.0	208.8	186.6	3.1	0.3	C
6	f	g	Basic Segment	4784	4260	9400	9274	0.52	0.46	0	64.2	16.8	16.6	0.24	0.24	0.0	0.0	310.3	276.3	4.3	0.1	B

Overall Results

Segment	Segment Type	Maximum d/c Ratio	Avg. Speed (mi/h)	Density (pc/mi/ln)	Density (veh/mi/ln)	Avg. Travel Time (min/veh)	Free-Flow Travel Time (min/veh)	VMT Demand (veh-min)	VMT Volume (veh-min)	VHT (veh-hrs)	VHD (veh-hrs)
a-b	Basic	0.79	18.7	85.6	84.8	0.52	0.15	0,221.3	0,193.2	10.34	7.36
b-c	Weaving	1.12	41.1	48.1	47.6	0.30	0.19	0,327.6	0,291.8	7.10	2.61
c-d	Basic	0.70	58.6	25.2	24.9	0.11	0.10	0,129.5	0,116.1	1.98	0.19
d-e	Weaving	0.82	52.8	32.9	32.4	0.11	0.09	0,121.7	0,109.4	2.07	0.39
e-f	OffRamp	0.70	59.7	24.8	24.5	0.17	0.16	0,208.8	0,186.6	3.13	0.26
f-g	Basic	0.52	64.2	16.8	16.6	0.24	0.24	0,310.3	0,276.3	4.31	0.06
Freeway			40.6	36.4	36.0	1.44	0.92	1,319.2	1,173.5	0,028.9	0,010.9

Density-Based LOS by Segment						
Segment	1	2	3	4	5	6
Time Step	Basic	Weaving	Basic	Weaving	Off Ramp	Basic
1	F	E	C	D	C	B

Demand-Based LOS by Segment						
Time Step	1	2	3	4	5	6
1	-	F	-	-	-	-

HCS 2010 Freeway Facilities

Project Properties

Analyst	Sudheer Dhulipala	Freeway Name	I-494 Existing	Analysis Period	PM Peak
Analysis Date	7/12/2016 1:22:19 PM	From	24th Ave	Version Date	10/10/2012
Agency	WSB & Associates, Inc.	To	12th Ave		
Location	Bloomington	Analysis Direction	WB		
User Notes					
File Name	C:\Users\sdhulipala\AppData\Local\Temp\preview.xml				

Facility-wide Values

Jam Density (pc/h/ln)	190	Time Period Duration (min)	15	Facility Length (mi)	0.99800
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Segment Input Data

Time Period 1

Mainline Data										
Seg #	From	To	Type	Length	Terrain	Adj. Demand	% Trucks	% RVs	# Lanes	FFS
1	a	b	Basic Segment	1275	Level	3812	0.00	0.00	3	65
2	b	c	On Ramp	1030	Level	4222	0.00	0.00	3	65
3	c	d	Weaving	480	Level	4254	0.00	0.00	3	65
4	d	e	Basic Segment	1015	Level	3551	0.00	0.00	3	65
5	e	f	Weaving	521	Level	4737	0.00	0.00	3	65
6	f	g	Basic Segment	950	Level	4160	0.00	0.00	3	65

RampData							
Seg #	Type	Adj. Demand	% Trucks	% RVs	Lanes	Accel/Decel Length	FFS
2	On Ramp	410	0.00	0.00	1	1000	40

Weaving Segment Data											
Seg #	Ramp to Ramp Prop.	On-Ramp					Off-Ramp				
		Adj. Demand	% Trucks	% RVs	Lanes	FFS	Adj. Demand	% Trucks	% RVs	Lanes	FFS
3	0.050	32	0.00	0.00	1	40	703	0.00	0.00	1	40
5	0.050	1186	0.00	0.00	1	40	577	0.00	0.00	1	40

Time Period Independent Weaving Segment Data

Seg #	Configuration	Short Length	# Weaving Lanes	Min. Lane Changes Freeway-Ramp	Min. Lane Changes Ramp-Freeway	Min. Lane Changes Ramp-Ramp
3	480	2	1	1	0	
5	521	2	1	1	0	

Time Period Results

Time Period 1

Seg #	From	To	Type	Adj. Demand	Vol. Served	Capacity (pc/h)	Capacity (veh/h)	d/c Ratio	v/c ratio	Queue Length (ft)	Avg. Speed (mi/h)	Density (pc/mi/ln)	Density (veh/mi/ln)	Avg. Travel Time (min/veh)	Free-Flow Travel Time (min/veh)	Mainline Delay (min/veh)	System Delay (min/veh)	VMT Demand (veh-min)	VMT Volume (veh-min)	VHT (veh-hrs)	VHD (veh-hrs)	LOS
1	a	b	Basic Segment	3812	3812	7050	7050	0.54	0.54	0	65.0	19.5	19.5	0.22	0.22	0.0	0.0	230.1	230.1	3.5	0.0	C
2	b	c	On Ramp	4222	4222	7050	7050	0.60	0.60	0	59.2	23.8	23.8	0.20	0.18	0.0	0.0	205.9	205.9	3.5	0.3	C
3	c	d	Weaving	4254	4254	6185	6185	0.69	0.69	0	52.1	27.2	27.2	0.10	0.08	0.0	0.0	96.7	96.7	1.9	0.4	C
4	d	e	Basic Segment	3551	3551	7050	7050	0.50	0.50	0	61.2	19.4	19.4	0.19	0.18	0.0	0.0	170.7	170.7	2.8	0.2	C
5	e	f	Weaving	4737	4737	5771	5771	0.82	0.82	0	45.3	34.9	34.9	0.13	0.09	0.0	0.0	116.9	116.9	2.6	0.8	D
6	f	g	Basic Segment	4160	4160	7050	7050	0.59	0.59	0	59.0	23.5	23.5	0.18	0.17	0.0	0.0	187.1	187.1	3.2	0.3	C

Overall Results

Segment	Segment Type	Maximum d/c Ratio	Avg. Speed (mi/h)	Density (pc/mi/ln)	Density (veh/mi/ln)	Avg. Travel Time (min/veh)	Free-Flow Travel Time (min/veh)	VMT Demand (veh-min)	VMT Volume (veh-min)	VHT (veh-hrs)	VHD (veh-hrs)
a-b	Basic	0.54	65.0	19.5	19.5	0.22	0.22	0,230.1	0,230.1	3.54	0.00
b-c	OnRamp	0.60	59.2	23.8	23.8	0.20	0.18	0,205.9	0,205.9	3.48	0.31
c-d	Weaving	0.69	52.1	27.2	27.2	0.10	0.08	0,096.7	0,096.7	1.85	0.37
d-e	Basic	0.50	61.2	19.4	19.4	0.19	0.18	0,170.7	0,170.7	2.79	0.16
e-f	Weaving	0.82	45.3	34.9	34.9	0.13	0.09	0,116.9	0,116.9	2.58	0.78
f-g	Basic	0.59	59.0	23.5	23.5	0.18	0.17	0,187.1	0,187.1	3.17	0.29
Freeway			57.8	23.3	23.3	1.03	0.92	1,007.3	1,007.3	0,017.4	0,001.9

Density-Based LOS by Segment						
Segment	1	2	3	4	5	6
Time Step	Basic	On Ramp	Weaving	Basic	Weaving	Basic
1	C	C	C	C	D	C

Demand-Based LOS by Segment						
Time Step	1	2	3	4	5	6
1	-	-	-	-	-	-

HCS 2010 Freeway Facilities

Project Properties

Analyst	Sudheer Dhulipala	Freeway Name	I-494 Proposed	Analysis Period	PM Peak
Analysis Date	7/12/2016 1:22:19 PM	From	24th Ave	Version Date	10/10/2012
Agency	WSB & Associates, Inc.	To	12th Ave		
Location	Bloomington	Analysis Direction	WB		
User Notes					
File Name	C:\Users\sdhulipala\AppData\Local\Temp\preview.xml				

Facility-wide Values

Jam Density (pc/h/ln)	190	Time Period Duration (min)	15	Facility Length (mi)	0.99800
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Segment Input Data

Time Period 1

Mainline Data										
Seg #	From	To	Type	Length	Terrain	Adj. Demand	% Trucks	% RVs	# Lanes	FFS
1	a	b	Basic Segment	1275	Level	3621	0.00	0.00	3	65
2	b	c	On Ramp	1030	Level	4011	0.00	0.00	3	65
3	c	d	Weaving	480	Level	4041	0.00	0.00	3	65
4	d	e	Basic Segment	1015	Level	3373	0.00	0.00	3	65
5	e	f	Weaving	521	Level	4500	0.00	0.00	3	65
6	f	g	Basic Segment	950	Level	3952	0.00	0.00	3	65

RampData							
Seg #	Type	Adj. Demand	% Trucks	% RVs	Lanes	Accel/Decel Length	FFS
2	On Ramp	390	0.00	0.00	1	1000	40

Weaving Segment Data											
Seg #	Ramp to Ramp Prop.	On-Ramp					Off-Ramp				
		Adj. Demand	% Trucks	% RVs	Lanes	FFS	Adj. Demand	% Trucks	% RVs	Lanes	FFS
3	0.050	30	0.00	0.00	1	40	668	0.00	0.00	1	40
5	0.050	1127	0.00	0.00	1	40	548	0.00	0.00	1	40

Time Period Independent Weaving Segment Data

Seg #	Configuration	Short Length	# Weaving Lanes	Min. Lane Changes Freeway-Ramp	Min. Lane Changes Ramp-Freeway	Min. Lane Changes Ramp-Ramp
3	480	2	1	1	0	
5	521	2	1	1	0	

Time Period Results

Time Period 1

Seg #	From	To	Type	Adj. Demand	Vol. Served	Capacity (pc/h)	Capacity (veh/h)	d/c Ratio	v/c ratio	Queue Length (ft)	Avg. Speed (mi/h)	Density (pc/mi/ln)	Density (veh/mi/ln)	Avg. Travel Time (min/veh)	Free-Flow Travel Time (min/veh)	Mainline Delay (min/veh)	System Delay (min/veh)	VMT Demand (veh-min)	VMT Volume (veh-min)	VHT (veh-hrs)	VHD (veh-hrs)	LOS
1	a	b	Basic Segment	3621	3621	7050	7050	0.51	0.51	0	65.0	18.6	18.6	0.22	0.22	0.0	0.0	218.6	218.6	3.4	0.0	C
2	b	c	On Ramp	4011	4011	7050	7050	0.57	0.57	0	59.4	22.5	22.5	0.20	0.18	0.0	0.0	195.6	195.6	3.3	0.3	C
3	c	d	Weaving	4041	4041	6185	6185	0.65	0.65	0	52.7	25.5	25.5	0.10	0.08	0.0	0.0	91.8	91.8	1.7	0.3	C
4	d	e	Basic Segment	3373	3373	7050	7050	0.48	0.48	0	61.3	18.3	18.3	0.19	0.18	0.0	0.0	162.1	162.1	2.6	0.1	C
5	e	f	Weaving	4500	4500	5771	5771	0.78	0.78	0	46.1	32.6	32.6	0.13	0.09	0.0	0.0	111.0	111.0	2.4	0.7	D
6	f	g	Basic Segment	3952	3952	7050	7050	0.56	0.56	0	59.2	22.2	22.2	0.18	0.17	0.0	0.0	177.8	177.8	3.0	0.3	C







Overall Results

Segment	Segment Type	Maximum d/c Ratio	Avg. Speed (mi/h)	Density (pc/mi/ln)	Density (veh/mi/ln)	Avg. Travel Time (min/veh)	Free-Flow Travel Time (min/veh)	VMT Demand (veh-min)	VMT Volume (veh-min)	VHT (veh-hrs)	VHD (veh-hrs)
a-b	Basic	0.51	65.0	18.6	18.6	0.22	0.22	0,218.6	0,218.6	3.36	0.00
b-c	OnRamp	0.57	59.4	22.5	22.5	0.20	0.18	0,195.6	0,195.6	3.29	0.28
c-d	Weaving	0.65	52.7	25.5	25.5	0.10	0.08	0,091.8	0,091.8	1.74	0.33
d-e	Basic	0.48	61.3	18.3	18.3	0.19	0.18	0,162.1	0,162.1	2.64	0.15
e-f	Weaving	0.78	46.1	32.6	32.6	0.13	0.09	0,111.0	0,111.0	2.41	0.70
f-g	Basic	0.56	59.2	22.2	22.2	0.18	0.17	0,177.8	0,177.8	3.00	0.27
Freeway			58.2	22.0	22.0	1.02	0.92	0,956.9	0,956.9	0,016.4	0,001.7

Density-Based LOS by Segment						
Segment	1	2	3	4	5	6
Time Step	Basic	On Ramp	Weaving	Basic	Weaving	Basic
1	C	C	C	C	D	C

Demand-Based LOS by Segment						
Time Step	1	2	3	4	5	6
1

HSIP worksheet

Control Section		T.H. / Roadway	Location				Beginning Ref. Pt.	Ending Ref. Pt.	State, County, City or Township	Study Period Begins	Study Period Ends
		E 77th Street	Bloomington Ave S to Longfellow Ave S						Hennepin Co.	1/1/2013	12/31/2015
Description of Proposed Work		Construct E. 77th Street extension as 4-lane divided urban roadway.									
Accident Diagram Codes	1 Rear End	2 Sideswipe Same Direction	3 Left Turn Main Line	5 Right Angle	4,7 Ran off Road	8, 9 Head On/ Sideswipe - Opposite Direction	Pedestrian		6, 90, 99	Other	Total
											
Study Period: Number of Crashes	Fatal	F									
	Personal Injury (PI)	A				1				1	2
		B	9	1	2	3	2			2	19
		C	24	1	3	11	6	2		8	55
Property Damage	PD	112	48	7	10	12	6		36	231	
% Change in Crashes <small>*Use Desktop Reference for Crash Reduction Factors</small>	Fatal	F									
	PI	A				-1%				-1%	
		B	-1%	-1%	-1%	-1%	-1%	-1%		-1%	
		C	-1%	-1%	-1%	-1%	-1%	-1%		-1%	
Property Damage	PD	-1%	-1%	-1%	-1%	-1%	-1%		-1%		
Change in Crashes <small>= No. of crashes X % change in crashes</small>	Fatal	F									
	PI	A				-0.01				-0.01	-0.02
		B	-0.09	-0.01	-0.02	-0.03	-0.02			-0.02	-0.19
		C	-0.24	-0.01	-0.03	-0.11	-0.06	-0.02		-0.08	-0.55
Property Damage	PD	-1.12	-0.48	-0.07	-0.10	-0.12	-0.06		-0.36	-2.31	
Year (Safety Improvement Construction)		2020									
Project Cost (exclude Right of Way)		\$ 15,115,000	Type of Crash	Study Period: Change in Crashes	Annual Change in Crashes	Cost per Crash	Annual Benefit	<div style="border: 1px solid black; background-color: #FFDAB9; padding: 5px; display: inline-block;">B/C= 0.06</div> Using present worth values, B= \$ 870,300 C= \$ 15,115,000 See "Calculations" sheet for amortization. Office of Traffic, Safety and Technology August 2015			
Right of Way Costs (optional)			F			\$ 1,140,000					
Traffic Growth Factor		0.5%	A	-0.02	-0.01	\$ 570,000	\$ 3,803				
Capital Recovery			B	-0.19	-0.06	\$ 170,000	\$ 10,777				
1. Discount Rate		2%	C	-0.55	-0.18	\$ 83,000	\$ 15,231				
2. Project Service Life (n)		30	PD	-2.31	-0.77	\$ 7,600	\$ 5,857				
			Total			\$ 35,668					

RESOLUTION NO. 11211

**RESOLUTION AUTHORIZING SUBMISSION OF THE 77TH STREET UNDERPASS
PROJECT FUNDING APPLICATION FOR FEDERAL SURFACE TRANSPORTATION
PROGRAM FUNDS**

WHEREAS, the City of Richfield has previously completed phased improvements to 77th Street Corridor including 77th Street expansion and the reconstruction of the Penn Avenue Bridge over I-494, the 76th Street Bridge over I-35W, and the Lyndale Avenue Bridge over I-494; and


WHEREAS, the City of Richfield proposes to provide a multi-modal connection via the 77th Street Underpass to regional destinations such as MSP International Airport and the Mall of America as well as a Regional Trail connection between the Minneapolis Grand Rounds system and the Minnesota National Wildlife Refuge; and

WHEREAS, the City of Richfield understands that the 77th Street Underpass Project will aid I-494 traffic congestion by removing local vehicle trips from the Principal Arterial system as well as providing increased transit service to destinations along the corridor; and


WHEREAS, the City of Richfield has determined that the 77th Street Underpass Project will create increased redevelopment opportunities along the I-494 corridor.

NOW, THEREFORE, BE IT RESOLVED that the City Council of the City of Richfield approves the submission of the 77th Street Underpass 2016 Application for Federal Surface Transportation Program funds. The application includes the construction of 77th Street via underpass of TH 77 to complete the planned A Minor Arterial Reliever and improve connections to destinations for walking, biking, and transit use along this corridor.

Adopted by the City Council of the City of Richfield, Minnesota this 14th day of June, 2016.


Debbie Goettel, Mayor

ATTEST:


Elizabeth VanHoose, City Clerk

METROPOLITAN AIRPORTS COMMISSION

Minneapolis-Saint Paul International Airport

6040 - 28th Avenue South • Minneapolis, MN 55450-2799

Phone (612) 726-8100



June 17, 2016

Mr. Jeff Pearson
City Engineer
City of Richfield
6700 Portland Avenue South
Richfield, MN 55423

Re: Letter of Support for the 77th Street Underpass

Dear Mr Pearson:

This letter is being sent to express the complete support that the Metropolitan Airports Commission (MAC) has for the proposed construction of the 77th Street underpass just north of the Highway 77/I-494 interchange. This project is a critical component in improving the transportation network surrounding the Minneapolis-St. Paul International Airport (MSP) and promoting local economic development.

The MAC has enjoyed a longstanding history of collaboration with the City of Richfield on transportation improvements along our common boundary. In the year 2000, MAC constructed Longfellow Avenue, which parallels Cedar Avenue between I-494 and Trunk Highway 62. In cooperation with the City of Richfield and the Minnesota Department of Transportation (MnDOT), numerous improvements were also made to the Highway 77 / 66th Street interchange. The agencies were also having discussions about the 77th Street underpass. When MAC completed the construction of Longfellow Avenue and the expansion of the 24th Avenue/77th Street corridor east of Cedar Avenue, a connection point was stubbed to a location where the City and MnDOT can connect when their portions of 77th Street and the Cedar Avenue ramps are completed.

This underpass is an important piece of the overall roadway infrastructure. Plans within the City of Bloomington, including the South Loop development and the next phase of the Mall of America, will generate additional traffic for I-494, Highway 77 and 24th Avenue. MAC's recently updated long term comprehensive plan envisions a 26-gate expansion to the Terminal 2-Humphrey over the next 20 years. Completion of the 77th Street underpass will help relieve some of the traffic pressures that exist today and are forecasted to increase into the future. MAC views this as an important project not only to the City of Richfield, but also to MnDOT, the City of Bloomington, and the International Airport.

We look forward to continuing our excellent transportation partnership with the City of Richfield and completing a transportation vision that has been in place for more than ten years. If you have any questions, please contact Allen Dye, at 612.713.7492 or via e-mail at al.dye@mspm.com

Sincerely,

Bridget M. Rief
Director Airport Development

The Metropolitan Airports Commission is an affirmative action employer.

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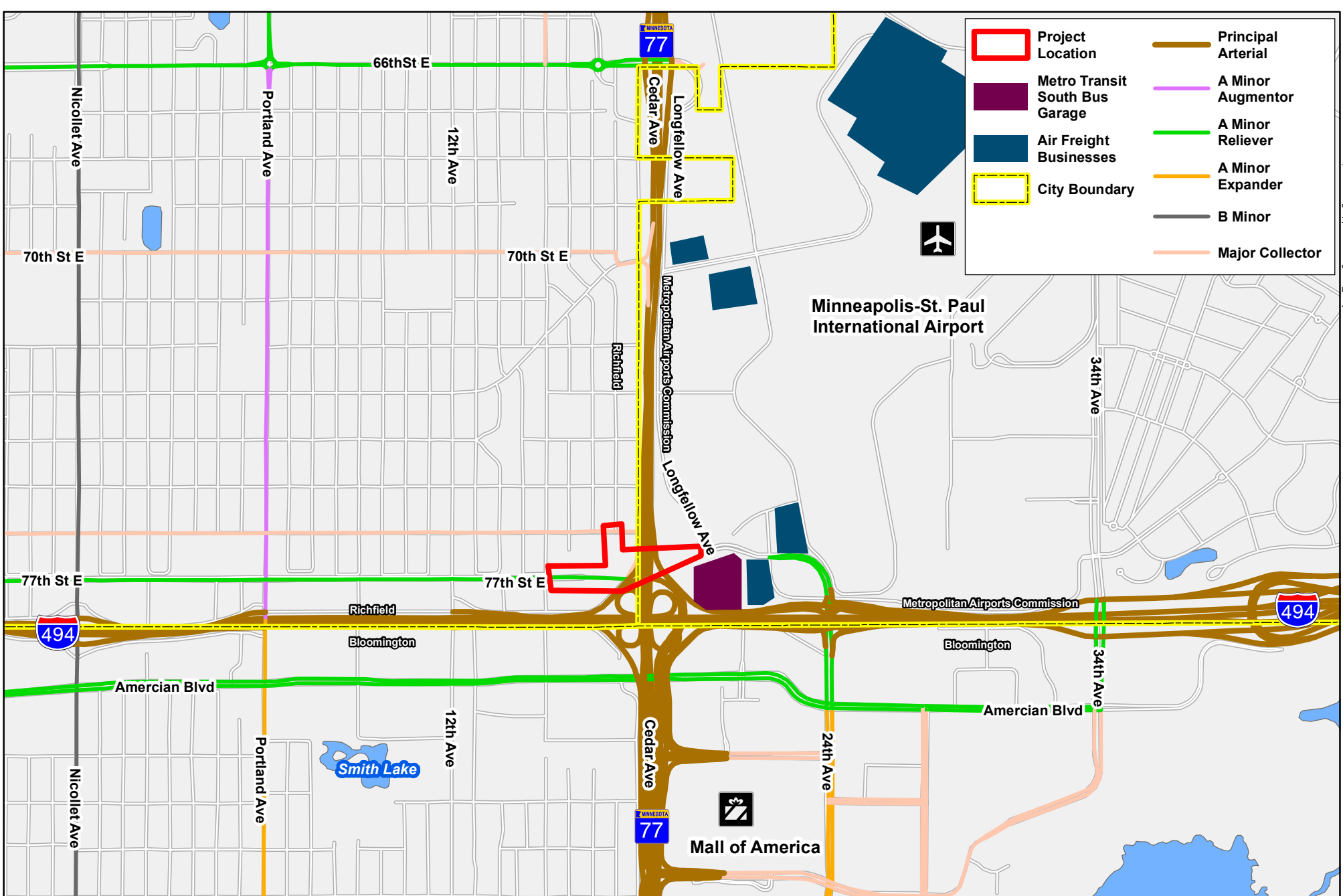
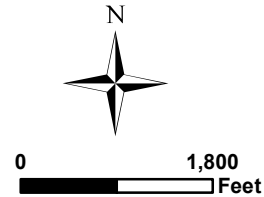


Figure 1: 77th Street Underpass & Extension Project Area
2016 Regional Solicitation Grant Application
City of Richfield, Hennepin County



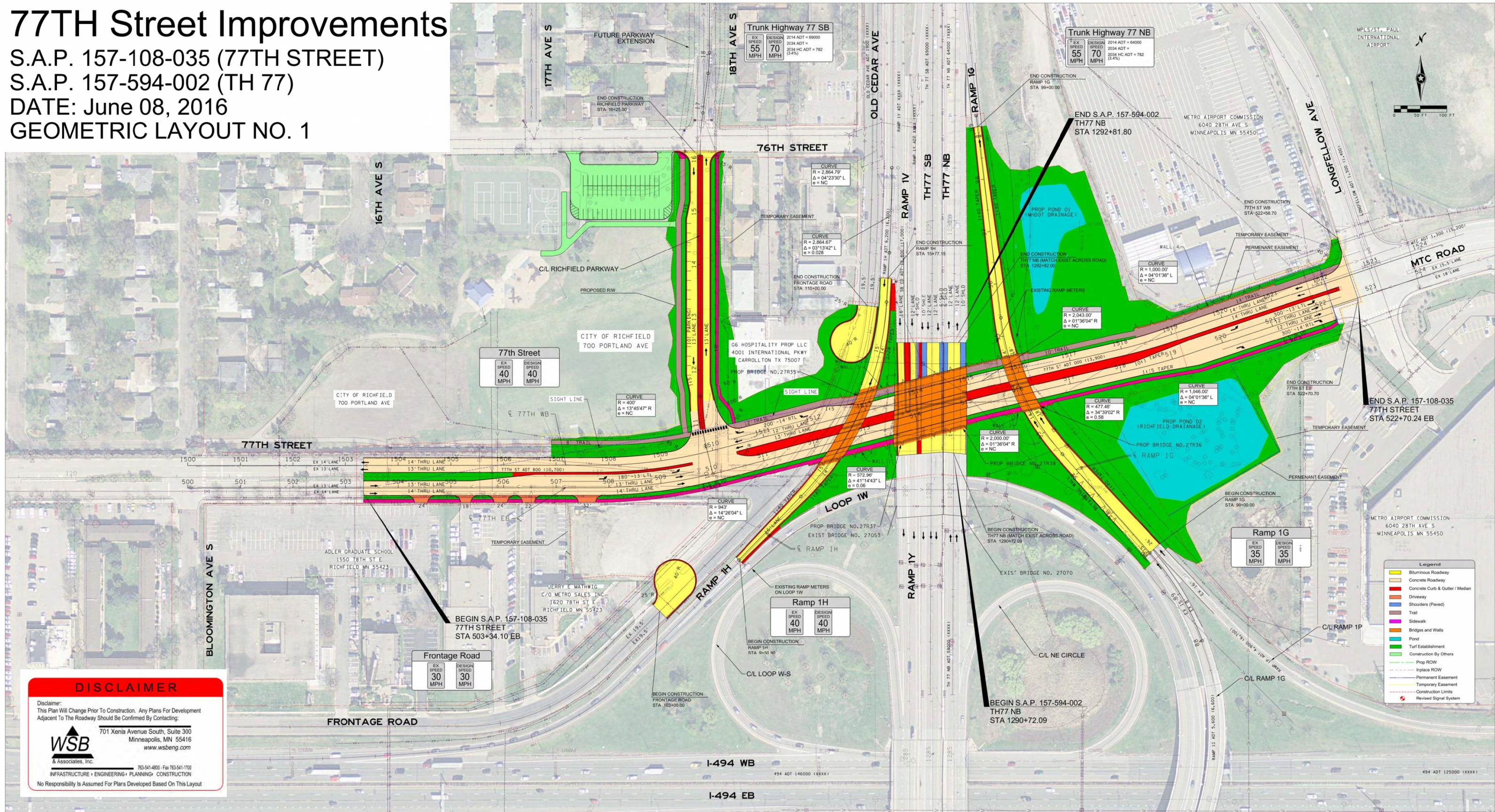
77TH Street Improvements

S.A.P. 157-108-035 (77TH STREET)

S.A.P. 157-594-002 (TH 77)

DATE: June 08, 2016

GEOMETRIC LAYOUT NO. 1



DISCLAIMER

Disclaimer:
This Plan Will Change Prior To Construction. Any Plans For Development Adjacent To The Roadway Should Be Confirmed By Contacting:

WSB
& Associates, Inc.
701 Xenia Avenue South, Suite 300
Minneapolis, MN 55416
www.wsbeng.com

763-541-4800 Fax 763-541-1700
INFRASTRUCTURE • ENGINEERING • PLANNING • CONSTRUCTION

No Responsibility Is Assumed For Plans Developed Based On This Layout

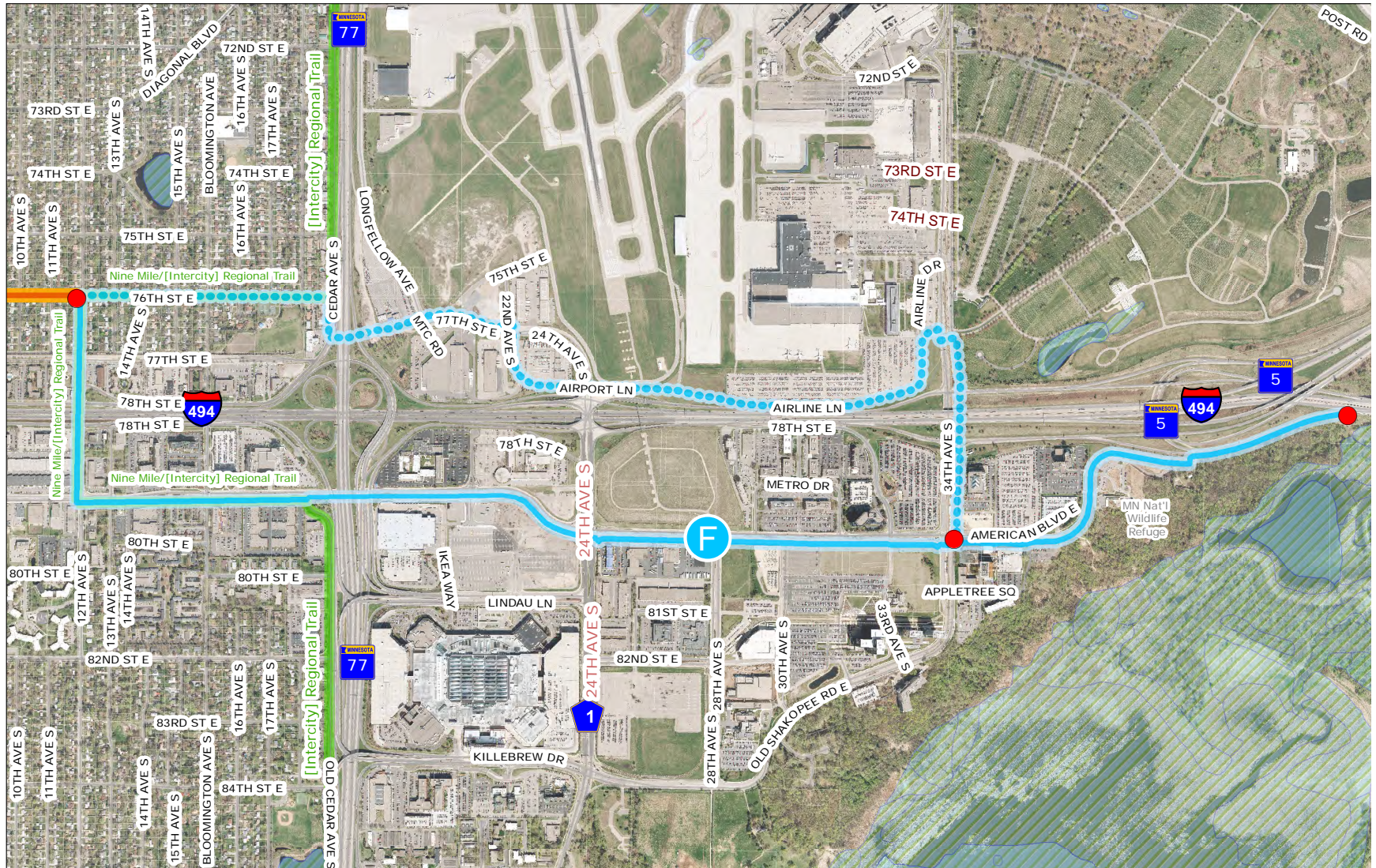
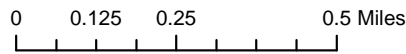


Figure 3: Nine Mile Creek Regional Trail - Bloomington Segment Map

Map prepared by Three Rivers Park District
 Planning Department - AR September 11, 2013

This GIS Data is provided "as is" without warranty of any representation of accuracy, timeliness, or completeness. The user acknowledges and accepts the limitations of the Data, including the fact that the Data is dynamic and is in a constant state of maintenance, correction, and update.





July 7, 2016

Jeff Pearson
City Engineer
City of Richfield
6700 Portland Avenue
Richfield, MN 55423

**RE: Letter of Support for the 77th Street Extension and Underpass
2016 Regional Solicitation Application**

Dear Mr. Pearson,

Metro Transit supports the City of Richfield's application for federal funds to construct an extension of 77th Street under Trunk Highway 77. The proposed 77th Street underpass connects 77th Street east and west of TH 77 (Cedar Ave) which will provide an alternate connection to the Metro Transit South Garage.

The project will address regional traffic issues on the I-494 corridor through Richfield and Bloomington by providing a new arterial roadway to carry short- to medium-length trips in the I-494 corridor. This is anticipated to improve bus operations by providing an alternative route to cross TH 77 without needing to access the freeway system and by providing an additional access to and from the Metro Transit South Garage, which is located adjacent to the project area.

Metro Transit supports the City in their efforts to fund this project.

Sincerely,

A handwritten signature in blue ink that reads 'Adam E. Harrington'.

Adam Harrington
Director of Service Development

A service of the Metropolitan Council

City of Richfield

- The intersection of 66th Street and Portland Avenue (CSAH 35) will be improved in 2008 as a two-lane roundabout. Future maintenance of the roundabout will be the responsibility of Hennepin County.
- Lyndale Bridge over I-494 will be replaced in 2010. A single-point diamond interchange will be constructed in this location due to the need for additional capacity on the existing bridge. Once constructed, maintenance of the bridge will be the responsibility of Mn/DOT.
- 76th Street, from TH 77 to 77th Street, will be reconstructed in 2010 with a Parkway design, with streetscape elements and bike lanes. When completed, 76th Street will become part of the Nine Mile Creek Regional Trail.
- An underpass of 77th Street under TH 77 is planned for construction sometime after year 2009-11.
- A 2008 study of arterials in Richfield will produce a design guide that will be shared with the County and serve as the basis for discussing the reconstruction of county roads.

Coordination with Other Jurisdictions

The City of Richfield should coordinate with adjacent jurisdictions (i.e., Bloomington, Edina and Minneapolis) as well as Hennepin County, the MAC and Mn/DOT when planning future improvements. Coordination among jurisdictions may provide opportunities for collaboration that could benefit all agencies and the public. This may

result in financial and time savings through economies of scale as well as potentially reducing construction impacts to residents through the coordination of projects.

2030 Traffic Forecasts

The pattern and intensity of travel within a city is directly related to the distribution and magnitude of households, population and employment within the city, neighboring communities and the region as a whole. This section provides an overview of the existing land use pattern in the City of Richfield.

In addition to addressing existing transportation needs, the Transportation Plan anticipates future transportation needs. Land use, travel patterns, population and employment change over time affect the efficiency and adequacy of the transportation network. This section also outlines expected changes in the city's land use pattern, households, population and employment, which will then be the basis for estimating future travel demand within the city. Finally, this section is designed to assist the City in developing a transportation system that supports land use and provides safe and efficient movement of people and goods.

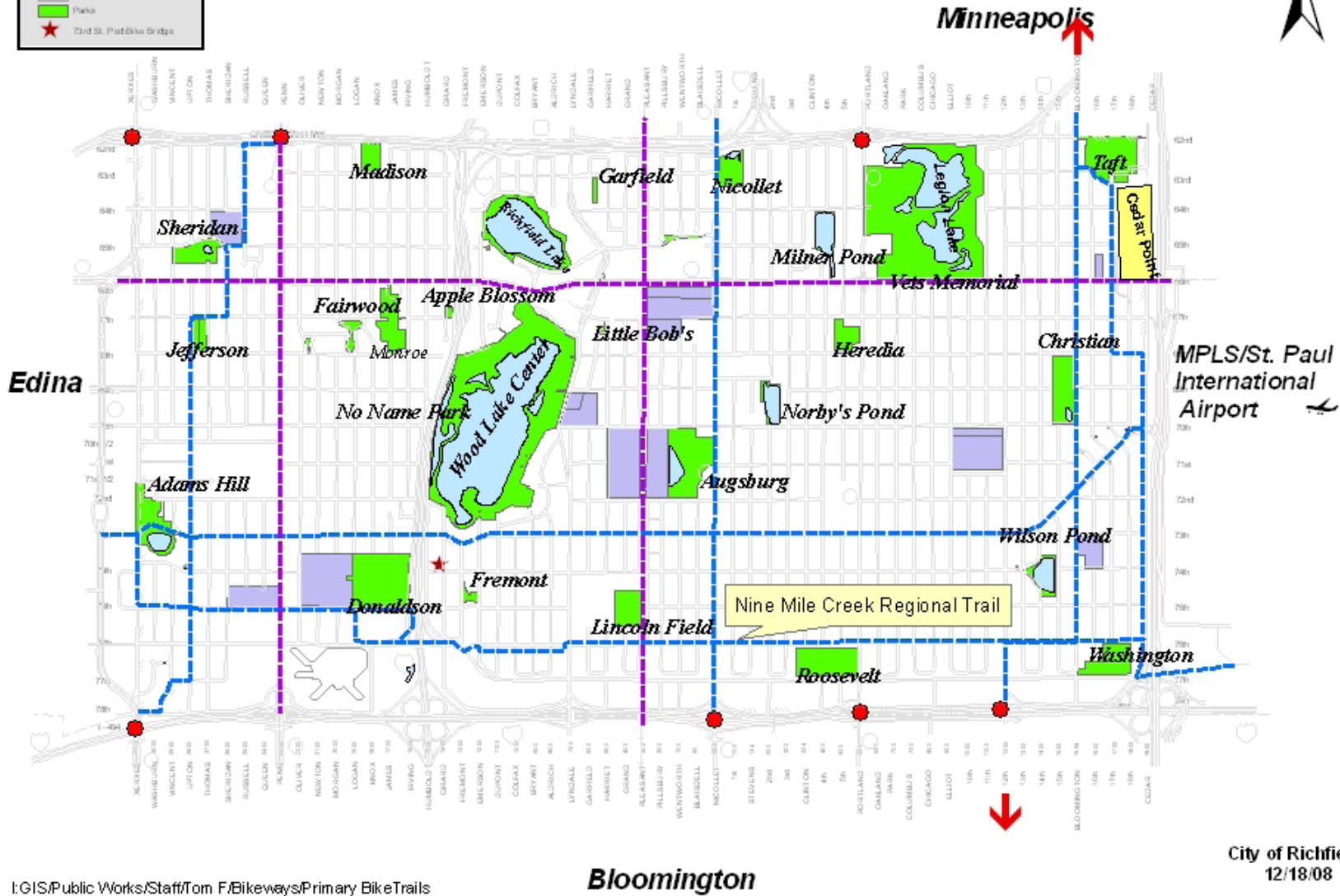
Land Use

Richfield is a mature, first-ring suburb that is now largely developed. While this does not mean that there will be no change or growth within the community, it does mean

RICHFIELD PROPOSED PRIMARY BIKE TRAILS

Legend

- Spot Improvements
- Future Bike Trails
- - - Proposed Primary Bike Trails
- Schools
- Best Buy Campus
- Parks
- ★ Third St. Ped/Bike Bridge



I:GIS/Public Works/Staff/Tom F/Bikeways/Primary Bike Trails

Illustrative Master Plan (East)



Right of Way Improvements
Project Summary Form – 77th Street Underpass
2016 Capital Budget (CIB)
2017-2020 Capital Improvement Program (CIP)

1. Project:	77 th Street Underpass
2. Total project cost:	\$22,500,000
3. Years to complete:	3
4. Is this a continuation of a current project?	No
If "Yes", what is first year project appears in CIP?	
5. Responsible department:	Public Works

6. Please list below the annual cost for each of the following years for this project:

2016 CIB	\$7,750,000	2020 CIP	
2017 CIP	\$7,750,000	Beyond 2020	
2018 CIP	\$7,000,000		
2019 CIP			

7. Please indicate the sources of funding:

User Fees	\$	% of total	
Special Revenue	\$	% of total	
Bonds	\$	% of total	
Mun. State Aid	\$600,000	% of total	3%
Grants			
Federal	\$7,000,000	% of total	31%
State	\$12,500,000	% of total	55%
County	\$2,000,000	% of total	9%
Other	\$400,000	% of total	2%
Federal Demo.	\$	% of total	
PIR	\$	% of total	
Special Assessment	\$	% of total	
TOTAL	\$22,500,000		100%

8. Brief summary of project: The project would extend 77th Street under Highway 77 to connect to the 24th Avenue Interchange at I-494. Right-of-way acquisition is required to complete the project. The underpass would include bike and pedestrian accommodations.

9. Does the project conflict with the City's Comprehensive Plan? Yes No **X**

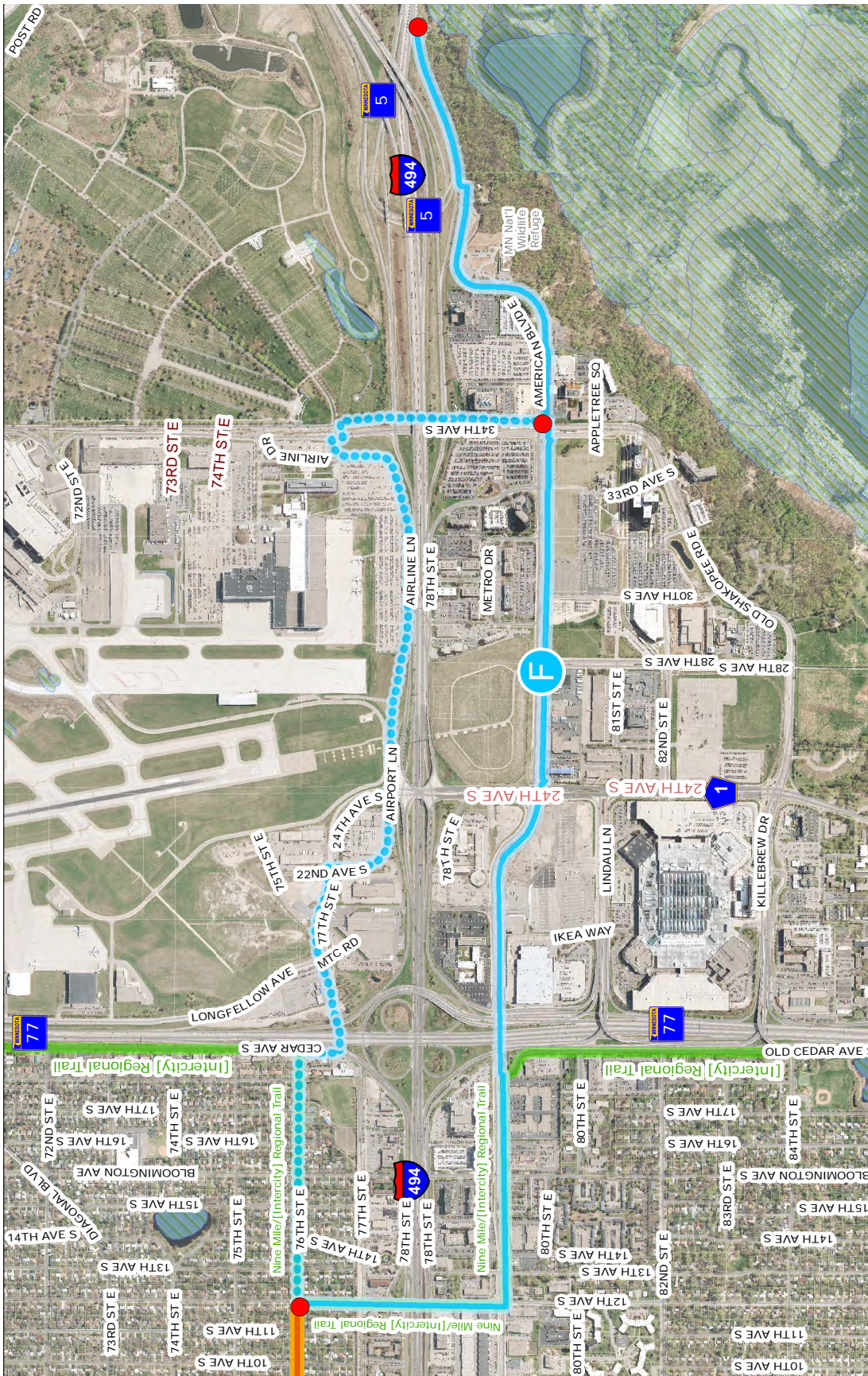
10. Priority ranking system

A. Check one of the following:

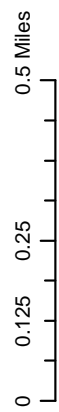
Preserve	Manage	Replace/Improve	Expand X
----------	--------	-----------------	-----------------

B. Indicate points for the following:

Protect existing resources:	
Health/safety:	X
Meets objectives in Comprehensive Plan:	X
Land use compatibility:	X
Community support:	X
Cost effectiveness:	X



Nine Mile Creek Regional Trail | Bloomington



Map prepared by Three Rivers Park District Planning Department - AR September 11, 2013

This GIS Data is provided "as is" without warranty of any representation of accuracy, timeliness, or completeness. The user acknowledges and accepts the limitations of the Data, including the fact that the Data is dynamic and is in a constant state of maintenance, correction, and update.

Figure 16
Bloomington Segment of the Nine Mile Creek Regional Trail
 Source: Three Rivers Park District

Bloomington Segment

Location and Status

The Bloomington segment of the regional trail is 3.25 miles long and connects to Minnesota Valley National Wildlife Refuge Visitor Center (Figure 16). This segment utilizes existing sidewalk and trail facilities for much of its length.

The Bloomington segment of the regional trail is planned to utilize the Intercity Regional Trail from 76th Street south along 12th Avenue over I-494 via a new pedestrian/bicycle bridge to American Boulevard and then east to Old Cedar Avenue. At Old Cedar Avenue, the Intercity Regional Trail Corridor extends south to the 86th Street Bikeway and Nine Mile Creek Regional Trail continues east under TH 77 along American Boulevard to the existing trail crossing of the Minnesota River at I-494 adjacent to the Minnesota Valley National Wildlife Refuge Visitor Center. The American Boulevard segment of trail is designated as an enhanced pedestrian way by the Bloomington ATP. As an enhanced pedestrian way, Bloomington envisions this trail segment design to focus on enhancing pedestrian movement in a comfortable streetscape setting while accommodating bicyclists.

Full realization of the Bloomington segment is contingent on the ability to secure additional right-of-way, improve the TH 77 underpass crossing to better accommodate the trail, and improve the existing sidewalk/trail for almost the entire length of the segment.

Given the complexities of these factors, and Richfield's support for an alternative route through the MAC property, an alternative route is also identified as part of this Master Plan.

MAC Alternative Option

The MAC alternative option utilizes the existing segment of the Intercity Regional Trail segment along 76th Street from 12th Avenue to Cedar Avenue in Richfield. From Cedar Avenue, the alternative route crosses TH 77 by way of a future TH 77 underpass at 77th Street. This underpass will serve as a reliever to the I-494 corridor and is a high priority for Richfield. From the TH 77 underpass, the trail is located on the north side of 77th Street and extends east to 24th Avenue.

At 24th Avenue, the trail continues south and east along Airport Lane to 34th Avenue through right-of-way under jurisdictional control of MAC and MnDOT. Access to the Minneapolis-St. Paul Airport and Hiawatha LRT is feasible at 34th Avenue and access to Fort Snelling State Park is possible via Post Road. At 34th Avenue the trail will extend south under I-494 via a new diverging diamond interchange that is currently under construction to American Boulevard in Bloomington. From the 34th Avenue/American Boulevard intersection, the trail east along American Boulevard to Minnesota Valley National Wildlife Refuge Visitor Center.

This alternative will be further pursued if American Boulevard is determined to not be feasible. Implementation of this segment is also contingent on agreement between Richfield, MAC, Bloomington and the Park District, that the MAC Alternative Option is preferred over the Bloomington segment, and Richfield and MAC securing the necessary funding, approvals, and support to implement the TH 77 underpass, redevelop the immediate area, and extend the regional trail through MAC property.

Context and Destinations

The Bloomington segment is located adjacent to a mix of land uses related to the I-494 corridor and airport.

The Bloomington segment is located within the South Loop District. This area's current land uses are a mix of office, industrial, and hospitality. Bloomington's South Loop calls for this area to transition to a greater variety of uses, including high density residential at the east end of the segment. The Alternative MAC Option is adjacent to large parking lots, Metro Transit garage, warehouses, runways, and Fort Snelling Cemetery.

Key destinations along or near the corridor include the Minneapolis-St. Paul Airport, Hiawatha LRT (blue line), Mall of America, IKEA, and Minnesota Valley National Wildlife Refuge. The Minnesota Valley National Wildlife Refuge offers opportunities for hiking, cross-country skiing, hunting, and fishing and has an impressive visitor center with classrooms, interpretive displays, bookstore, and information kiosks.

The eastern trail terminus will provide connections to Dakota County's Big Rivers Regional Trail, Minnesota State Trail: Fort Snelling State Park Connection, and an extensive trail system of the Minnesota Valley National Wildlife Refuge.

The Nine Mile Creek Regional Trail also connects to Metro Transit bus routes 5, 54, 440, 542, and 552 in Bloomington.

Natural Resources

Significant natural resources associated with this trail segment are not along the trail corridor, but rather at the regional trail's terminus at the Minnesota Valley National Wildlife Refuge.

The Minnesota Valley National Wildlife Refuge comprises over 14,000 acres and spans 99 miles along the Minnesota River. In Bloomington, the Minnesota Valley National Wildlife Refuge is described by the US Fish and Wildlife Services "... as a green belt of large marsh areas bordered by office buildings, highways, residential areas, and

grain terminals." Located directly on the Minnesota River, the refuge encompasses significant terrain, a wide variety of both upland and lowland plant communities, and a great diversity of wildlife.

The refuge is managed specifically for wildlife and is home to coyotes, bald eagles, trout, prothonotary warblers, and numerous waterfowl and migratory birds. The MLCCS classifies the adjacent areas as predominantly artificial surfaces and cultural vegetation (Appendix C). The eastern termini at the Minnesota Valley National Wildlife Refuge includes areas of forests, herbaceous landcover, wetland, and open water.

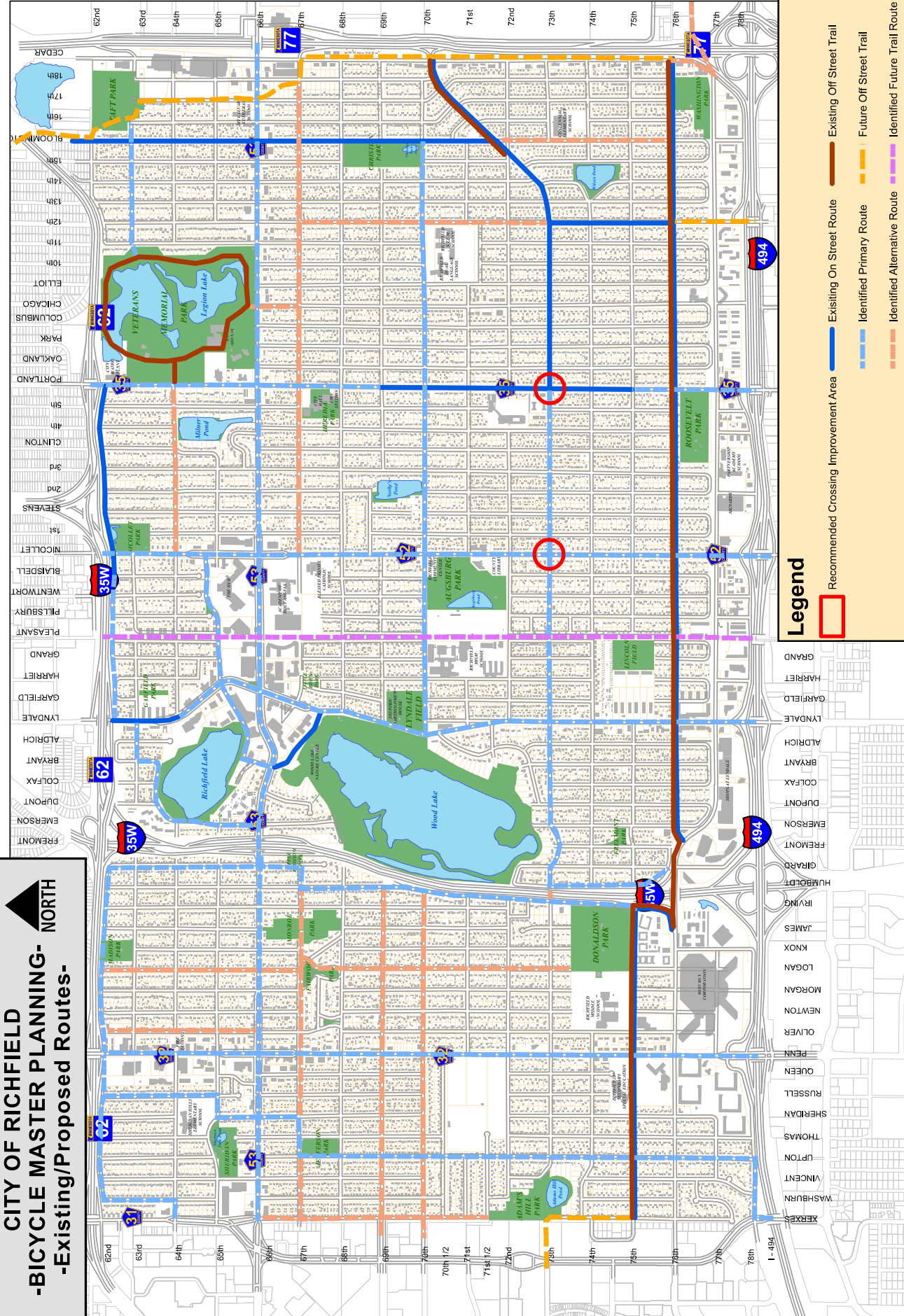
Species of Special Concern

The Minnesota Department of Natural Resources has documented the following important species near the trail corridor Upland Sandpiper, Forster's Tern, Blanding's Turtle, Colonial Waterbird, and Bald Eagles. None of these species are anticipated to be negatively affected by the trail corridor.

Acquisition Needs

Trail easements would be required along 12th Avenue and American Boulevard as well as portions of 34th Avenue for the Alternative MAC Option.

CITY OF RICHFIELD
-BICYCLE MASTER PLANNING-
-Existing/Proposed Routes-



Legend

- Recommended Crossing Improvement Area
- Existing On Street Route
- Existing Off Street Trail
- Identified Primary Route
- Future Off Street Trail
- Identified Alternative Route
- Identified Future Trail Route

Policies and Practices

Previous Practices

Since the adoption of the ADA, the City of Richfield has strived to provide accessible pedestrian features as part of the City's capital improvement projects. As additional information was made available as to the methods of providing accessible pedestrian features, the City updated their procedures to accommodate these methods.

Maintenance of pedestrian facilities within the public right of way has followed the practices set forth by the City. Prior to yearly Mill and Overlay and Sealcoat Maintenance Projects, all pedestrian curb ramps in the project area are brought up to standard during concrete repairs. In addition, a project was completed in 2012 that ground all offset joints on public sidewalks. Sidewalks are brought up to standard with new construction projects.

Current Policy

The City of Richfield has several established policies that guide decisions on accessible pedestrian design. Specific policies, plans, and procedures include:

- Sidewalk Policy
- Pavement Management Program
- Complete Streets Policy
- Bicycle Master Plan
- Traffic Control Committee
- Transportation Commission

The City of Richfield's goal is to continue to provide accessible pedestrian design features as part of the City's capital improvement projects. Requests for accessibility improvements can be submitted to the Transportation Engineer Contact information for Transportation Engineer is located in Appendix D. The City has established ADA design standards and procedures as listed in Appendix E. These standards and procedures will be kept up to date with nationwide and local best management practices.

The City will continue to consider and respond to all accessibility improvement requests. All accessibility improvements that have been deemed reasonable will be scheduled consistent with transportation priorities. The City will coordinate with external agencies to ensure that all new or altered pedestrian facilities within the City's jurisdiction are ADA compliant to the

maximum extent feasible. ADA signage requests are processed through the City Traffic Control Committee.

Improvement Schedule

Priority Areas

The City of Richfield has identified priority areas in the 2012 self-evaluation as follows:

- Arterials
- Collectors in Maintenance Areas
- Local Streets in Maintenance Areas

Special consideration should be given to driveway approach areas along Lyndale Avenue that are not scheduled for reconstruction or maintenance within 10 years.

External Agency Coordination

Other agencies, including MN DOT, Hennepin County, and Metro Transit, are responsible for pedestrian facilities within the jurisdiction of the City of Richfield. The City will coordinate with those agencies to track and assist in the facilitation of the elimination of accessibility barriers along their routes.

Schedule

The City of Richfield has set the following schedule goals for improving the accessibility of its pedestrian facilities within the City's jurisdiction:

- After 20 years, 80% of accessibility features within the jurisdiction of City would be ADA compliant.

ADA Coordinator

In accordance with 28 CFR 35.107(a), the City of Richfield has identified an ADA Title II Coordinator to oversee the City policies and procedures. Contact information for this individual is located in Appendix D.

Implementation Schedule

Methodology

The City of Richfield will utilize the scheduled street and utility improvement projects for upgrading pedestrian facilities to the current ADA standards. In some cases, special funding

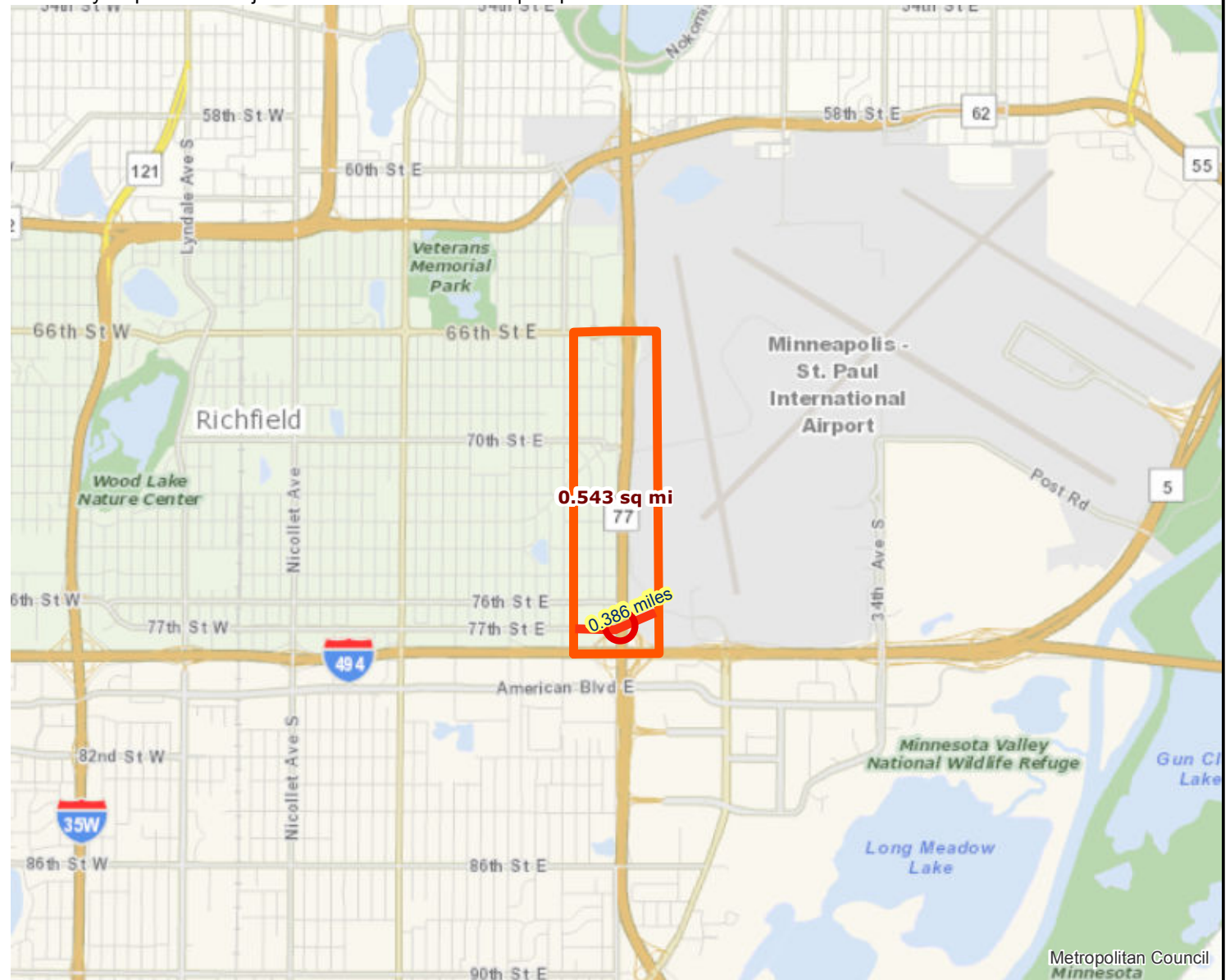
Roadway Area Definition

Roadway Expansion Project: 77th Street Extension | Map ID: 1464725525073

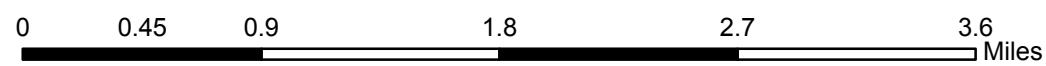
Results

Project Length: 0.386 miles

Project Area: 0.543 sq mi



- Project Points
- Principal Arterials
- A Minor Arterials Planned
- Project
- A Minor Arterials
- Project Area
- Principal Arterials Planned



Created: 5/31/2016
LandscapeRSA1



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



Documentation for safety measure calculation for 77th Street Extension/Underpass Project

- 1) *Identify the parallel roadway(s) that will be affected by the project.*

The project will draw traffic from American Parkway, I-494, and CSAH 53 (E. 66th Street) due to E. 77th Street's role as a reliever route.

- 2) *Using crash data for the most recent three years, calculate the existing crash rate for the parallel roadway(s) identified in Step 1.*

Crash information for the American Blvd, I-494, and CSAH 53 (E. 66th Street) corridors were requested and received from MnDOT. The crash rate information was calculated for American Parkway from 12th Avenue to 24th Avenue, I-494 from 12th Avenue to 24th Avenue, and CSAH 53 or E. 66th Street from 12th Ave to Longfellow Ave. Crash rates included intersection- and interchange-related crashes. The crash rate calculation is shown in **Table 1** on the following page.

- 3) *Identify the daily traffic volume that will be relocated from the parallel roadway(s) to the new roadway.*

The volumes projected to be diverted from parallel roadways were determined using Met Council's Travel Demand Model. Based on the model, the daily volumes diverted to E 77th St. are shown in **Table 1**.

- 4) *Calculate the number of crashes on the parallel roadway(s) using the existing crash rate from Step 2 and the relocated traffic volume to determine the change in number of crashes due to the relocated traffic volume.*

The adjusted number of crashes on CSAH 53 (66th Street), I-494, and American Blvd. with the rerouted traffic volumes was calculated using the following formula:

$$\text{Adjusted number of crashes (3-Year Period)} = \text{Existing number of crashes (3-Year Period)} * \frac{\text{Adjusted ADT}}{\text{Existing ADT}}$$

The adjusted number of crashes is shown in **Table 1**.

- 5) *Identify the average crash rate for the new roadway using MnDOT's average crash rates by roadway type. Using the average crash rate for the new roadway, calculate the number of crashes related to the relocated traffic.*

The proposed E. 77th Street extension will be constructed as a 4-lane divided urban roadway. The crash rate on American Blvd was used to estimate the crashes on E. 77th St. due to the similarity in function of both roadways.

The number of crashes on this segment is projected to be:

$(3 \text{ years}) * (0.36 \text{ miles segment length}) * (365 \text{ days/year}) * (11,200 \text{ vehicles/day}) * (2.33 \text{ crashes per million entering vehicles per mile of roadway}) / 1,000,000 = 10.3 \text{ crashes (3-Year Period)}$

- 6) *Calculate the crash reduction factor using the existing number of crashes on the existing parallel roadways (Step 4) compared to the estimated crashes calculated for the new roadway (Step 5) due to the relocated traffic volume.*

Projected number of crashes on new roadway: 10.3

Existing number of crashes on parallel roadways: 307

Crash reduction on existing roadways attributed to traffic that would be diverted: 11.9

Crash reduction factor = $\text{Future crashes} / \text{existing crashes} = (307 - 11.9 + 10.3) / 307 = 0.99$

- 7) *The calculated crash reduction factor should be used in the HSIP B/C worksheet.*

See attached B/C worksheet.

Table 1: Crash Rate Calculations on Existing Roadways

	66th St	I-494	American Blvd	Total
Crashes in 3 years	37	234	36	307
ADT	13,400	144,000	14,100	
Length (miles)	0.6	1.2	1	
Crash Rate Per Million Vehicles	3.92	1.24	2.33	
Vehicles Redirected to E 77th St	800	3,000	1,900	5,700
Adjusted ADT	12,600	141,000	12,200	
Crashes with adjusted ADT	34.8	229.1	31.1	295.1
Crashes Reduced in 3 years	2.2	4.9	4.9	11.9

Three Rivers
Park District
Board of
Commissioners

June 20, 2016

Penny Steele
District 1

Mr. Jeff Pearson
City Engineer
City of Richfield
6700 Portland Avenue
Richfield, MN 55423

Jennifer DeJournett
District 2

**RE: Letter of Support for the 77th Street Extension and Underpass
2016 Regional Solicitation Application**

Dear Mr. Pearson,

Daniel Freeman,
Vice Chair
District 3

Three Rivers Park District supports the City of Richfield's application for federal funds to construct an extension of 77th Street under Trunk Highway 77. The proposed 77th Street underpass includes a paved trail that will connect to the Nokomis-Minnesota River Regional Trail and has been identified as an alternative route option for Nine Mile Creek Regional Trail ultimately connecting to the MN Valley Wildlife Refuge in Bloomington.

John Gunyou,
Chair
District 4

The construction of the Nokomis-Minnesota River Regional Trail created a significantly improved crossing of I-494 for bicyclists and pedestrians. However, Trunk Highway 77 remains a major barrier for regional connections from Richfield. This project will provide a significant opportunity to cross that barrier and provide key connections to a number of other regional facilities including Lake Nokomis, the Minneapolis Grand Rounds Scenic Byway System, the Minnesota River Valley National Wildlife Refuge, Fort Snelling State Park, Mall of America, and the Minneapolis-St. Paul International Airport. This also improves access for users to connect to the Park District's regional trail network.

Gene Kay
Appointed
At Large

Good luck with your application. Please contact me at 763-694-7635 with any questions.

Sincerely,

Steve Antolak
Appointed
At Large



Kelly Grissman
Director of Planning

Boe Carlson
Superintendent

G:\Planning\Administration\Letters of Support\Richfield - 77th Street Extension.docx