



*Gold Line*

BUS RAPID TRANSIT PROJECT ENVIRONMENTAL ASSESSMENT

Environmental Assessment Appendix A Technical Report

# **Physical and Environmental Resources**

September 2019



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## ACRONYMS AND ABBREVIATIONS

2040 TPP	<i>2040 Transportation Policy Plan</i>
ADT	Average Daily Traffic
ASTM	American Society of Testing and Materials
AUL	Activity and Use Limitations
BMP	Best Management Practice
BRT	Bus Rapid Transit
Btu	British Thermal Unit
CCP	Construction Contingency Plan
CFR	Code of Federal Regulations
CO	Carbon Monoxide
Council	Metropolitan Council
CREC	Controlled Recognized Environmental Condition
CRWD	Capitol Region Watershed District
dB	Decibel
dBA	A-Weighting System
DNR	Minnesota Department of Natural Resources
EA	Environmental Assessment
EPA	U.S. Environmental Protection Agency
ESA	Environmental Site Assessment
ETSC	Endangered, Threatened Special Concern
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FPPA	Farmland Protection Policy Act
FTA	Federal Transit Administration
GIS	Geographic Information System
HREC	Historical Recognized Environmental Condition
Hz	Hertz
I-	Interstate
IRT	Issue Resolution Team
iPaC	Information for Planning and Consultation
Ldn	Day-Night Sound Level
Leq	“Equivalent” Sound Level
LGU	Local Government Unit



LRTPP	Long-Range Transportation Policy Plan
LUST	Leaking Underground Storage Tanks
MBS	Minnesota Biological Survey
MCES	Metropolitan Council Environmental Services
MDH	Minnesota Department of Health
MEPA	Minnesota Environmental Policy Act
MLCCS	Minnesota Land Cover Classification System
MnDOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency
MSATs	Mobile Source Air Toxics
NAAQS	National Ambient Air Quality Standards
NAC	Noise Area Classifications
NAD	No Association Determination
NEPA	National Environmental Policy Act of 1969
NFIP	National Flood Insurance Program
NHIS	Natural Heritage Information System
NISC	National Invasive Species Council
NLCD	National Land Cover Data
NPDES	National Pollutant Discharge Elimination System
NRCS	National Resources Conservation Service
NURP	Nationwide Urban Runoff Program
NWI	National Wetland Inventory
NWL	Normal Water Level
OES	MnDOT Office of Environmental Stewardship
PAHs	Polycyclic Aromatic Hydrocarbon
PFAS	Polyfluorinated Alkyl Substances
PM	Particulate Matter
ppm	Parts Per Million
PPV	Peak Particle Velocity
Project	METRO Gold Line Bus Rapid Transit Project
RAP	Response Action Plan
REC	Recognized Environmental Condition
RWMWD	Ramsey-Washington Metro Watershed District
SEL	Sound Exposure Level
SFHA	Special Flood Hazard Areas





SIP	State Implementation Plan
SSURGO	Soil Survey Geographic
TDMLs	Total Maximum Daily Loads
TH	Trunk Highway
TIP	Transportation Improvement Plan
TP	Total Phosphorus
TSS	Total Suspended Solids
UFC	Unregulated Fill Criteria
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VdB	Vibration Velocity
VMT	Vehicle Miles Traveled
WCA	Wetland Conservation Act



## 5. PHYSICAL AND ENVIRONMENTAL RESOURCES TECHNICAL REPORT

### 5.1. Introduction

This report was prepared in support of the METRO Gold Line Bus Rapid Transit (BRT) Project (Project) Environmental Assessment (EA). It provides results of the analysis of impacts to physical and environmental resources from the Project for the No-Build Alternative, Build Alternative 1 and Build Alternative 2. It also addresses the Hazel Street Station Option and the Dedicated Guideway Option at Hadley Avenue and 4th Street design options for Alignment C of Build Alternatives 1 and 2.

The National Environmental Policy Act (NEPA)<sup>1,2</sup> and the Minnesota Environmental Policy Act (MEPA)<sup>3</sup> provide the general basis of consideration for discussing physical and environmental impacts. Specific laws, regulations and executive orders apply to some physical and environmental resources such as air quality, surface waters and floodplains. The regulatory context section references applicable specific statutory or regulatory laws for each resource.

This report evaluates the following physical and environmental resources: utilities; floodplains; surface waters (wetlands, waterbodies and waterways); stormwater and water quality; geology, groundwater and soils; hazardous materials and contamination; noise and vibration; biological environment (wildlife habitat and endangered species); air quality; energy; and farmlands. The *Indirect Effects and Cumulative Impacts Technical Report* in **Appendix A** discusses indirect and cumulative effects to resources.

The analysis for each resource was based on a “study area” – a geographic space where potential impacts to the resource were evaluated. The study area was based on the Project’s “potential limits of disturbance,” or the area in which the Project would be built. In some cases, the study area extends beyond the potential limits of disturbance, so the analysis could evaluate impacts to adjacent or nearby resources; for example, a wetland or waterway may extend beyond the Project’s potential limits of disturbance.

**Table 5.1-1** summarizes the study areas for each resource this technical report evaluates.

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<sup>1</sup> *The National Environmental Policy Act of 1969, as amended. (“The Public Health and Welfare,” Title 42, U.S. Code (USC), Sec. 4321 et seq. (1969)). Available at: <https://www.gpo.gov/fdsys/pkg/USCODE-2011-title42/pdf/USCODE-2011-title42-chap55-sec4321.pdf>. Accessed November 2018.*

<sup>2</sup> *Council on Environmental Quality. “Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act.” 2005 reprint of “Protection of Environment,” Title 40, Code of Federal Regulations (CFR), Parts 1500-1508. Available at: [https://www.energy.gov/sites/prod/files/NEPA-40CFR1500\\_1508.pdf](https://www.energy.gov/sites/prod/files/NEPA-40CFR1500_1508.pdf). Accessed October 2018.*

<sup>3</sup> *“Environmental Policy,” Chap. 116D., Minnesota Statutes, 2018. Available at: <https://www.revisor.mn.gov/statutes/cite/116D>. Accessed May 2018.*



TABLE 5.1-1: PHYSICAL AND ENVIRONMENTAL ANALYSIS RESOURCE STUDY AREAS

Resource Evaluated	Study Area Definition	Basis for Study Area
Utilities	Within or directly adjacent to the potential limits of disturbance	Captures utilities within the potential limits of disturbance as well as adjacent utilities the Project could impact
Floodplains	Within ¼-mile of the potential limits of disturbance	Captures floodplain impacts to upstream and downstream waters within a reasonable distance outside of the potential limits of disturbance
Surface Waters (Wetlands Waterbodies, and Waterways)	<ul style="list-style-type: none"> <li>Level 1 delineation: Within ¼-mile of the potential limits of disturbance</li> <li>Level 2 delineation: Potential limits of disturbance and all areas that could support stormwater management facilities</li> </ul>	<ul style="list-style-type: none"> <li>Level 1 delineation: Captures wetlands within and directly adjacent to Project; the Council does not anticipate physical impacts to wetlands beyond this distance</li> <li>Level 2 delineation: Captures wetlands within proposed limits of disturbance; physical impacts to wetland would occur within these limits</li> </ul>
Stormwater and Water Quality	1 mile on either side of the Build Alternatives for impaired waters; within potential limits of disturbance for stormwater	Meets National Pollutant Discharge Elimination System requirements for identifying impaired waters or sensitive resources within 1 mile of Project
Geology, Groundwater and Soils	Area within ½-mile of potential limits of disturbance	Captures area surrounding Project where resource and/or Project impacts could occur
Hazardous Materials Contamination	<ul style="list-style-type: none"> <li>Operating impacts: Phase I Environmental Site Assessment (ESA) for area within 500 feet of Project alignment centerline</li> <li>Construction impacts: potential limits of disturbance</li> </ul>	<ul style="list-style-type: none"> <li>Operating impacts: Phase I ESA – the Minnesota Department of Transportation’s (MnDOT) modified American Society of Testing and Materials 1527-13 methodology</li> <li>Construction impacts: 15% Concept Plans (see <b>Appendix B</b>)</li> </ul>
Noise and Vibration	Based on screening distances provided in Sections 4.3 and 6.3 of the FTA guidance report <i>Transit Noise and Vibration Impact Assessment Manual</i> (September 2018) and “Procedures for Abatement of Highway Traffic Noise and Construction Noise,” Title 23, U.S. Code, Part 772	Based on screening distances provided in Sections 4.3 and 6.3 of the FTA guidance report <i>Transit Noise and Vibration Impact Assessment Manual</i> (September 2018); direction from the Federal Highway Administration (FHWA) and FTA on noise analysis requirements for BRT projects for which both sets of federal regulations/guidance apply; Minnesota Statutes, Section 446.07; and Minnesota Rules, Part 7030



Resource Evaluated	Study Area Definition	Basis for Study Area
Biological Environment (Wildlife Habitat and Endangered Species)	Within 1 mile of the potential limits of disturbance for presence of threatened and endangered species; within ¼-mile of the potential limits of disturbance for wildlife habitat, including habitat for threatened and endangered species	Captures the habitat that is directly adjacent to the Project and the wildlife the Project could potentially affect and identifies the potential presence of threatened and endangered species with the greater area around the Project
Air Quality	Roadways and intersections along the Build alternatives potentially affected by the Project; carbon monoxide analysis for one worst-case intersection as identified in the traffic evaluation along each alignment. The analysis evaluates Mobile Source Air Toxic impacts qualitatively following FHWA guidance.	Established in cooperation with the Minnesota Pollution Control Agency, Ramsey and Washington counties, MnDOT and the Council
Energy	Anticipated changes in travel patterns and bus operations due to the construction of Build alternatives	Total energy consumption of the Build alternatives measured in in British thermal units (Btus) (industry standard)
Farmlands	Farmlands classified as prime, unique, or of state or local importance that are not in a U.S. Census “urbanized” area within the potential limits of disturbance	Encompasses farmland the Project may impact in accordance with Natural Resources Conservation Services (NRCS) Farmland Impact Conversion Rating Form for Corridor Type Projects (NRCS-CPA-106 Form)

### 5.1.1. Overview of Build Alternatives

The *Alternatives Technical Report* in **Appendix A** of this EA provides descriptions of the two Build Alternatives evaluated within the EA, Build Alternative 1 (A1-BC-D3) and Build Alternative 2 (A2-BC-D3). The difference between the two Build Alternatives is within Alignment A in downtown Saint Paul. Alignment A2 of Build Alternative 2 would terminate at Union Depot, and Alignment A1 of Build Alternative 1 would terminate approximately 1 mile to the west at the Smith Avenue Transit Center. The Federal Transit Administration (FTA) and Metropolitan Council (Council) based the anticipated long- and short-term impacts from the Build Alternatives on the 15% Concept Plans for the Project (see **Appendix B**).

### 5.1.2. Overview of No-Build Alternative

NEPA requires that the Project analysis includes the No-Build Alternative to provide a base point from which to evaluate the potential impacts, benefits and costs of the Build Alternatives, as well as a potential outcome of the EA process. The No-Build Alternative represents the existing transportation system as the Council's 2040



*Transportation Policy Plan (2040 TPP)*<sup>4</sup> presents it – with only planned and programmed improvements, and without the Project. Therefore, construction and operation of the Project is not included in the No-Build Alternative. Section 2.6.1 of the *Alternatives Technical Report* in **Appendix A** list some of the funded highway and transit projects in the 2040 TPP that are included in the No-Build Alternative.

The following summary provides a consolidated discussion of the No-Build Alternative for the physical and environmental resources evaluated in this report. This summary assumes future conditions in 2040 in the resource study area if the Project were not built.

#### 5.1.2.1. Utilities

The No-Build Alternative would have no associated long-term or short-term impacts to utilities within the study area because the Project would not be built. Other transportation and development projects could impact utilities due to ground disturbance required to implement physical improvements, such as new roadways and buildings. These projects would be subject to applicable local regulations and coordination with utility owners.

#### 5.1.2.2. Floodplains

The No-Build Alternative would have no associated long-term or short-term impacts to 100-year floodplains or floodways within the study area because the Project would not be built. Other transportation and development projects could impact floodplains and these projects would be subject to federal, state and local regulations.

#### 5.1.2.3. Surface Water

The No-Build Alternative would have no associated long-term or short-term impacts to surface waters within the study area because the Project would not be built. Other transportation and development projects could impact surface waters and these projects would be subject to federal, state and local regulations.

#### 5.1.2.4. Stormwater and Water Quality

The No-Build Alternative would have no associated long-term or short-term impacts to stormwater or water quality within the study area because the Project would not be built. Other transportation and development projects could impact stormwater and water quality and these projects would be subject to federal, state and local regulations. Under the No-Build Alternative, water quality benefits from stormwater treatment associated with the Project would not be implemented, however treatment associated with other projects could also provide water quality benefits.

#### 5.1.2.5. Geology, Groundwater and Soils

The No-Build Alternative would have no associated long-term or short-term impacts to geology, groundwater or soils within the study area because the Project would not be built. Other transportation and development projects could impact the existing geology, groundwater and soil environment. These changes would be subject to federal, state and local regulations.

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<sup>4</sup> Metropolitan Council. 2040 Transportation Policy Plan. Adopted January 2015. Available at: [https://metro council.org/Transportation/Planning-2/Key-Transportation-Planning-Documents/Transportation-Policy-Plan-\(1\)/The-Adopted-2040-TPP-\(1\).aspx](https://metro council.org/Transportation/Planning-2/Key-Transportation-Planning-Documents/Transportation-Policy-Plan-(1)/The-Adopted-2040-TPP-(1).aspx). Accessed November 2018.



### 5.1.2.6. Hazardous Materials and Contamination

The No-Build Alternative would have no associated long-term or short-term impacts to contaminated land within the study area because the Project would not be built. Other transportation and development projects could result in the removal and cleanup of contaminated land, or increased risk of future contamination, depending on the type and location of the project.

### 5.1.2.7. Noise and Vibration

The No-Build Alternative would have no associated long-term or short-term impacts to noise or vibration within the study area because the Project would not be built. Noise levels would continue to be dominated by other transportation-related noise sources such as roadways, cars and trucks. Other projects could increase noise levels and could be subject to federal, state and local regulations depending on the type of project.

### 5.1.2.8. Biological Environment (Endangered Species and Wildlife Habitat)

The No-Build Alternative would have no associated long-term or short-term impacts to the biological environment, including threatened and endangered species and wildlife habitat, within the study area because the Project would not be built. Other transportation and development projects could impact these resources and these projects would be subject to federal, state and local regulations.

### 5.1.2.9. Air Quality

The No-Build Alternative would have no associated changes in traffic patterns or congestion in the study area, and therefore would not produce changes to air quality, because the Project would not be built. The *2040 Transportation Policy Plan* documented the Council's regional conformity for CO emissions, and EPA predicts that emissions of MSATs would decrease dramatically by the design year of the Project.

### 5.1.2.10. Energy

The No-Build Alternative would consume approximately 255,893 billion Btus of energy annually, based on output from the Twin Cities Regional Travel Demand Model. This is slightly higher than the Build Alternatives. The higher consumption under the No-Build Alternative is due to fewer mode shifts from passenger vehicles to bus.

### 5.1.2.11. Farmlands

The No-Build Alternative would have no associated long-term or short-term impacts to prime or unique farmlands within the study area because the Project would not be built and because all NRCS-mapped prime and unique farmland within the study area has been converted to urban use.

## 5.2. Utilities

This section evaluates Project-related impacts to public and private utilities.

### 5.2.1. Regulatory Context and Methodology

#### 5.2.1.1. Regulatory Context

The following laws, regulations and guidelines associated with utility relocation and accommodation comprise the regulatory context for the utilities analysis.



## FEDERAL

- “Highways,” Title 23, Code of Federal Regulations (CFR), Sec. 123, 2006 ed, Supplement 5,<sup>5</sup> and Section 109<sup>6</sup>
- “Highways,” Title 23, CFR, Chapter I, Subchapter G, Part 645, Subparts A and B<sup>7</sup>
- FTA’s *Project and Construction Management Guidelines* (2016), Appendix F – “Utility Relocation Agreements”<sup>8</sup>

## STATE

- Minnesota Department of Transportation (MnDOT)
  - MnDOT’s Utility Accommodation on Highway Right-of-Way Policy and Procedures<sup>9</sup>
  - MnDOT’s Utility Accommodation and Coordination Manual<sup>10</sup>
- The Constitution of the State of Minnesota<sup>11</sup> addresses just compensation associated with private property that public use takes, destroys or damages
- Minnesota Statutes

<sup>5</sup> “Relocation of Utility Facilities,” Title 23, USC, Sec. 123 2006, Supplement 5. Available at: <https://www.gpo.gov/fdsys/granule/USCODE-2011-title23/USCODE-2011-title23-chap1-sec123>. Accessed October 2018.

<sup>6</sup> “Standards,” Title 23, USC, Sec. 109(l)(1), 2012. Available at: <https://www.gpo.gov/fdsys/granule/USCODE-2011-title23/USCODE-2011-title23-chap1-sec109>. Accessed October 2018.

<sup>7</sup> “Highways,” Chap. 1, Utilities, Title 23, USC, Chapter I, Subchapter G, Part 645, Subparts A and B. Federal Highway Administration, 2003. Available at: <https://www.gpo.gov/fdsys/granule/CFR-2011-title23-vol1/CFR-2011-title23-vol1-part645>. Accessed October 2018.

<sup>8</sup> U.S. Department of Transportation. Federal Transit Administration. “Project and Construction Management Guidelines”, as amended. 2016. Appendix F – “Utility Relocation Agreements”. Available at: [https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/FTA\\_Project\\_and\\_Construction\\_Mgmt\\_Guidelines\\_2016.pdf](https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/FTA_Project_and_Construction_Mgmt_Guidelines_2016.pdf). Accessed October 2018.

<sup>9</sup> Minnesota Department of Transportation. “Utility Accommodation on Highway Right of Way Policy and Procedures”. Available at: <http://www.dot.state.mn.us/policy/operations/op002.html>. Accessed October 2018.

<sup>10</sup> Minnesota Department of Transportation. “Utility Accommodation and Coordination Manual”. Available at: <https://www.dot.state.mn.us/utility/guidance.html>. Accessed October 2018.

<sup>11</sup> “Private Property for Public Use,” Article 1, Sec. 13, Constitution of the State of Minnesota, as amended. Available at: <https://www.revisor.mn.gov/constitution/>. Accessed October 2018.



- Section 161.20, Subdivision 1<sup>12</sup> addresses the general powers of the MnDOT commissioner to carry out the provisions of Article 14, Section 2<sup>13</sup> of the state constitution regarding the public highway system. Subdivision 2<sup>14</sup> addresses the commissioner’s power regarding property acquisition.
- Section 161.45<sup>15</sup> addresses relocating utilities on highway rights-of-way. This section describes rule-making authority and utility owner interests when real property is conveyed.
- Section 161.46<sup>16</sup> addresses reimbursing utility owners for relocating facilities. The section includes definitions and reimbursement requirements, and it describes provisions associated with a lump sum settlement, acquiring a facility relocated for utility, and relocation work by the state.
- Section 216B<sup>17</sup> addresses utilities located within rights-of-way that cities own. These utilities may be subject to an individual franchise agreement that provides the terms for which the utility companies may operate in the public right-of-way.
- Section 216D.04<sup>18</sup> addresses the Department of Public Safety’s notice, plan and locating requirements for excavation projects involving underground facilities
- Section 222.37, Subdivision 2<sup>19</sup> addresses pipeline relocations
- Minnesota Rules Parts 8810.3100 through 8810.3600<sup>20</sup> address the utility permit process, standards for work conducted under permit, and aerial and underground lines

### 5.2.1.2. Methodology

The utilities analysis defined the resource study area as the area within or directly adjacent to the Project construction area, or potential “limits of disturbance” as I estimated based on the 15% Concept Plans.

The analysis utilized information about existing utilities near the Project obtained from Gopher State One Call,<sup>21</sup> a notification system that informs Minnesota underground facility operators about intended excavation.

<sup>12</sup> “Provisions of constitution.” Subd. 1, Minnesota Statutes, 2018. Ch. 161, Sec. 161.20. Available at: <https://www.revisor.mn.gov/statutes/cite/161.20>. Accessed November 2018.

<sup>13</sup> “Public Highway System,” Article 14, Sec. 2, Constitution of the State of Minnesota, as amended. 2012. Available at: <https://www.revisor.mn.gov/constitution/>. Accessed October 2018.

<sup>14</sup> “Property acquisition; agreements and contracts.” Subd. 2, Minnesota Statutes, 2018. Ch. 161, Sec. 161.20. Available at: <https://www.revisor.mn.gov/statutes/cite/161.20>. Accessed November 2018.

<sup>15</sup> “Utility on Highway Right-of-Way; Relocation.” Sec. 161.45, Minnesota Statutes, Ch. 161, 2018. Available at: <https://www.revisor.mn.gov/statutes/cite/161.45>. Accessed November 2018.

<sup>16</sup> “Reimbursement of Utility.” Sec. 161.46, Minnesota Statutes, Ch. 161, 2018. Available at: <https://www.revisor.mn.gov/statutes/cite/161.46>. Accessed November 2018.

<sup>17</sup> “Public Utilities.” Chap. 216B, Minnesota Statutes, 2018. Available at: <https://www.revisor.mn.gov/statutes/cite/216B>. Accessed November 2018.

<sup>18</sup> “Excavation; Land Survey.” Sec. 216D.04, Minnesota Statutes, Ch. 216D, 2018. Available at: <https://www.revisor.mn.gov/statutes/cite/216D.04>. Accessed November 2018.

<sup>19</sup> “Pipeline.” Subd. 2, Minnesota Statutes, 2018. Ch. 222, Sec. 222.37. Available at: <https://www.revisor.mn.gov/statutes/cite/222.37>. Accessed November 2018.

<sup>20</sup> “Utilities Equipment.” Parts 8810.3100-8810.3600, Minnesota Rules, Chap. 8810, 2012. Available at: <https://www.revisor.mn.gov/rules/8810/>. Accessed October 2018.

<sup>21</sup> Gopher State One Call. Available at: <http://www.gopherstateonecall.org/>. Accessed October 2018.





The cities of Saint Paul, Maplewood, Landfall, Oakdale and Woodbury; Ramsey and Washington counties; District Energy St. Paul; St. Paul Regional Water; the Council; and MnDOT provided information on storm sewer, sanitary sewer, water main, fiber optic and communications utilities. Minnesota IT Services also provided information on several fiber optic cables in a duct bank that runs parallel with Interstate 94 (I-94) from downtown Saint Paul past Bielenberg Drive.

CenterPoint Energy, AT&T, Comcast, Consolidated Comm I, MCI Communications, Sprint, Windstream, CenturyLink, Comcast, Exenet, Magellan Midstream Partners, Rogers, Flint Hills Resources for the Minnesota Pipeline, and Xcel Energy provided information about private utilities for facilities located within the resource study area. The Council will continue to gather information from additional private utilities as identified.

The analysis compared the provided information with the Build Alternatives to identify potential conflicts with existing utilities, approximating the locations and magnitudes of impacts based on the Project's 15% Concept Plans (see **Appendix B**). The Council will continue to refine the plans as the Project advances through the Project Development and Engineering phases.

### 5.2.2. Affected Environment

The affected environment includes the following utilities within or directly adjacent to the potential limits of disturbance: storm sewer, sanitary sewer, water main, natural gas, oil, telecommunications, and electric utility lines and vaults. Electric and telecommunications lines comprise overhead utilities in the same area.

Storm and sanitary sewer services are owned and maintained by the public works divisions of the areas in which they are located, including: the cities of Saint Paul, Maplewood, Landfall, and Woodbury; Ramsey and Washington counties; and Metropolitan Council Environmental Services (MCES). Several publicly owned storm and sanitary sewer services run parallel to and intersect within the Project study area.

MCES interceptor sewer lines are located within the Project study area. The sewer lines range in size from 15 to 144 inches in diameter, all varying in depth. In Alignment B, a 72-inch MCES interceptor runs roughly parallel to Trunk Highway (TH) 61, where it intersects with I-94. In Alignment C, an interceptor crosses I-94 just to the west of Battle Creek Lake. In Alignment D, a 16-inch DIP FM forcemain runs along the north side of Tamarack Road, which is located within a 30-inch casing where it crossed Bielenberg Drive.

Multiple data centers are located within Alignment D3 that have water main infrastructure located within the Project study area.

Magellan Midstream Partners owns underground gas line utilities within Alignment C. The gas lines range in size from six to 12 inches in diameter, running north to south and intersecting with Alignment C.

Minnesota Pipeline LLC owns two buried oil pipelines in the study area. Flint Hills Resources operates the pipelines that cross 4th Street North between Hayward and Helmo avenues in Oakdale. The oil pipelines cross I-94 and continue south along the west side of Bielenberg Drive in Woodbury.

Minnesota IT Services provided drawings, identifying the location of fiber optic cables that intersect and run parallel to the Project. Minnesota IT Services fiber optic cables are located within all the Project alignments.

MnDOT owns and operates a traffic-management system along the I-94 corridor that consists of fiber optic cabling in buried conduits and associated structures and equipment.

Xcel Energy provides electrical service in the study area using overhead and underground distribution power lines. Xcel Energy has electric transmission lines that intersect and run parallel within the study area. Utility vaults are also located in Alignment A1.



## 5.2.3. Environmental Consequences

### 5.2.3.1. Operating Phase (Long-Term) Impacts

#### BUILD ALTERNATIVE 1 (A1-BC-D3)

The Council anticipates several long-term impacts from Build Alternative 1 to existing underground and overhead utilities throughout the Project area. As the Project progresses, the Council would evaluate utilities on a case-by-case basis to determine if utilities must be adjusted to accommodate guideway construction and operations. If elements of the Project conflict with existing utility lines, owners may need to modify, relocate or reconstruct the utilities. The Council would coordinate with each utility owner regarding impacts to existing facilities as the Project advances through Project Development and into the Engineering Phase.

The Council will evaluate utilities for relocation under the following conditions:

- Utility is located beneath a footing of a proposed parking structure, retaining wall and/or station
- Utility conflicts with proposed BRT systems or communications elements
- Water and sewer do not meet depth requirements for safe operation due to changes in Project grading
- Utility Review Zone Risk Assessment dictates utility owners must relocate utility outside of the guideway

The Project could require relocating the buried fiber optic cables and associated system infrastructure from White Bear Avenue to McKnight Road in Saint Paul; and between Century Avenue and Hadley Avenue in Oakdale due to guideway and other Project infrastructure.

Construction of the guideway could impact MnDOT's traffic-management system along the I-94 corridor requiring the Council to relocate or modify the changeable message sign and associated equipment between Frank Street and Johnson Parkway in Saint Paul to accommodate the guideway between I-94 and Hudson Road.

The Project will avoid and/or minimize potential maintenance impacts to buried oil pipelines through advancement of design near the proposed Helmo Avenue Station and along Bielenberg Drive. The Council will coordinate with pipeline owners to advance design that will minimize impacts to pipeline maintenance activities. Project improvements in these areas include a new station, guideway, roadway widening, bridge abutments, and other Project related infrastructure. Where impacts cannot be avoided, the Council will work with the utility owner to mitigate these impacts. The Council recognizes routine maintenance or extraordinary repairs may be necessary for these pipelines. The design advancement will coordinate the placement of the guideway, structures, and traffic systems to limit the future disruption of BRT operations and allow construction access to the pipelines. Advancement of design will evaluate where 1) the footprint of disturbance on the pipeline can be reduced through perpendicular crossings of the guideway, 2) offsetting the guideway to allow pipeline maintenance access when parallel to the pipeline, 3) adjusting proposed grading where feasible to limit additional fill on top of the pipeline, and 4) placement of permanent structures (i.e., stations and bridges) and stormwater facilities would minimize impacts to pipeline maintenance activities.

The Project will not impact MCES interceptor sewer lines for Alignment A, C, and D3. Within Alignment B a valve box for the MCES sewer line is located near the guideway. The Project will avoid and/or minimize any potential impacts through design advancement during the Project Development and Engineering phases.

In most areas utility vaults would not result in a conflict with the station platform. However, the Project could impact the accessibility of utility vaults located in downtown Saint Paul within Alignment A1 due to bump outs at the station areas. The 5<sup>th</sup> Street/Robert Street Station, Union Depot/Sibley Street Station and Union Depot/Wacouta Street Station will have bump-outs to accommodate combined pull-out and in-lane stopping. The



Council will continue to evaluate the extent of impacts from station construction and will coordinate with utility owners as the Project design advances through the Project Development and Engineering phases.

Proposed station platforms would require connections to electrical power and a communication network to provide lighting, real-time messaging systems, security cameras and fare collection.

Neither the Hazel Street Station Option nor the Dedicated Guideway Option at Hadley Avenue and 4th Street would produce impacts to floodplains beyond those the Council anticipates for Alignment C.

### **BUILD ALTERNATIVE 2 (A2-BC-D3)**

Build Alternative 2 would produce the same long-term impacts to utilities as Build Alternative 1, however Alignment A2 does not have identified utility relocations. The station platform at the Union Depot under Alignment A2 would need the same components of other stations platforms such as electrical power and a communications network connection to provide lighting, real-time messaging systems, security cameras and fare collection.

#### **5.2.3.2. Construction Phase (Short-Term) Impacts**

### **BUILD ALTERNATIVE 1 (A1-BC-D3)**

Build Alternative 1 would produce short-term impacts to utilities during construction activities such as excavation and grading, placing structural foundations and using large-scale equipment. Utility relocations would result in service disruptions during limited durations throughout construction. The Council anticipates these disruptions would be minimal, and providers would establish temporary connections for customers before permanently relocating utilities facilities. The Council will coordinate with utility owners to schedule disruptions to service.

### **BUILD ALTERNATIVE 2 (A2-BC-D3)**

Alignment A2 under this Build Alternative would terminate at Union Depot and would not impact the portion of the Project area west of Union Depot to Smith Avenue; therefore, Alignment A2 would produce fewer short-term impacts to utilities than Alignment A1 under Build Alternative 1.

#### **5.2.4. Avoidance, Minimization and/or Mitigation Measures**

Avoidance, minimization and mitigation measures apply to both Build Alternative 1 and Build Alternative 2. The Council would continue to confirm and map the locations of existing utilities in the Project area during the Project Development and Engineering phases so that it can refine designs to best avoid the utilities, where practicable. Where conflict is unavoidable, the Council will coordinate with utility owners to identify Project-related impacts and potential mitigation measures such as relocations, replacements or other actions. If a legal agreement exists stating that a utility owner would pay to move the utility to accommodate a roadway improvement project, the Council will coordinate with that owner per the conditions of the agreement. Existing utility land rights will also be evaluated to determine their impact on relocation costs.

The Council will continue to coordinate with Minnesota Pipeline LLC and Flint Hills Resources to advance the design on the BRT guideway and other Project infrastructure in compliance with standards separating the Project from the oil pipelines. The Council will analyze any adjustments to the Project resulting from ongoing coordination and the Project will maintain a specified distance from the oil pipelines as determined through this coordination. The Council will continue to evaluate any potential impact as the Project design advances through the Project Development and Engineering phases.

The Council will coordinate during construction with utility owners and operators to determine potential disruptions in service. If Project construction requires temporary service disruptions, the utility owners would notify affected



property owners. Potential disruptions would be temporary, and owners would restore utility services to preconstruction levels in a timely manner. If construction activities reveal previously unidentified utilities, the Council would notify the owner of the utility and determine appropriate mitigation measures. The Council will coordinate closely with owners of water supply lines critical for the cooling systems of the data centers within Alignment D3. In the case of a disruption to the water supply, a temporary connection would be established.

The Council will also implement measures to avoid and mitigate risks associated with utility relocations, including implementing a confined space entry safety plan, remediating contaminated soils prior to utility excavations, and remediating and disposing of hazardous pipe coatings and materials impacted by utility relocations.

The Council will mitigate accessibility impacts at the station platforms by adjusting existing utility vaults to match the new grade, including raising or lowering and resetting existing frames, covers, and lids and adding or replacing riser collars.

## 5.3. Floodplains

This section evaluates Project-related impacts to floodplains and floodways. **Section 5.4.** separately addresses surface water including wetlands, and **Section 5.4.4.** addresses stormwater and water quality.

### 5.3.1. Regulatory Context and Methodology

#### 5.3.1.1. Regulatory Context

Local, state and federal legislation protect floodplains<sup>22</sup> because of their ecological value and functionality. Impacts to floodplains from Project implementation would require permits from various agencies and regulatory bodies.

Section 404 of the Clean Water Act<sup>23</sup>, the Rivers and Harbors Appropriation Act of 1899 and Executive Order 11988 – “Floodplain Management”<sup>24</sup> are federal laws that protect floodplains. The Minnesota Department of Natural Resources (DNR) establishes state and local protections through public waters work permits; watershed districts; water management organizations/commissions; or city permits. The following agencies regulate floodplains and floodways:

- Federal Emergency Management Agency (FEMA)
- DNR
- Watershed districts

The required permits vary depending on the features, sizes and locations of impacts, and other factors. This EA uses the definition of a floodplain impact as a disturbance or fill within a 100-year FEMA floodplain boundary that

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<sup>22</sup> *The Federal Emergency Management Agency defines floodplains as “the lowland and relatively flat areas adjoining inland and coastal waters including flood-prone areas of offshore islands, including, at a minimum, that area subject to a one percent or greater chance of flooding in any given year.” Available at: <http://www.fema.gov>. Accessed July 2018.*

<sup>23</sup> *“Navigation and Navigable Waters,” Title 33, USC, Sec. 1344, Subsection 404, et seq. Available at: <http://uscode.house.gov/view.xhtml?req=granuleid:USC-prelim-title33-section1344&num=0&edition=prelim>. Accessed October 2018.*

<sup>24</sup> *Executive Order 11988, “Floodplain management,” Title 3, CFR, Part 117, 1977, as amended. Available at: <https://www.archives.gov/federal-register/codification/executive-order/11988.html>. Accessed October 2018.*



results in floodplain storage loss. The analysis assessed potential Project-related impacts to floodplains based on conceptual designs of the Build alternatives.

### 5.3.1.2. Methodology

The initial study area for floodplain impacts included the area within ¼-mile of the potential limits of disturbance. This distance captured floodplain impacts to upstream and downstream waters within a reasonable distance outside of the potential limits of disturbance. As the Council advanced the Project design and formally established the potential limits of disturbance, the Council advanced the analysis to identify impacts to more accurately floodplains and floodways within or directly adjacent to the potential limits of disturbance, rather than the ¼-mile area.

### FEDERAL EMERGENCY MANAGEMENT AGENCY

Executive Order 11988 requires all federal agencies to evaluate and avoid to the extent possible adverse impacts to floodplain areas that may result from actions the FTA and Council administer, regulate or fund. The National Flood Insurance Act of 1968<sup>25</sup> authorizes FEMA, through the National Flood Insurance Program (NFIP), to regulate floodplains and floodways.

The Project analysis evaluated FEMA 100-year floodplains<sup>26</sup> and FEMA floodways<sup>27</sup> based on current digital data including geospatial data and aerial survey mapping data (contours). The analysis used FEMA Flood Insurance Rate Maps and Flood Insurance Studies to identify floodplains and floodways within the study area. The Council obtained FEMA 100-year floodplain and floodway digital geospatial data from the Minnesota Geospatial Commons<sup>28</sup>. Placing fill or buildings in the floodway may block the flow of water and increase flood elevations; therefore, FEMA generally restricts such activities in the floodway and requires mitigation in the form of replaced storage volume to offset lost floodway storage. Similarly, the agency restricts activities in the floodplain that reduce flood-storage capacity and would require replacement of lost storage volume.

### MINNESOTA DEPARTMENT OF NATURAL RESOURCES

On behalf of FEMA, the DNR also regulates activities that may impact floodplains such as construction, excavation or deposition of materials over or under waters that may affect flood stage, floodplain or floodway boundaries. The DNR regulates floodplain management through its State Floodplain Management Program, which oversees the FEMA-authorized NFIP for Minnesota.

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<sup>25</sup> "The National Flood Insurance Act 1968, as amended, and The Flood Disaster Protection Act of 1973," Title 42, USC, Sec. 4001, et. seq., 1973 (as amended). Available at: <https://www.fema.gov/media-library/assets/documents/21010>. Accessed October 2018.

<sup>26</sup> Federal Emergency Management Agency. According to "Definitions," Title 44, CFR, Sec. 9.4, 100-year floodplain (also known as base floodplain) means the floodplain "for the flood which has a one percent chance of being equaled or exceeded in any given year." Available at: <http://www.fema.gov>. Accessed July 2018.

<sup>27</sup> Federal Emergency Management Agency. According to "Definitions," Title 44, CFR, Sec. 9.4, "... floodway means that portion of the floodplain which is effective in carrying flow, within which this carrying capacity must be preserved and where the flood hazard is generally highest, i.e., where water depths and velocities are the greatest. It is that area which provides for the discharge of the base flood so the cumulative increase in water surface elevation is no more than one foot." Available at: <http://www.fema.gov>. Accessed July 2018.

<sup>28</sup> Minnesota Geospatial Commons. Available at <https://gisdata.mn.gov/>. Accessed July 2018.



The DNR classifies Special Flood Hazard Areas (SFHAs)<sup>29</sup> into zones according to whether the area has a detailed hydraulic analysis. Zones A and AE are SFHAs subject to inundation by the 1-percent-annual-chance flood event, which the DNR determines using either approximate methodologies (Zone A) or detailed methods (Zone AE). The DNR requires a building permit for construction projects that impact a FEMA-regulated floodplain, and the permitting requirements vary by zone. Submittal requirements for permits may include the following items:

- Letter of Map Revision: FEMA's modification to an effective Flood Insurance Rate Map, Flood Boundary and Floodway Map, or both<sup>30</sup>
- Conditional Letter of Map Revision: FEMA's comment on a proposed project that would, upon construction, affect the hydrologic or hydraulic characteristics of a flooding source, and that would result in the modification of the existing floodway, the effective Base Flood Elevations or the SFHA

## WATERSHED DISTRICTS

Watershed districts also regulate activities that might impact floodplains such as construction, excavation, and deposition of materials over or under waters that might affect flood stage, floodplain or floodway boundaries.

### Capitol Region Watershed District

Capitol Region Watershed District (CRWD) Rules<sup>31</sup> prohibit any permanent fill within the 100-year floodplain unless the agency responsible provides compensatory storage within the project limits of disturbance or immediately adjacent to the development within the affected floodplain. Public roadway projects must comply with the following flood-control and freeboard requirements:

- The roadway shall not flood when adjacent to stormwater storage basins designed to store the 100-year storm event.
- The roadway must abide by the freeboard requirement set by the road authority.

### Ramsey-Washington Metro Watershed District

Ramsey-Washington Metro Watershed District (RWMWD) updated its *Watershed Management Plan*<sup>32</sup> in April 2017, and the district is in the process of updating its rules. RWMWD floodplain requirements are the same as those listed for CRWD; however, RWMWD has its own 100-year floodplain elevations that could differ from FEMA's elevations.

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<sup>29</sup> Federal Emergency Management Agency identifies on its Flood Insurance Rate Maps, (maps on which FEMA delineates officially the SFHAs and the risk-premium zones applicable to a community) SFHAs that will be inundated by the flood event having a 1 percent chance of being equaled or exceeded in a given year. The 1-percent-annual-chance flood is also referred to as the "base flood" or "100-year flood." SFHAs are labeled as Zones A, AO, AH, A1-A30, AE, etc. Available at: <http://www.fema.gov>. Accessed August 2018.

<sup>30</sup> Federal Emergency Management Agency. Available at: <http://www.fema.gov>. Accessed August 2018.

<sup>31</sup> Capitol Region Watershed District. Capitol Region Watershed District Rules. Revised June 5, 2019. Available at: <https://www.capitolregionwd.org/wp-content/uploads/2019/07/06-05-19-CRWD-Amended-Signed-Rule.pdf>. Accessed June 2019.

<sup>32</sup> Ramsey-Washington Metro Watershed District. "Watershed Management Plan". April 2017 <https://www.rwmwd.org/wp-content/uploads/RWMWD-Management-Plan.pdf>. Accessed October 2018.



### 5.3.2. Affected Environment

The analysis categorizes land uses within the potential limits of disturbance as urban and suburban residential, commercial and mixed use development. Floodplains and floodways within the potential limits of disturbance are associated with the Mississippi River, its tributaries such as Battle Creek, and waterbodies with fluctuating water elevations. RWMWD primarily regulates floodplains that fall within the Project potential limits of disturbance; FEMA also regulates the Zone A floodplains (see **Section 5.3.1.2** subsection **Federal Emergency Management Agency**). **Table 5.3-1** lists floodplains within or directly adjacent to the potential limits of disturbance.

**TABLE 5.3-1: FLOODPLAINS AND FLOODWAYS WITHIN THE POTENTIAL LIMITS OF DISTURBANCE**

Name of Associated Waterbody or RWMWD Waterbody ID <sup>a</sup>	Flood Elevation (Feet Above Mean Sea Level) <sup>b</sup>	Alignment(s)
Mississippi River <sup>c, d</sup>		A1/A2/B
Upstream of US 52 <sup>c</sup>	708.0 <sup>d</sup>	A1/A2
Downstream of US 52 <sup>c</sup>	707.0 <sup>d</sup>	A1/A2/B
Tanners Lake <sup>c</sup>	967.7	C
Battle Creek Lake <sup>c</sup>	961.0	C
BC-63S	1027.9	C
BC-62 <sup>c</sup>	1006.2	C
BC-75A	Unknown	C
BC-57X <sup>c</sup>	1021.5	D3
BC-57X	Unknown	D3
BC-52 <sup>c</sup>	1014.2	D3
BC-53 <sup>c</sup>	1014.2	D3
BC-31	1010.3	D3
BC-29	1015.2	D3
BC-25X	Unknown	D3
BC-25	Unknown	D3
BC-26	Unknown	D3
BC-17X	Unknown	D3
BC-17 <sup>c</sup>	999.9	D3
BC-21	1021.1	D3
BC-22	1028.1	D3
BC-22A	1024.1	D3
BC-23	1033.5	D3
BC-24	994.9	D3

<sup>a</sup> RWMWD-regulated waterbody; "BC-XX" represents RWMWD identification number. BC = Battle Creek.



- <sup>b</sup> The flood elevation reflects RWMWD's Atlas 14 Model Results (Datum NAVD88), obtained September 2018 (unless otherwise noted). Note: Elevations may be slightly different than what RWMWD published in its 2017 plan update.
- <sup>c</sup> FEMA-regulated Zone A floodplain. Note: Where a FEMA-regulated Zone A floodplain falls within a RWMWD-regulated floodplain, the table lists the RWMWD-modeled high-water level (unless otherwise noted).
- <sup>d</sup> Ramsey County Flood Insurance Study. FEMA Flood Insurance Number 27123CV00A. 2010. Available at: [http://fox.dnr.state.mn.us/pub/waters/floodplain/County\\_data/Ramsey/Ramsey%20County%20MN%20Final%20FIS/27123CV00A.pdf](http://fox.dnr.state.mn.us/pub/waters/floodplain/County_data/Ramsey/Ramsey%20County%20MN%20Final%20FIS/27123CV00A.pdf). Accessed August 2018.

### 5.3.3. Environmental Consequences

#### 5.3.3.1. Operating Phase (Long-Term) Impacts

The analysis categorized floodplains along the Project corridor as RWMWD-regulated, FEMA-regulated or both. RWMWD has its own 100-year floodplain elevations that may differ from FEMA's floodplain elevations. RWMWD may have floodplains modeled for waterbodies that FEMA has not considered to be floodplains or floodways, and FEMA may have floodplains modeled for waterbodies that RWMWD has not considered to be floodplains or floodways. The Council considered both FEMA- and RWMWD-regulated floodplains when analyzing potential impacts from the Project.

#### BUILD ALTERNATIVE 1 (A1-BC-D3)

##### Alignment A1 (Smith Avenue to Mounds Boulevard)

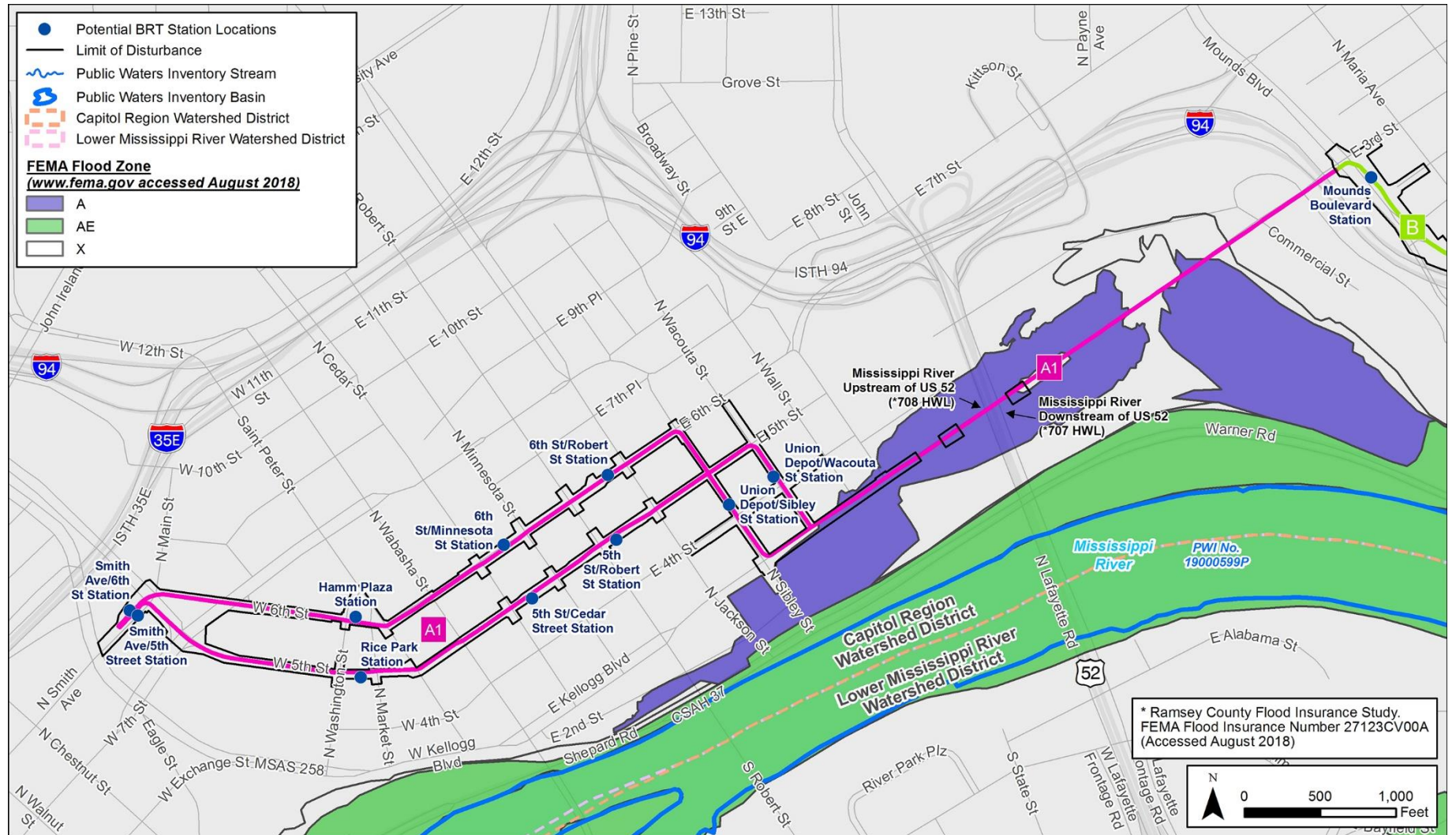
Alignment A1 would not produce long-term impacts to 100-year floodplains. This alignment includes potential limits of disturbance in downtown Saint Paul that would extend into the Mississippi River floodplain; however, the Council would construct this alternative in an already-developed area that would not impact the floodplain with additional fill. The remaining floodplains and floodways along Alignments A1 are located outside of the potential limits of disturbance and would not be impacted.

**Figure 5.3-1** shows the floodplains located within the limits of disturbance for Alignment A1.





**FIGURE 5.3-1: ALIGNMENT A1 FLOODPLAIN RESOURCES AND IMPACTS**





### Alignment B (Mounds Boulevard to White Bear Avenue)

Alignment B does not include floodplains or floodways within the potential limits of disturbance; therefore, this alignment would not produce long-term impacts to 100-year floodplains or floodways (see **Figure 5.3-2** and **Figure 5.3-3**).

### Alignment C (White Bear Avenue to I-694)

The following five floodplains are located within the limits of disturbance for Alignment C (see **Figure 5.3-4**):

- **Tanners Lake** (FEMA, RWMWD): This alignment would place approximately 400 cubic yards of fill in the Tanners Lake floodplain.
- **Battle Creek Lake** (FEMA, RWMWD): Based on the elevation of the floodplain (961.0 feet) and proposed alignment elevation (970 feet), the Council does not anticipate impacts from the Project. The alignment elevation is approximately 9 feet above the 100-year floodplain elevation.
- **BC-63S** (RWMWD): Based on the proposed guideway's location in relation to the waterbody, the Council does not anticipate impacts from the Project.
- **BC-62** (FEMA, RWMWD): Based on the proposed guideway's location in relation to the waterbody, the Council does not anticipate impacts from the Project.
- **BC-75A** (RWMWD): Based on the proposed guideway's location in relation to the waterbody, the Council does not anticipate impacts from the Project.

Neither the Hazel Street Station Option nor the Dedicated Guideway Option at Hadley Avenue and 4th Street would produce long-term impacts to 100-year floodplains or floodways.

### Alignment D3 (I-694 to Woodbury Theatre Park-and-Ride)

The following 13 floodplains are located within the potential limits of disturbance for Alignment D3:

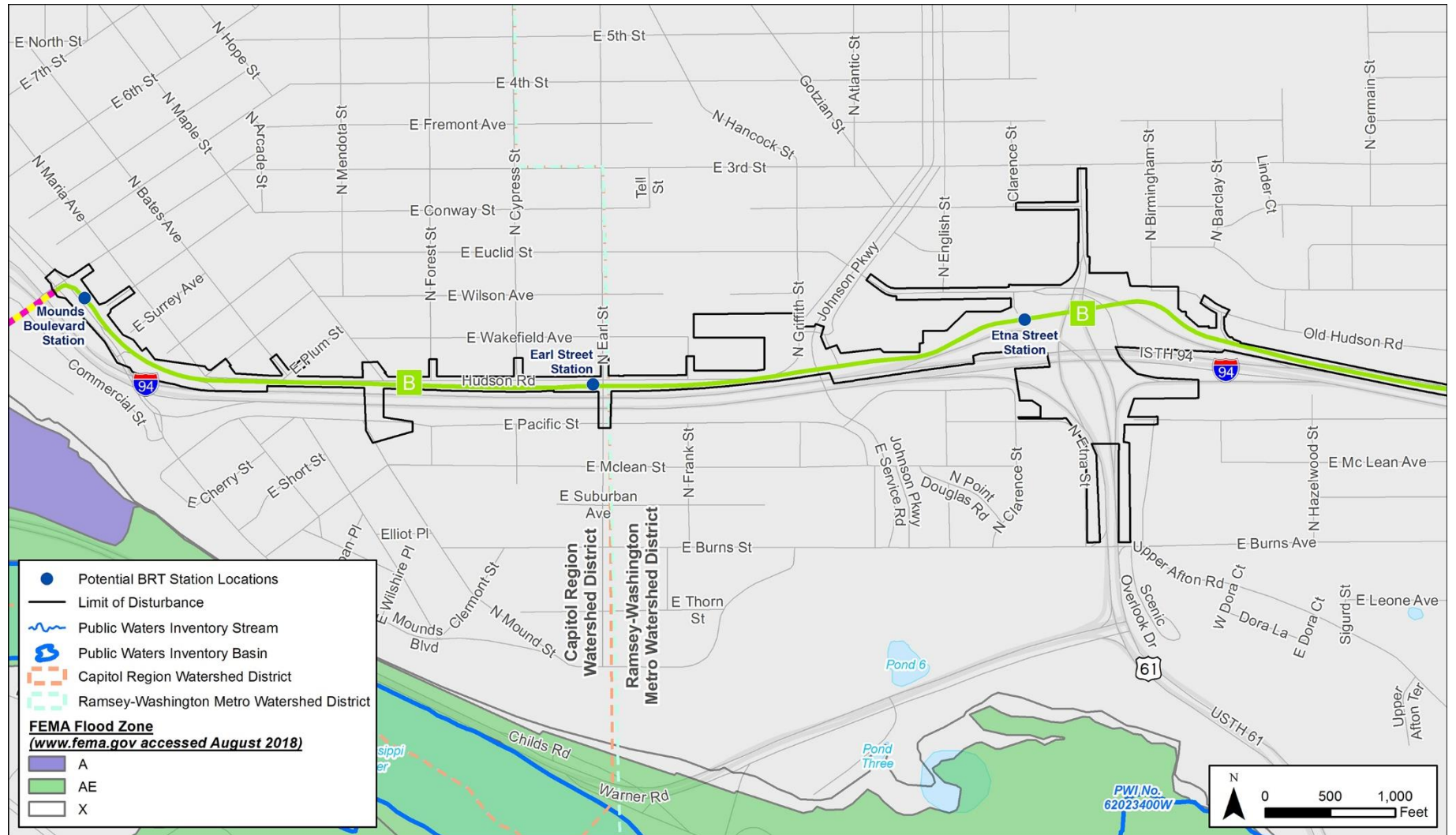
- **BC-57X** (FEMA, RWMWD) (see **Figure 5.3-5**): Two floodplains are labeled "BC-57X" – one with an unknown floodplain elevation and one with an RWMWD ID. Alignment D3 would place approximately 622 cubic yards of fill in the floodplain of waterbody BC-57X, which has a known floodplain elevation. Based on the proposed guideway's location in relation to the other waterbody, the Council does not anticipate impacts from the Project to the BC-57X waterbody that has an unknown elevation.
- **BC-52** (FEMA, RWMWD) (see **Figure 5.3-5**): Based on the elevation of the floodplain (1014.2 feet) and grading tie-in elevation (1017.0 feet), the Council does not anticipate impacts from the Project. The grading tie-in elevation is approximately 2.8 feet above the floodplain elevation.
- **BC-53** (FEMA, RWMWD) (see **Figure 5.3-5**): There are three floodplains labeled BC-53 (two with unknown floodplain elevations and one with an identified floodplain by RWMWD). Approximately 3,820 cubic yards of fill in the floodplain of waterbody BC-53 that has a known floodplain elevation. Based on the proposed guideway's location in relation to the other two waterbodies, the Council does not anticipate impacts from the Project to the BC-53 waterbodies that have unknown floodplain elevations.
- **BC-31** (RWMWD) (see **Figure 5.3-5**): Based on the bridge abutment's location in relation to the waterbody floodplain elevation (1010.3 feet), the Council does not anticipate impacts from the Project.
- **BC-29** (RWMWD) (see **Figure 5.3-5**): Based on the elevation of the 100-year floodplain (1015.2 feet) and grading tie-in elevation (1025.0 feet), the Council does not anticipate impacts from the Project. The grading tie-in elevation is approximately 9.8 feet above the floodplain elevation.



- **BC-25X** (RWMWD) (see **Figure 5.3-6**): The floodplain elevation is unknown for this waterbody. Based on the grading tie-in elevation (1017.0 feet), there are anticipated impacts; however, impacts cannot be determined until detailed modeling of the basin occurs during the Engineering phase of the Project.
- **BC-25** (RWMWD) (see **Figure 5.3-6**): This waterbody's floodplain elevation is unknown. Based on the grading tie-in elevation (1022.0 feet), the Council anticipates impacts from the Project; however, the extent of the impacts cannot be determined until detailed modeling of the basin occurs during the Engineering phase of the Project.
- **BC-26** (FEMA, RWMWD) (see **Figure 5.3-6**): This waterbody's floodplain elevation is unknown. Based on the proposed guideway's location in relation to the other waterbody, the Council does not anticipate impacts from the Project.
- **BC-17X** (RWMWD) (see **Figure 5.3-6**): Lane striping is the only proposed work in this area. The Council does not anticipate impacts from the Project.
- **BC-17** (RWMW) (see **Figure 5.3-6**): Lane striping is the only proposed work in this area. The Council does not anticipate impacts from the Project.
- **BC-21** (RWMWD) (see **Figure 5.3-6**): The Council does not anticipate impacts from the Project.
- **BC-22** and **BC-23** (RWMWD) (see **Figure 5.3-6**): The Council does not anticipate impacts from the Project.



FIGURE 5.3-2: ALIGNMENT B FLOODPLAIN RESOURCES AND IMPACTS





**FIGURE 5.3-3: ALIGNMENTS B AND C FLOODPLAIN RESOURCES AND IMPACTS**

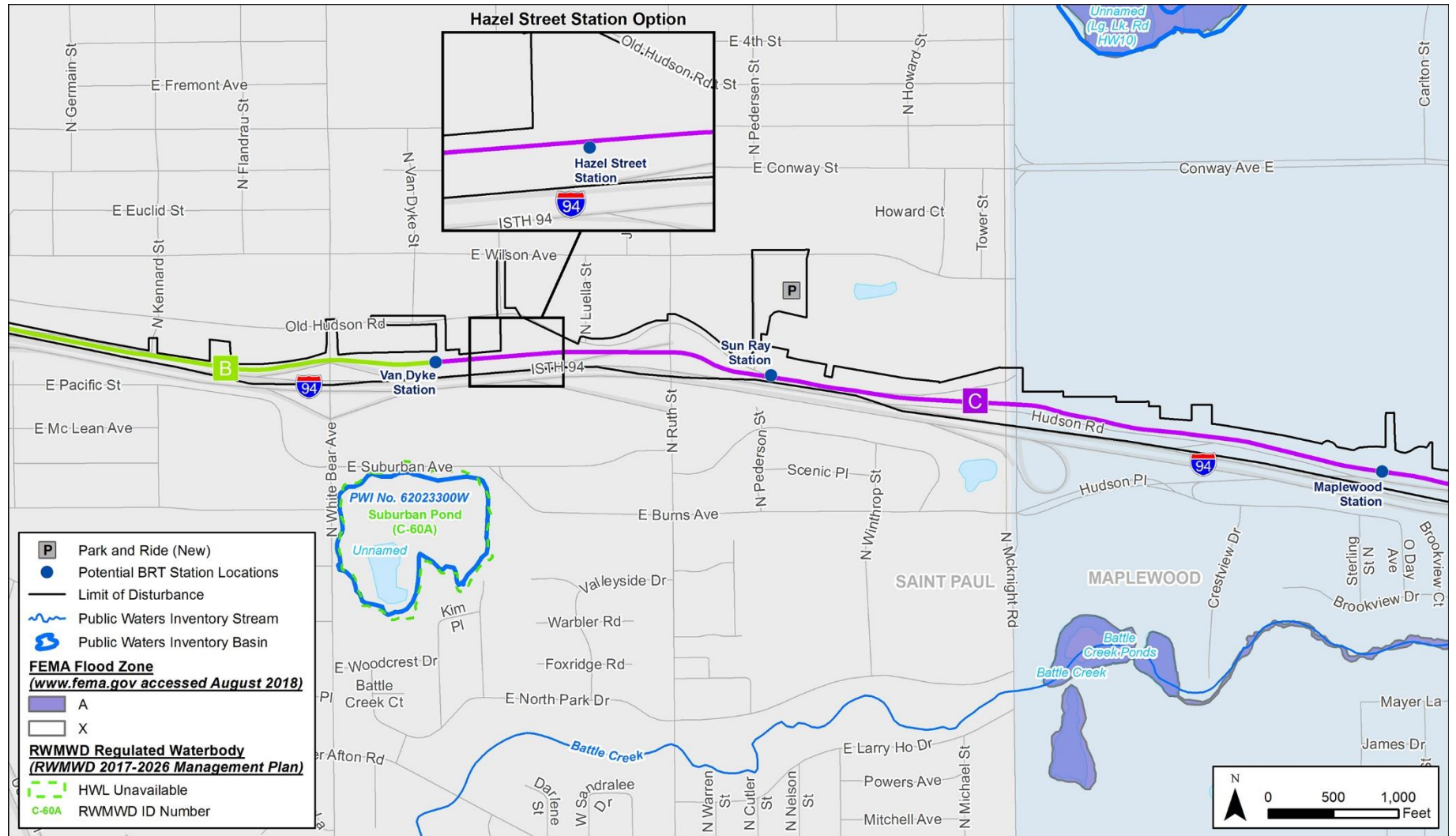




FIGURE 5.3-4: ALIGNMENT C FLOODPLAIN RESOURCES AND IMPACTS

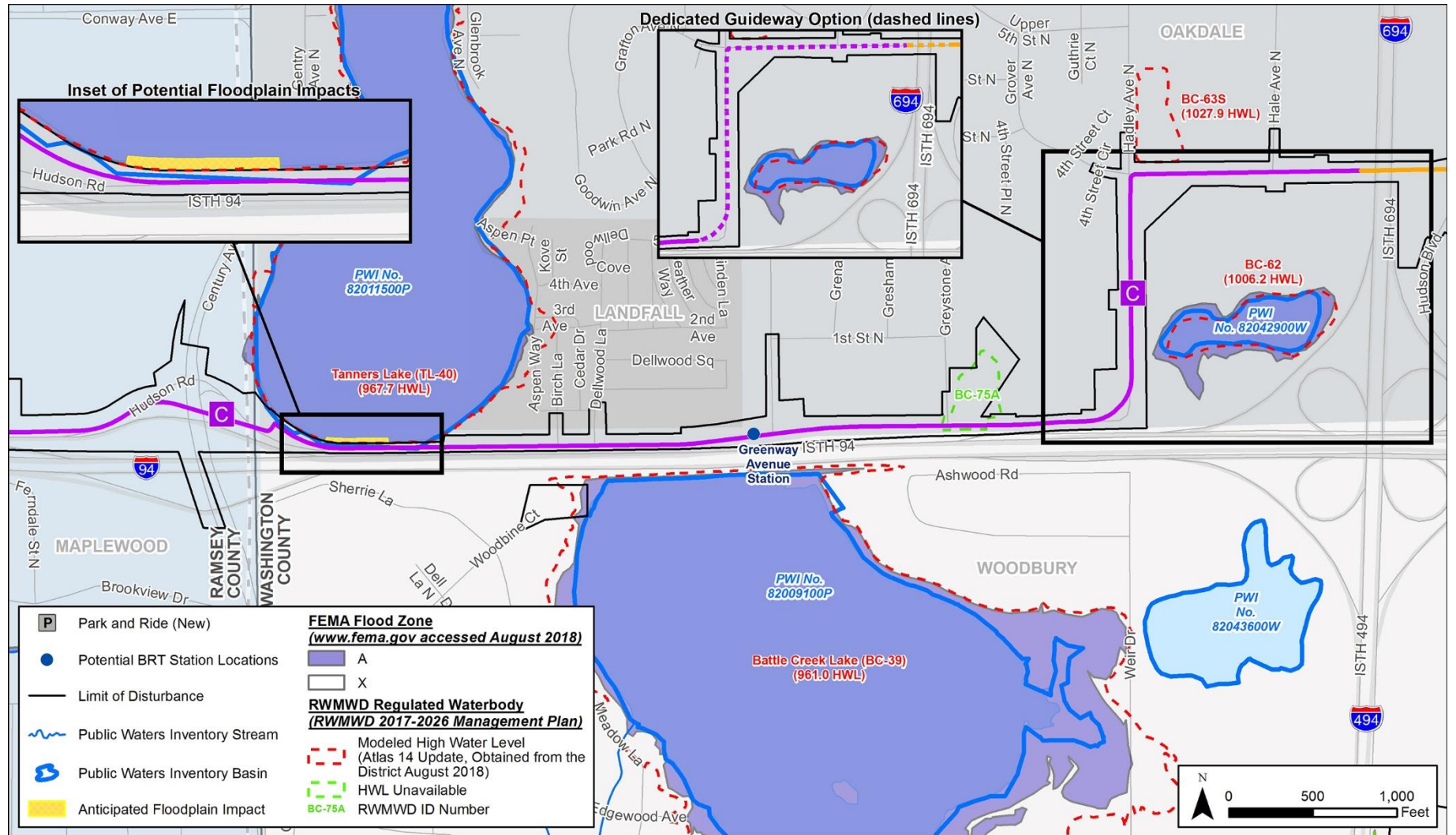




FIGURE 5.3-5: ALIGNMENT D3 FLOODPLAIN RESOURCES AND IMPACTS

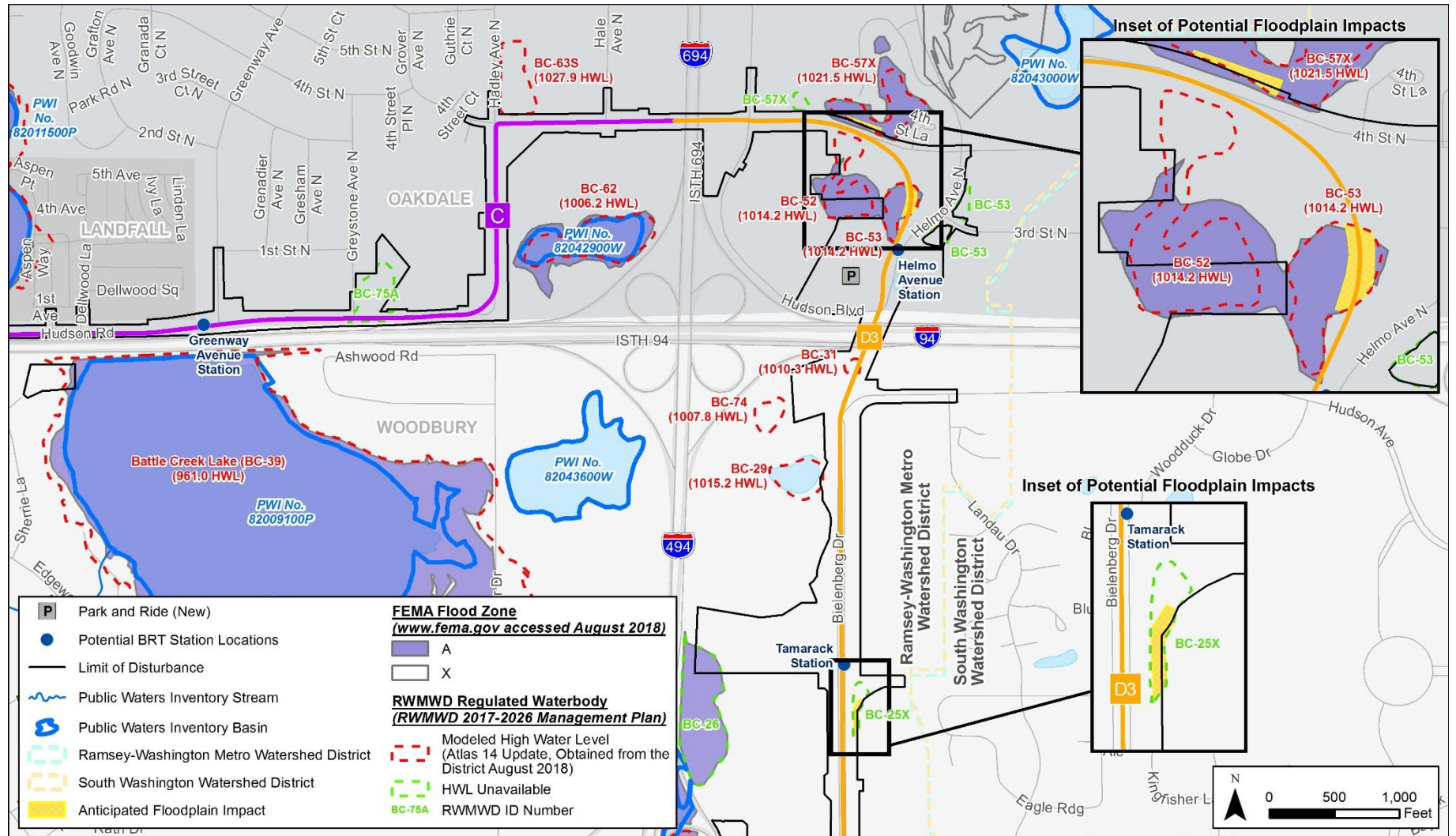
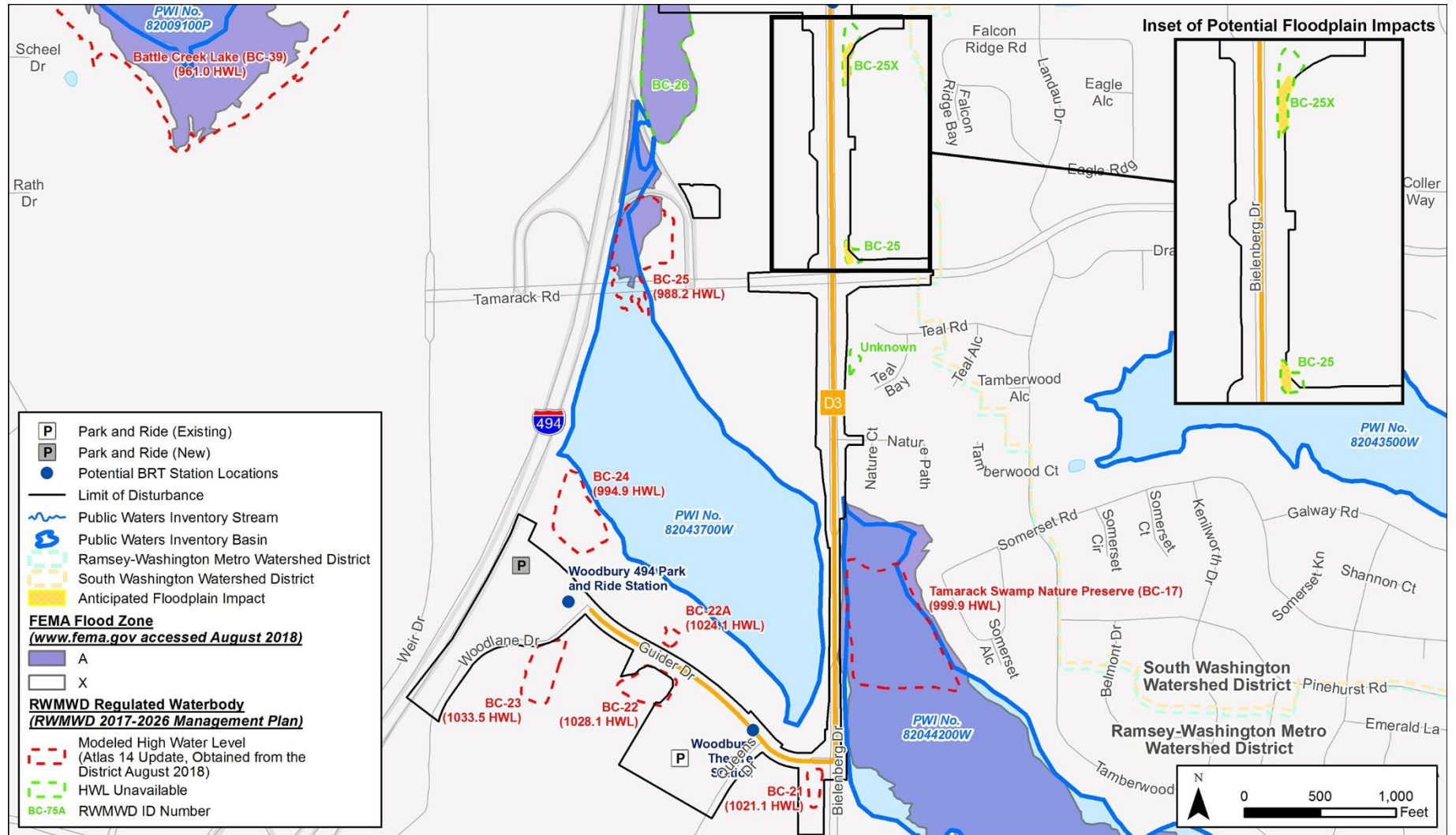




FIGURE 5.3-6: ALIGNMENT D3 FLOODPLAIN RESOURCES AND IMPACTS







### BUILD ALTERNATIVE 2 (A2-BC-D3)

Build Alternative 2 would produce the same impacts to 100-year floodplains and floodways as Build Alternative 1. **Figure 5.3-7** shows the floodplains located within the potential limits of disturbance for Alignment A1.

### SUMMARY OF IMPACTS

**Table 5.3-2** summarizes the potential Project impacts to 100-year floodplains and floodways by alignment. Alignments C would potentially impact one floodplain and Alignment D3 potentially four – two of which the FTA and Council cannot estimate the anticipated volume of impact. The Council does not anticipate the Project would produce impacts to floodplains and floodways outside of the potential limits of disturbance.

**TABLE 5.3-2: SUMMARY OF FLOODPLAIN IMPACTS BY ALIGNMENT**

Alignment	Total Floodplain Impact (Cubic Yards of Fill)
Alignments A1 and A2	0
Alignment B	0
Alignment C	400
<i>With Hazel Street Station Option</i>	400
<i>With Dedicated Guideway Option at Hadley Avenue and 4th Street</i>	400
Alignment D3 <sup>a</sup>	4,442

<sup>a</sup> The Council anticipates impacts to floodplains BC-25 and BC-25X and will confirm these impacts after completing modeling work.

Either Build Alternative would produce a total potential floodplain impact of a minimum of 4,842 cubic yards of fill with additional impacts possible for two locations at which the floodplain elevations are unknown. The Council will further evaluate possible avoidance of these impacts as Project design advances during the Project Development and Engineering phases. The Council does not anticipate Project impacts to floodways.

The Hazel Street Station Option and the Dedicated Guideway Option at Hadley Avenue and 4th Street would produce the same impacts to 100-year floodplains or floodways as the Van Dyke Street Station and mixed traffic in this section of Alignment C.

### 5.3.3.2. Construction Phase (Short-Term) Impacts

#### BUILD ALTERNATIVE 1 (A1-BC-D3)

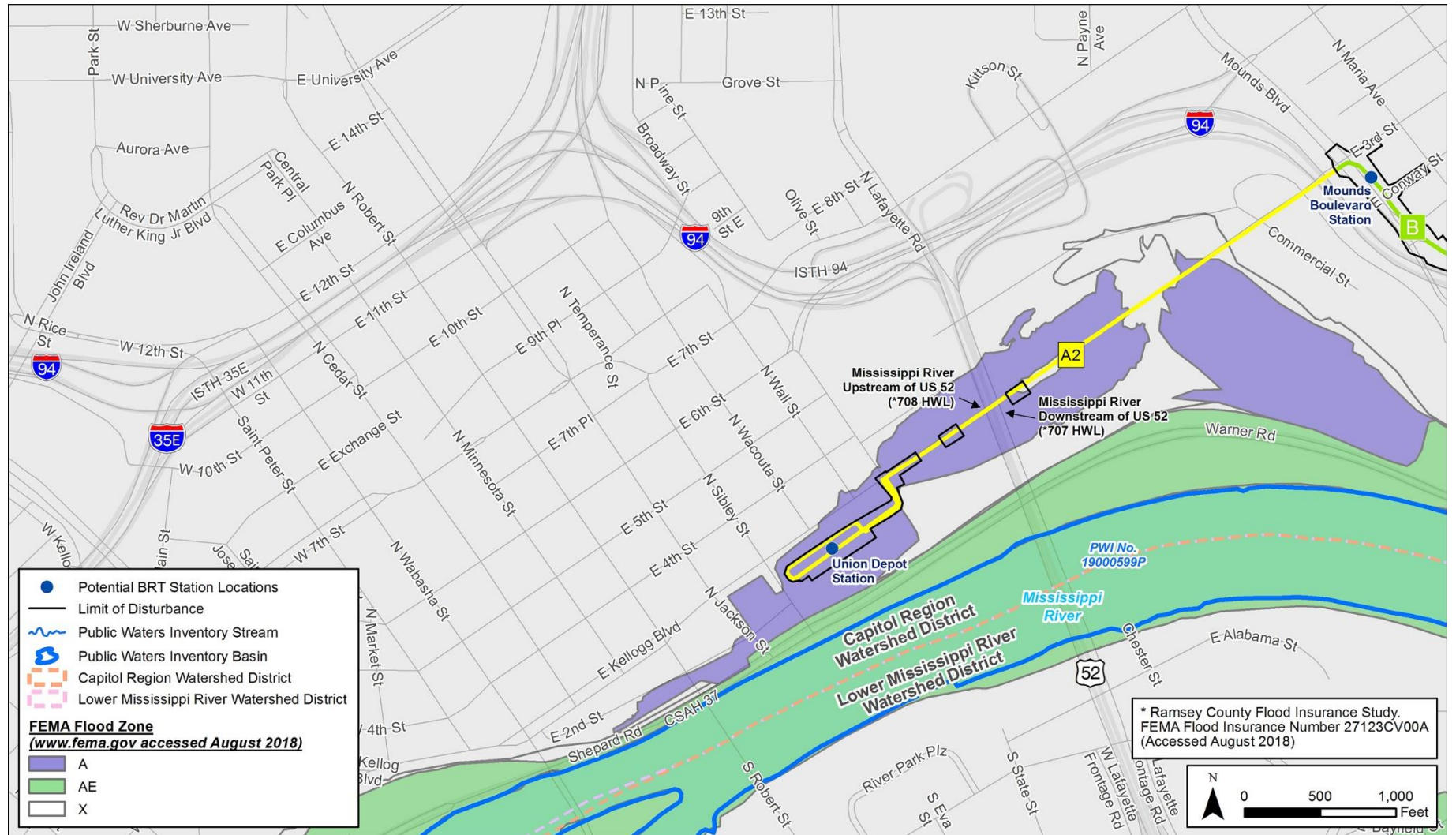
Build Alternative 1 would not produce short-term impacts to 100-year floodplains or floodways.

#### BUILD ALTERNATIVE 2 (A2-BC-D3)

Build Alternative 2, and Alignment A2, would not produce short-term impacts to 100-year floodplains or floodways.



**FIGURE 5.3-7: ALIGNMENT A2 FLOODPLAIN RESOURCES AND IMPACTS**





### 5.3.4. Avoidance, Minimization and/or Mitigation Measures

Avoidance, minimization and mitigation measures apply to both Build Alternative 1 and Build Alternative 2. The Council would coordinate floodplain mitigation for the impacted area within Alignments C and D3 with RWMWD, which requires compensatory mitigation ratio of 1:1 replacement as the storage loss within the same floodplain. The Council will coordinate with RWMWD to identify during the Engineering phase the specific areas that require floodplain mitigation.

In areas for which RWMWD's model does not specify the 100-year high-water level, the district would review the Council's existing conditions model for the Project, which the Council would provide as part of its permit application. If the Council proposes to replace the fill lost due to Project implementation, RWMWD and the Council would review the compensatory storage for each area to avoid a net increase in impacts and/or the potential for flooding outside of the Project corridor.

## 5.4. Surface Water

This section evaluates Project-related impacts to surface waters including wetlands, waterbodies and waterways.

Information provided in the *Level 2 Wetland Delineation Report*<sup>33</sup> supplements this section. **Section 5.3** separately addresses floodplains, and **Section 5.4** addresses stormwater and water quality.

### 5.4.1. Regulatory Context and Methodology

#### 5.4.1.1. Regulatory Context

Wetlands are areas that are covered by water or have waterlogged soils for long periods during the growing season. Plants growing in wetlands can live in saturated soil conditions for at least part of the growing season. Wetlands such as swamps and marshes are often obvious, but some wetlands remain dry part of the year and therefore cannot be easily recognized.

Local, state and federal legislation protect wetlands because of their ecological and functional value. The Clean Water Act<sup>34</sup> establishes regulations related to discharging pollutants into the Waters of the United States and for regulating quality standards for surface waters. The U.S. Environmental Protection Agency (EPA) oversees states' implementation of these regulations, reviews permit applications and provides comments to the agency with jurisdiction.

Section 404 of the Clean Water Act establishes a permitting program to regulate the discharge of dredged or fill material into "Waters of the United States," excluding those wetlands that are hydrologically isolated on the landscape.<sup>35</sup> The U.S. Army Corp of Engineers (USACE) St. Paul District administers the program, and it requires

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<sup>33</sup> WSB & Associates Inc. Level 2 Wetland Delineation Report. September 19, 2018. Available at: <https://www.metrotransit.org/gold-line-documents>. Accessed October 2018.

<sup>34</sup> "Navigation and Navigable Waters," Title 33, USC, Sec. 1344, Subsection 404, et seq. Available at: <http://uscode.house.gov/view.xhtml?req=granuleid:USC-prelim-title33-section1344&num=0&edition=prelim>. Accessed October 2018.

<sup>35</sup> Rapanos v. United States, 547 U.S. 715 (2006). Available at: <https://supreme.justia.com/cases/federal/us/547/715/>. Accessed October 2018.



projects have a permit before placing dredged or fill material into any Water of the United States, including wetlands. The USACE is responsible for administering the Section 404 permitting program (including individual, general and nationwide permit decisions), conducting approved or preliminary jurisdictional determinations, developing policy and guidance, and enforcing all other Section 404 provisions.

The USACE bases permit requirements for transportation projects on impacts to wetlands from “single and complete projects”, which USACE defines as “*that portion of the overall linear project proposed or accomplished by one owner/developer or partnership or other association of owners/developers that includes all crossings of a single water of the US (i.e., a single waterbody) at a specific location. For linear projects crossing a single waterbody, or multiple waterbodies several times at separate and distant locations, each crossing is considered a single and complete project for purposes of this general permit authorization.*”<sup>36</sup> Linear projects include transportation facilities such as roads, highways, attached frontage roads, railways, trails, airport taxiways, and runways. Linear transportation projects qualify for coverage by the Transportation Regional General permit if they meet one of the following requirements:

- Each single and complete project would not cause the permanent loss of more than 1 acre of Waters of the United States as defined by the Clean Water Act
- The overall project (including all single and complete projects) would result in the permanent loss of 3 acres or less of Waters of the United States, in which case, the 1-acre threshold for each single and complete project would not apply.

Non-linear transportation projects may also be covered by the Transportation Regional General Permit. Non-linear transportation projects include facilities such as stormwater management facilities, vehicle maintenance or storage buildings, weigh stations, rest-stops, parking lots, train stations, aircraft hangars, and associated infrastructure. To qualify for coverage by the Transportation Regional General permit, non-linear transportation projects must meet one of the following requirements:

- Regulated activities will not cause the loss of more than 0.5 acre of Waters of the United States as defined by the Clean Water Act
- The discharge will not cause the loss of more than 300 linear feet of a tributary

Linear projects that would produce permanent impacts that exceed 3 acres, or projects with non-linear components that exceed 0.5 acre, and do not qualify for the Transportation General Permit require a Letter of Permission. Impacts of more than 5 acres require an Individual Permit and public comment period.

The FTA, as the lead federal transportation agency, implements Executive Order 11990<sup>37</sup> via U.S. Department of Transportation Order 5660.1A. Together, these orders establish a national policy to “avoid to the extent possible the long- and short-term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practical alternative.”

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<sup>36</sup> U.S. Army Corps of Engineers. “Single and complete linear project” definition. February 2018. Available at [http://www.mvp.usace.army.mil/Portals/57/docs/regulatory/RGP/Transportation\\_RGP.pdf?ver=2018-02-22-093530-183](http://www.mvp.usace.army.mil/Portals/57/docs/regulatory/RGP/Transportation_RGP.pdf?ver=2018-02-22-093530-183). Accessed October 2018.

<sup>37</sup> Executive Order 11990, “Protection of wetlands”, Title 3, CFR, p. 121, as amended, 1977 Available at: <https://www.archives.gov/federal-register/codification/executive-order/11990.html>. Accessed October 2018.



The DNR regulates lakes, rivers, streams and wetlands if the State has identified them as public waters or public waters wetlands.<sup>38</sup> Projects that would change the course, current, or cross-section of public waters or public waters wetlands require a permit from the DNR.

The Minnesota Board of Water and Soil Resources and Local Government Units (LGUs) administer the Minnesota Wetland Conservation Act (WCA) of 1991. The City of Saint Paul, the RWMWD and MnDOT are LGUs that regulate wetlands for the WCA, which established a no net loss for wetlands,<sup>39</sup> requiring that anyone proposing to drain or fill a wetland must try to avoid disturbing the wetland; to minimize to the extent possible unavoidable impacts; and to replace impacted areas “in kind,” with comparable function and value.

The USACE, DNR, MnDOT, RWMWD and the City of Saint Paul require permitting for impacts to wetlands. The required permits vary depending on the feature, size of wetland, location of wetland, and other factors. Projects might also require other permits related to stormwater management, erosion control or stream crossings in combination with the permit related to surface waters.

#### 5.4.1.2. Methodology

Surface water includes all wetlands, waterbodies (lakes and ponds) and waterways (streams, rivers, public ditches and drainage ways).

The initial resource study area included the area roughly ¼-mile around the potential limits of disturbance for the Build Alternatives. Impacts to wetlands include disturbance, placement of fill, or excavation within the wetland boundary that results in the loss of its function. The Council conducted its Level 2 wetland delineation within the Project’s potential limits of disturbance, including all areas that could potentially support stormwater management facilities, based on the 15% Concept Plans for the Build Alternatives (see **Appendix B**). Stormwater management facilities were more broadly identified in the 15% Concept Plans to allow for flexibility as design advances.

Boundaries that were approved by the regulatory agencies are denoted as such on figures in Section 5.4.3. Some boundaries were delineated but ultimately not approved because they were determined to be outside of the limits of disturbance. These unapproved boundaries are also identified on the surface water figures. If the potential limits of disturbance change to include these areas, boundaries will be reviewed and approved by the regulatory agencies. Impact areas will continue to be refined and reduced as design advances during Project Development and Engineering phases. Final wetland impacts will be reported in the permit applications submitted to the regulatory agencies and are expected to fit within the linear and non-linear project thresholds for a Transportation Regional General Permit.

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<sup>38</sup> *Public waters and public waters wetlands include all water basins and water courses that meet the criteria set forth in 1) Minnesota Statutes Section 103G.005, Subdivision 15 (“Definitions,” Chap. 103G., Minnesota Statutes, Sec. 103G.005. 2018. Available at: <https://www.revisor.mn.gov/statutes/cite/103G.005>. Accessed October 2018) and 2) are identified on Public Waters Inventory maps (“Public Waters Inventory,” Chap 103G, Minnesota Statutes, Sec. 103G.201. Available at: <https://www.revisor.mn.gov/statutes/cite/103G.201>. Accessed October 2018).*

<sup>39</sup> *“Wetland Conservation,” Chap. 8420, Minnesota Rules, 1994. Available at: <https://www.revisor.mn.gov/rules/8420/full>. Accessed November 2018.*



The Council conducted its Level 2 delineation according to routine methodology described in the *Corps of Engineers Wetlands Delineation Manual*<sup>40</sup> and regional supplement.<sup>41</sup> The Level 2 delineation categorized wetlands by Circular 39 type<sup>42</sup> and federal<sup>43</sup> and state classifications,<sup>44</sup> and it calculated impacts in total acreages (or linear feet for waterways) using the most current digital data available.

To identify the surface waters in the resource study area, the Council used the National Wetland Inventory (NWI), which the DNR updated in 2016; the DNR Public Waters Inventory maps; the U.S. Geological Survey (USGS) National Hydrography Dataset,<sup>45</sup> and DNR field reviews. The analysis augmented the NWI data based on the following information:

- 2015 aerial photography interpretation
- Soil Survey of Washington and Ramsey Counties<sup>46</sup>
- Two-foot light-detection and ranging – referred to as “LiDAR” – contour data
- Field reviews from July 29, 2015, and Aug. 1, 2016

In addition, the analysis used data from a 2015 Level 2 delineation Washington County conducted for another project to identify an undeveloped parcel southwest of the Tamarack Road/Bielenberg Drive intersection to verify whether surface water was present in the area.

The analysis investigated three criteria – soil, hydrology and vegetation – at each sample point to determine the presence and extent of surface waters. A minimum of one transect consisting of a sample point within both the upland and wetland was performed at each wetland, unless otherwise noted on the data sheet. The USACE requested jurisdictional determinations for those wetlands that did not appear to be Waters of the United States as defined by the Clean Water Act.

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<sup>40</sup> U.S. Army Corps of Engineers. *Corps of Engineers Wetlands Delineation Manual*. 1987. Available at: <https://www.mvp.usace.army.mil/Portals/57/docs/regulatory/RegulatoryDocs/1987%20Manual.pdf>. Accessed December 2018.

<sup>41</sup> U.S. Army Corps of Engineers. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region*. January 2012. Available at: <https://www.nae.usace.army.mil/Portals/74/docs/regulatory/JurisdictionalLimits/RegionalSupplement2012.pdf>. Accessed December 2018.

<sup>42</sup> Shaw and Fredine. *Circular 39 wetland types*. 1956. Available at: <https://ia801901.us.archive.org/8/items/wetlandsofunited00shaw/wetlandsofunited00shaw.pdf>. Accessed October 2018.

<sup>43</sup> U.S. Department of the Interior. *US Department of the Interior Classification of Wetlands and Deepwater Habitats of the United States*. December 1979. Available at <https://www.fws.gov/wetlands/documents/Classification-of-Wetlands-and-Deepwater-Habitats-of-the-United-States.pdf>. Accessed October 2018.

<sup>44</sup> Eggers, Steve and Reed, Donald. July 2015. *Wetland Plants and Plant Communities of Minnesota and Wisconsin*. USACE St. Paul District. Available at: <https://usace.contentdm.oclc.org/digital/collection/p266001coll1/id/2845>. Accessed October 2018.

<sup>45</sup> U.S. Geological Survey. “National Hydrography Dataset”. Available at: [https://www.usgs.gov/core-science-systems/ngp/national-hydrography/national-hydrography-dataset?qt-science\\_support\\_page\\_related\\_con=0#qt-science\\_support\\_page\\_related\\_con](https://www.usgs.gov/core-science-systems/ngp/national-hydrography/national-hydrography-dataset?qt-science_support_page_related_con=0#qt-science_support_page_related_con). Accessed 2016.

<sup>46</sup> Natural Resources Conservation Service. “Web Soil Survey”. Available at: <https://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>. Accessed 2016.



## 5.4.2. Affected Environment

Urban and suburban residential, commercial and mixed use development categories comprise the land use within the resource study area. The *Level 2 Wetland Delineation Report* provides a list of surface waters within the resource study area.

## 5.4.3. Environmental Consequences

### 5.4.3.1. Operating Phase (Long-Term) Impacts

The analysis found that the Build Alternatives would produce approximately 2.60 acres of long-term impacts to wetlands, 0.002 acre of impact at Tanners Lake, 0.03 acre of impact to wet ditches, and 0.02 acre of impact to non-DNR tributaries. According to RWMWD classifications,<sup>47</sup> the Project would not impact any “high-quality” surface waters. **Table 5.4-1** summarizes by Build Alternative the Project-related long-term impacts to surface waters.<sup>48</sup>

**TABLE 5.4-1: LONG-TERM IMPACTS TO SURFACE WATERS BY ALTERNATIVE**

Alternative	Total Impacts (Acres)
Build Alternative 1 (A1-BC-D3)	2.652
Build Alternative 2 (A2-BC-D3)	2.652
<i>Hazel Street Station Option</i>	2.652
<i>Dedicated Guideway Option at Hadley Avenue and 4th Street</i>	2.652

## BUILD ALTERNATIVE 1 (A1-BC-D3)

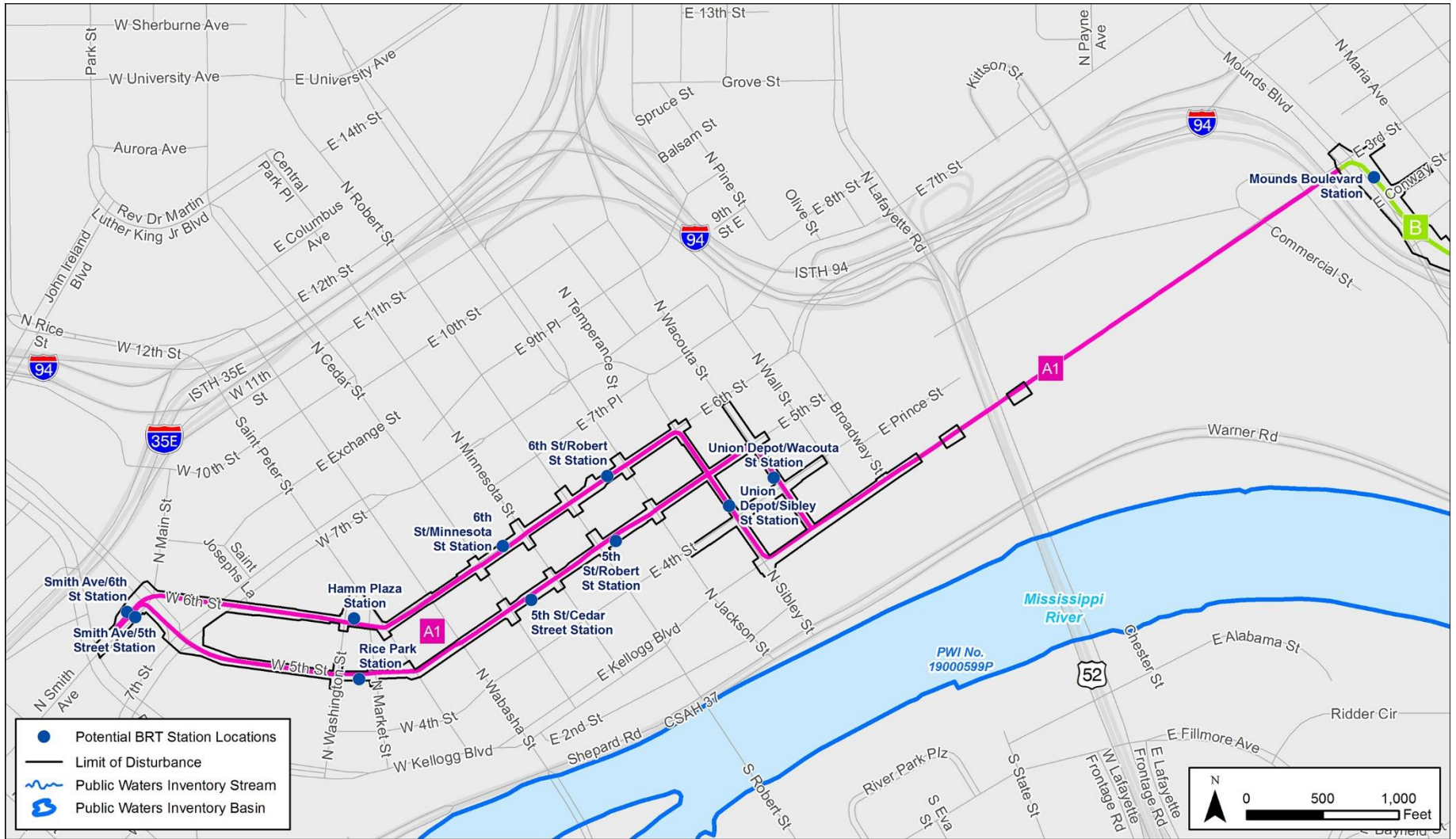
### Alignment A1 (Smith Avenue to Mounds Boulevard)

The analysis did not identify surface waters within the potential limits of disturbance for Alignment A1; therefore, the Council does not anticipate this alignment would produce long-term impacts to surface water. **Figure 5.4-1** shows the location of Alignment A1.

<sup>47</sup> Wetland management classifications are from Ramsey-Washington Metro Watershed District Watershed Management Plan (2007), Figure I.A-7. Available at: <https://www.rwmwd.org/wp-content/uploads/RWMWD-Management-Plan.pdf>. Accessed October 2018.

<sup>48</sup> Impacts related to non-linear facilities (stormwater and park-and-ride facilities) are expected to be reduced as design is advanced and more analysis completed for anticipated stormwater needs for the Project. Based on these reductions, anticipated cumulative impacts for non-linear are expected to be less than 0.5 acre and fall under the Transportation Regional General Permit.

FIGURE 5.4-1: ALIGNMENT A1 SURFACE WATER RESOURCES AND IMPACTS







### Alignment B (Mounds Boulevard to White Bear Avenue)

The analysis identified one stormwater pond, Pond 136-1, within the potential limits of disturbance for Alignment B. No impacts are expected to the stormwater pond; therefore, the Council does not anticipate the alignment would produce long-term impacts to surface water.

Figure 5.4-2 and Figure 5.4-3 show the location of Alignment B.

### Alignment C (White Bear Avenue to I-694)

The analysis found that the Project would produce impacts to two of the eleven surface waters within the potential limits of disturbance for Alignment C (see Table 5.4-2): Tanners Lake, Wetland 22-1, Wetland 39-1, Wetland 49-2, Pond 140-1, Pond 140-2, Pond 140-3, Pond 140-4, Pond 140-5, Pond 140-6, and Pond 55-1.

**TABLE 5.4-2: ALIGNMENT C WETLAND IMPACTS**

NWI No.	Type <sup>a</sup>	Plant Community <sup>b</sup>	Impact (Acres)	Impact Facility
Tanners Lake	N/A	N/A	0.002	Guideway
Wetland 22-1	1	Seasonally Flooded Basin	0.01	Stormwater
<b>Total</b>			<b>0.012</b>	

<sup>a</sup> Circular 39 wetland types. Shaw and Fredine. 1956. Available at: <https://ia801901.us.archive.org/8/items/wetlandsofunitied00shaw/wetlandsofunitied00shaw.pdf>. Accessed October 2018.

<sup>b</sup> Eggers, Steve and Reed, Donald. July 2015. "Wetland Plants and Plant Communities of Minnesota and Wisconsin." USACE St. Paul District. Available at: <https://usace.contentdm.oclc.org/digital/collection/p266001coll1/id/2845>. Accessed October 2018.

The Project would fill up to 0.01 acre of wetland for stormwater pond construction at Menomini Park in Woodbury.

The potential limits of disturbance for Alignment C overlaps with Tanners Lake,<sup>49</sup> where the Project would impact approximately 0.002 acres of surface water below the Ordinary High Water elevation due to removal of a retaining wall and slope correction.

Within Wetland 22-1, which is the wetland fringe west of Battle Creek Lake,<sup>50</sup> the Project would produce approximately 0.01 acres of impact due to construction of an outlet for a stormwater feature.

Neither the Hazel Street Station Option nor the Dedicated Guideway Option at Hadley Avenue and 4th Street would produce long-term impacts to surface waters other than those noted for Alignment C.

Figure 5.4-3 and Figure 5.4-4 show the wetlands within the potential limits of disturbance for Alignment C.

<sup>49</sup> Minnesota Department of Natural Resources. Public Waters Inventory Map 82-115P. Available at: [https://www.dnr.state.mn.us/waters/watermgmt\\_section/pwi/maps.html](https://www.dnr.state.mn.us/waters/watermgmt_section/pwi/maps.html). Accessed October 2018.

<sup>50</sup> Minnesota Department of Natural Resources. Public Waters Inventory Map 82-91P. Available at: [https://www.dnr.state.mn.us/waters/watermgmt\\_section/pwi/maps.html](https://www.dnr.state.mn.us/waters/watermgmt_section/pwi/maps.html). Accessed October 2018.



FIGURE 5.4-2: ALIGNMENT B SURFACE WATER RESOURCES AND IMPACTS

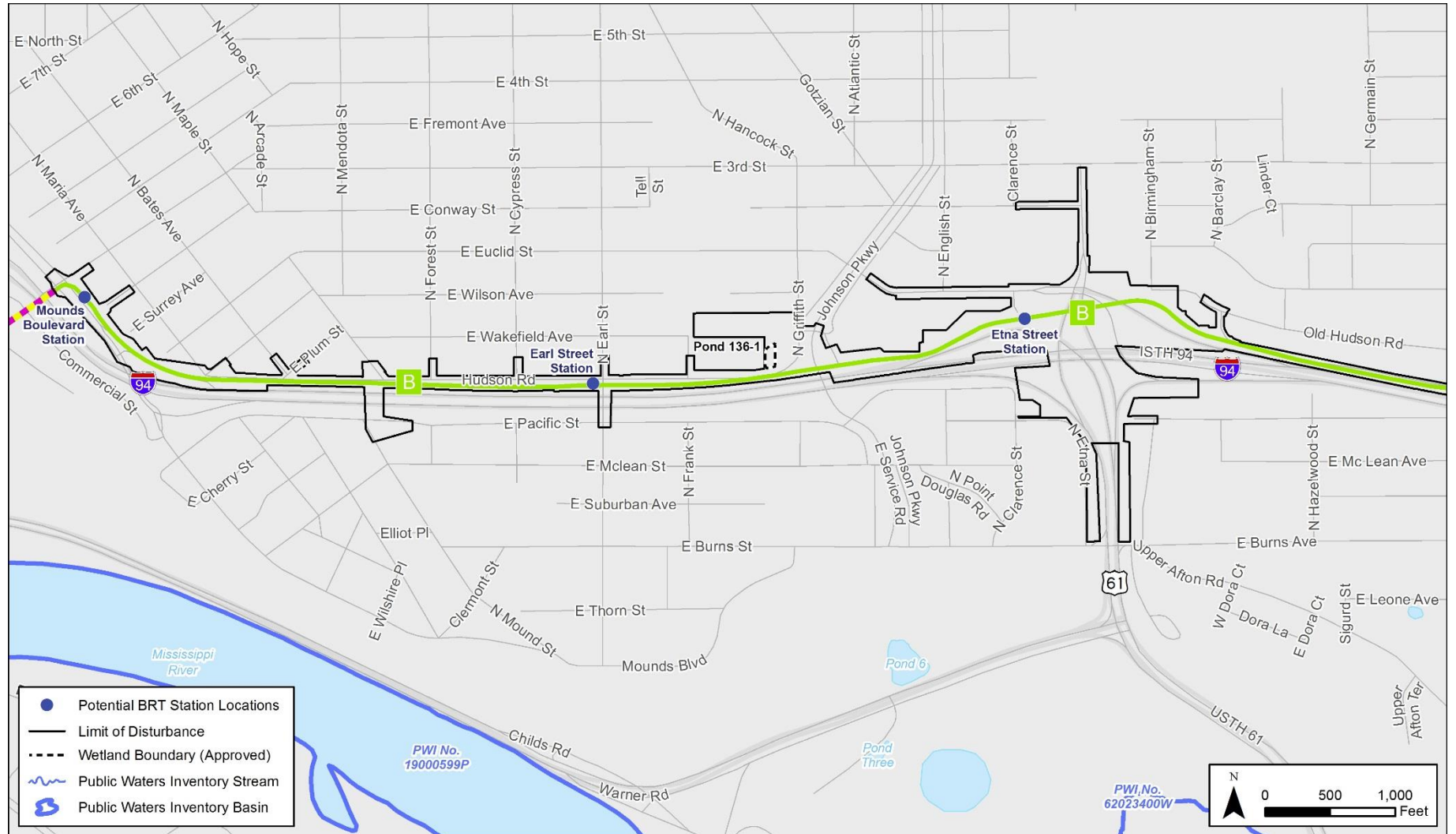


FIGURE 5.4-3: ALIGNMENTS B AND C SURFACE WATER RESOURCES AND IMPACTS

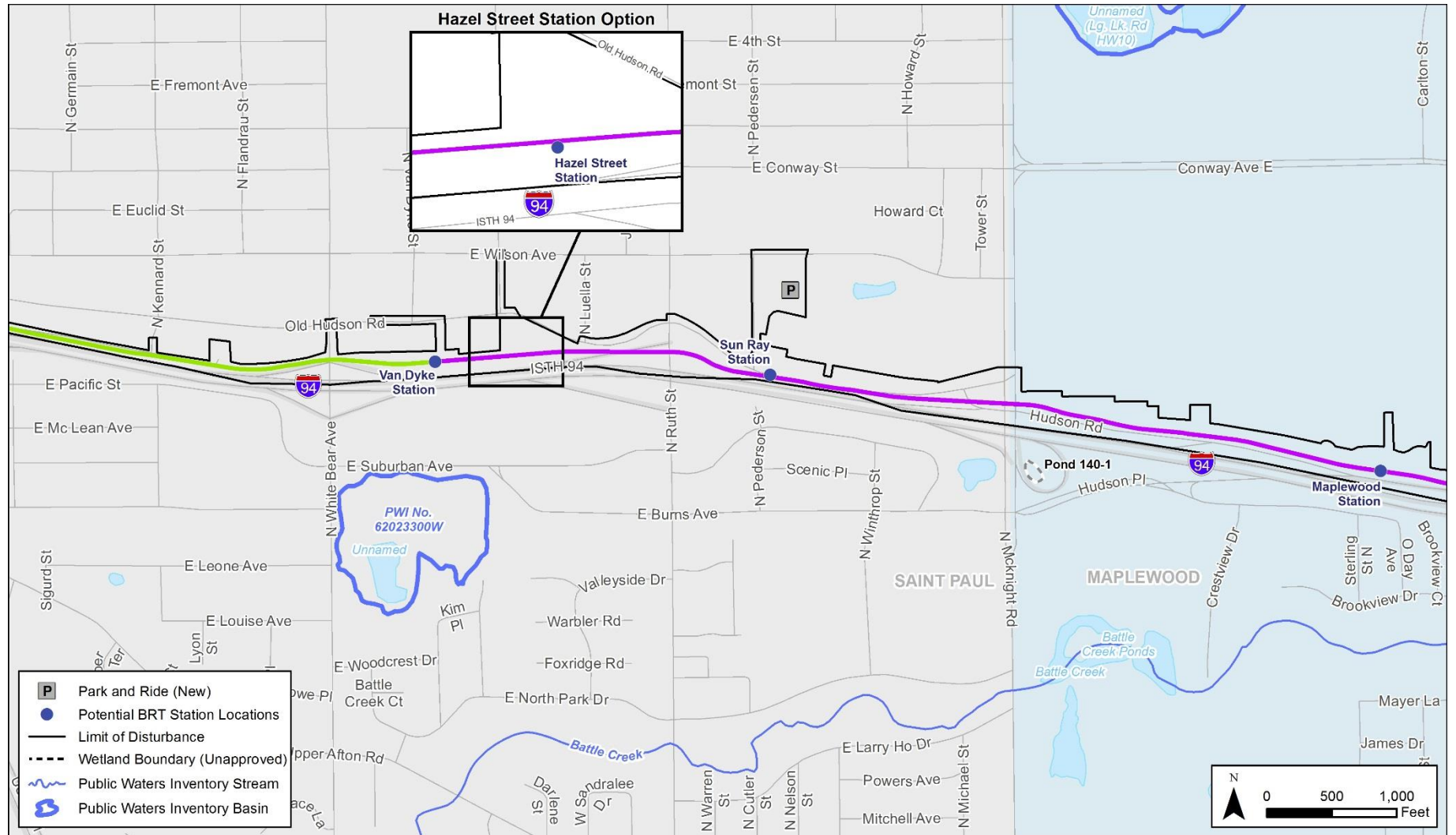
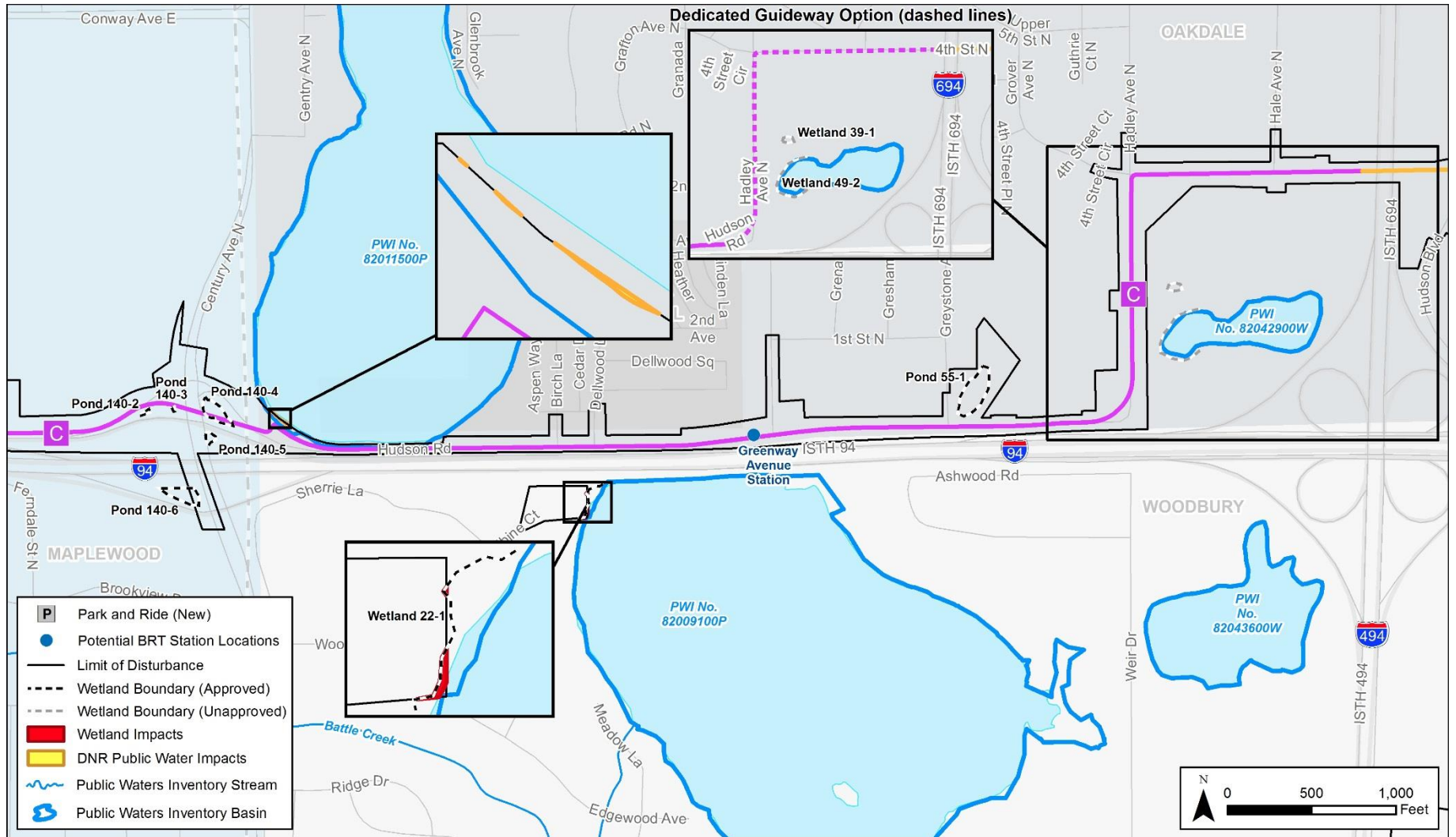




FIGURE 5.4-4: ALIGNMENTS C SURFACE WATER RESOURCES AND IMPACTS





### Alignment D3 (I-694 to Woodbury 494 Park-and-Ride)

Ten wetlands were identified within the potential limits of disturbance for Alignment D3: Wetland 36-1, Wetland 36-2, Wetland 42-1, Wetland 44-1, Wetland 45-1, Wetland 48-1, Wetland 62-1, Wetland 71-1, Wetland 139-1, and Wetland 139-4. The Project would impact a combined total of 2.59 acres at six of these locations -- 1.59 acres for guideway construction, 0.36 for park-and-ride construction, and 0.64 acres for stormwater facilities construction (see **Table 5.4-3**). Impacts related to stormwater facilities are expected to be reduced based on design advancement and analysis that will limit impacts at proposed stormwater facilities. Impact reductions associated with advanced design include best management practice (BMP) outfalls and associated energy dissipation features, such as rip rap. Based on these reductions, anticipated cumulative impacts for non-linear facilities (stormwater and park-and-ride facilities) are expected to be less than 0.5 acre and fall under the Transportation Regional General Permit. Two tributaries were identified within Alignment D3. Neither of the identified tributaries are classified as a DNR public watercourse. One tributary is located between Wetland 36-2 and the downgradient pond and the other is located between Wetland 42-1 and 48-1. Approximately 0.02 acre of impact is expected to the tributary between Wetland 36-2 and the downgradient pond due to park-and-ride construction. Minor impacts to the tributary between Wetland 42-1 and 48-1 may occur as the result of culvert extension.

Two wet ditches were also identified within Alignment D3, located west of Wetland 62-1 and Wetland 42-1, north and south of 4th Street North. These wet ditches will be filled due to guideway construction. Impacts are estimated to be approximately 0.03 acres.

Eleven stormwater ponds were identified within Alignment D3 are: Pond 37-1, Pond 38-1, Pond 56-1, Pond 57-1, Pond 61-1, Pond 70-1, Pond 70-2, Pond 70-3, Pond 114-1, Pond 120-1, and Pond 123-1. Impacts to stormwater ponds are not expected but may occur due to culvert construction or extension for stormwater management. These impacts are expected to be minor and will be finalized as the design progresses.

**Figure 5.4-5** and **Figure 5.4-6** show the locations of the 10 wetlands and 11 stormwater ponds the analysis identified within the potential limits of disturbance for Alignment D3.

**TABLE 5.4-3: ALIGNMENT D3 WETLAND IMPACTS**

Inventory No.	Type <sup>a</sup>	Plant Community <sup>b</sup>	Impact (Acres)	Impact Facility
36-2	3	Shallow Marsh	0.36	Park-and- Ride
42-1	1	Seasonally Flooded Basin	0.14	Guideway
62-1	3	Shallow Marsh	0.16	Guideway
48-1	3,4	Shallow Marsh/Deep Marsh	1.29	Guideway
48-1	3,4	Shallow Marsh/Deep Marsh	0.09 <sup>c</sup>	Stormwater
139-1	3	Shallow Marsh	0.55 <sup>c</sup>	Stormwater
N/A	N/A	Tributary	0.01	Park-and-Ride
N/A	N/A	Tributary	0.01	Stormwater
N/A	N/A	Wet Ditch	0.03	Guideway
<b>Total</b>			<b>2.64</b>	

<sup>a</sup> Circular 39 wetland types from Shaw and Fredine. 1956. Available at: <https://ia801901.us.archive.org/8/items/wetlandsofunitied00shaw/wetlandsofunitied00shaw.pdf>. Accessed October 2018.

<sup>b</sup> Eggers, Steve and Reed, Donald. July 2015. Wetland Plants and Plant Communities of Minnesota and Wisconsin. USACE St. Paul District. Available at: <https://usace.contentdm.oclc.org/digital/collection/p266001coll1/id/2845>. Accessed October 2018.



*° Impacts associated with stormwater facilities at Wetland 48-1 and Wetland 139-1 are based on the 15% Concept Plans. As the Project's design is advanced and more analysis completed for anticipated stormwater needs for the Project, impacts are anticipated to be reduced to requirements needed to qualify for the Transportation Regional General Permit.*

**FIGURE 5.4-5: ALIGNMENT D3 SURFACE WATER RESOURCES AND IMPACTS**

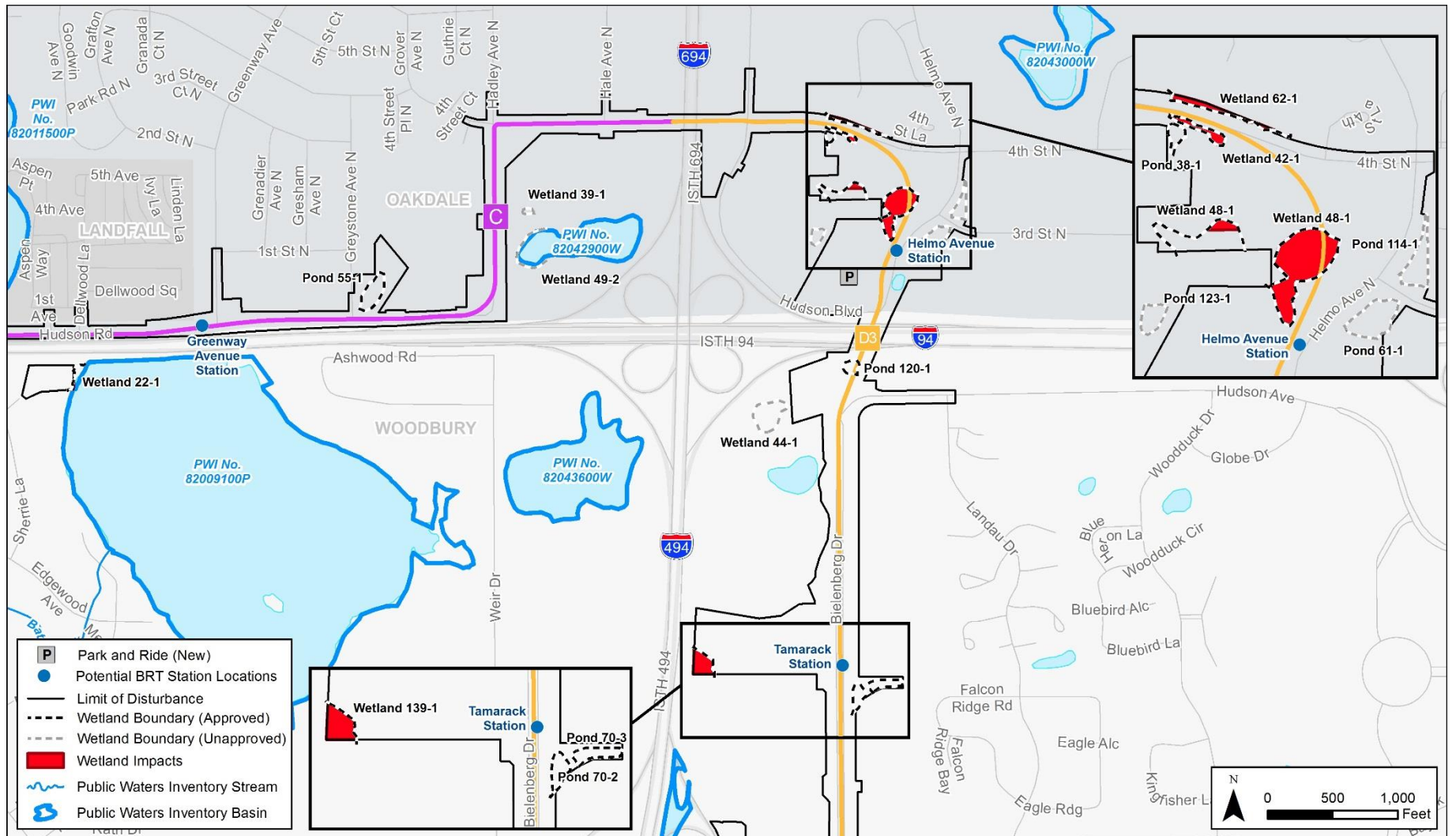
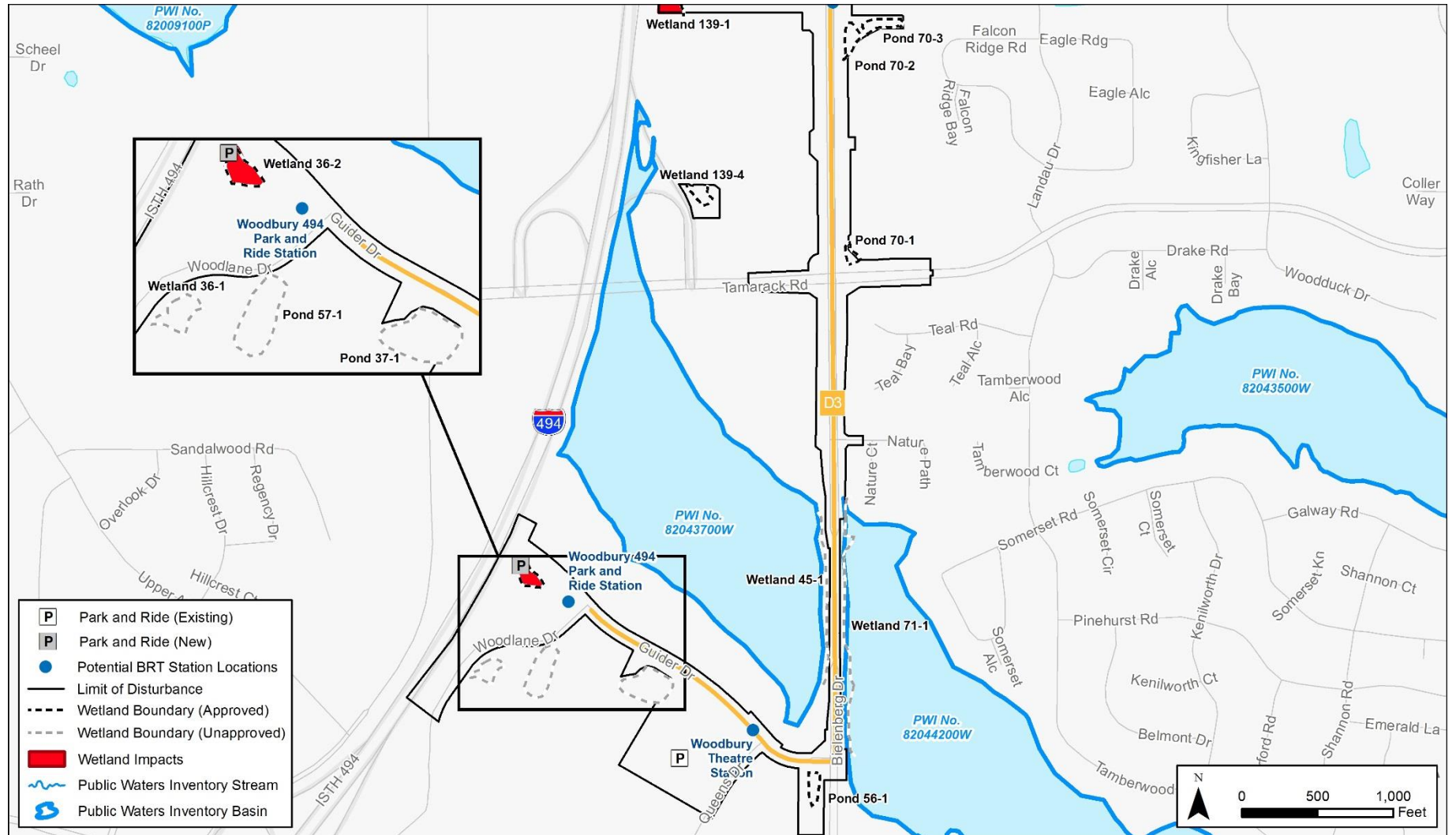


FIGURE 5.4-6: ALIGNMENT D3 SURFACE WATER RESOURCES AND IMPACTS







### BUILD ALTERNATIVE 2 (A2-BC-D3)

Alignment A2 does not include any surface waters; therefore, Build Alternative 2 would produce the same long-term impacts to surface waters as Build Alternative 1.

**Figure 5.4-7** shows the location of Alignment A2.

#### 5.4.3.2. Construction Phase (Short-Term) Impacts

##### BUILD ALTERNATIVE 1 (A1-BC-D3)

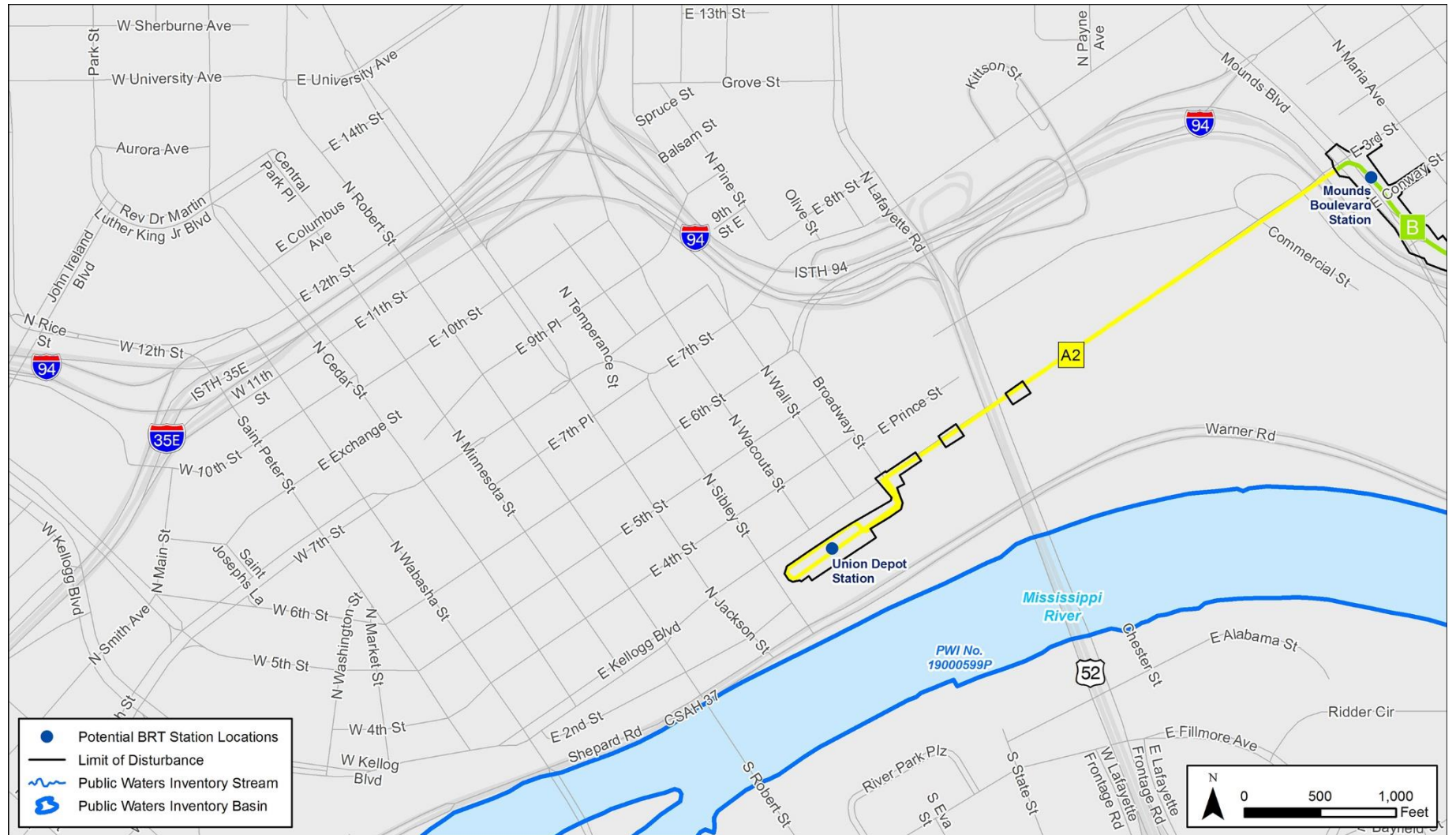
The Council does not anticipate Build Alternative 1 would produce short-term impacts to surface waters. The Council will closely monitor design and planning efforts prior to the construction phase of the Project to avoid or minimize impacts to surface waters.

##### BUILD ALTERNATIVE 2 (A2-BC-D3)

Alignment A2 does not include any surface waters; therefore, Build Alternative 2 would not produce short-term impacts to surface waters.



FIGURE 5.4-7: ALIGNMENT A2 SURFACE WATER RESOURCES AND IMPACTS





#### 5.4.4. Avoidance, Minimization and/or Mitigation Measures

Avoidance, minimization and mitigation measures apply to both Build Alternative 1 and Build Alternative 2. The Council has avoided and minimized to the extent possible, at the current level of design, Project-related impacts to surface waters. The Engineering Phase would incorporate, where feasible, additional avoidance and minimization measures, which could include constructing steeper inslopes, broken backslopes, and treating of stormwater prior to discharge. The Council has also proposed placing stormwater ponds in upland areas, if feasible.

The Project would require a CWA wetland permit from the USACE, a Public Waters Work Permit from DNR and a Section 401 certification from the Minnesota Pollution Control Agency (MPCA) and RWMWD. The City of Saint Paul has waived LGU jurisdiction to RWMWD (see **Attachment A-5-1**) and MnDOT's right-of-way does not contain wetlands; therefore, RWMWD would be the designated LGU for the Project and would require a WCA wetland replacement plan.

RWMWD's rules dictate the siting of both onsite and banking wetland replacement, and the rules specify that the Council must prioritize these replacement locations as follows:

- Onsite (most preferred)
- Within the same sub-watershed
- Within RWMWD
- Outside of RWMWD (least preferred)

The Project area has limited available space conducive to creating wetland; therefore, the Council anticipates it would mitigate impacts to wetlands through the purchase of wetland credits from a state-managed wetland bank, rather than providing on-site replacement of wetlands. Neither the sub-watershed nor the RWMWD contains available wetland banks, so unless a bank becomes available during the Engineering Phase and prior to construction, the Council will likely purchase credits from a wetland bank located outside of the RWMWD.

The current replacement ratio for wetland credits in the Project area's part of Minnesota is 2.5 to 1, although the following conditions may reduce by 0.25 credits each (to a minimum replacement ratio of 2 to 1):

- Replacement within the same Bank Service Area as the impacted wetland
- Replacement in advance of the proposed impact
- Replacement in kind with the impacted wetland type

The permitting agencies would determine the final amounts, types, and locations of wetland replacement or bank credits during the permit review process, which would occur during the Project Development Phase, after completion of the NEPA process. **Table 5.4-4** identifies wetland replacement based on current rules and regulations. Mitigation for the impacts to tributaries, wet ditches and stormwater ponds is not expected to be required.

If necessary, the Council would investigate further potential construction areas for on-site or project-specific wetland replacement as the Project design advances. Areas the Council would consider could include public land adjacent to the Project corridor and/or lands the Project acquired.



**TABLE 5.4-4: REQUIRED WETLAND REPLACEMENT BY ALTERNATIVE**

Alternative	Anticipated Impact	Acres Replaced with Minimum 2:1 Replacement Ratio	Acres Replaced with Potential 2.5:1 Replacement Ratio
Build Alternative 1 (A1-BC-D3)	2.602 acres	5.20 acres	6.50 acres
Build Alternative 2 (A2-BC-D3)	2.602 acres	5.20 acres	6.50 acres
<i>With Hazel Street Station Option</i>	<i>2.602 acres</i>	<i>5.20 acres</i>	<i>6.50 acres</i>
<i>With Dedicated Guideway on Hadley Avenue and 4th Street Option</i>	<i>2.602 acres</i>	<i>5.20 acres</i>	<i>6.50 acres</i>

## 5.5. Stormwater and Water Quality

This section evaluates Project-related impacts to stormwater and water quality. **Section 5.3** separately addresses floodplains, and **Section 5.4** addresses surface water including wetlands, waterbodies and waterways.

### 5.5.1. Regulatory Context and Methodology

#### 5.5.1.1. Regulatory Context

The following agencies have roles concerning stormwater management within the study area:

- CRWD
- RWMWD
- MPCA
- MnDOT
- Ramsey and Washington counties
- Cities of Saint Paul, Maplewood, Landfall, Oakdale and Woodbury

The watershed districts and the MPCA primarily share regulatory and permitting authority for stormwater management in the Project area. Each watershed district has its own rules that include specific design standards and permitting requirements.

In Minnesota, the MPCA administers the National Pollutant Discharge Elimination System (NPDES)/State Disposal System construction stormwater permitting program, which authorizes stormwater runoff from construction sites that disturb 1 or more acres. Minnesota adopted its current permit in August 2018.

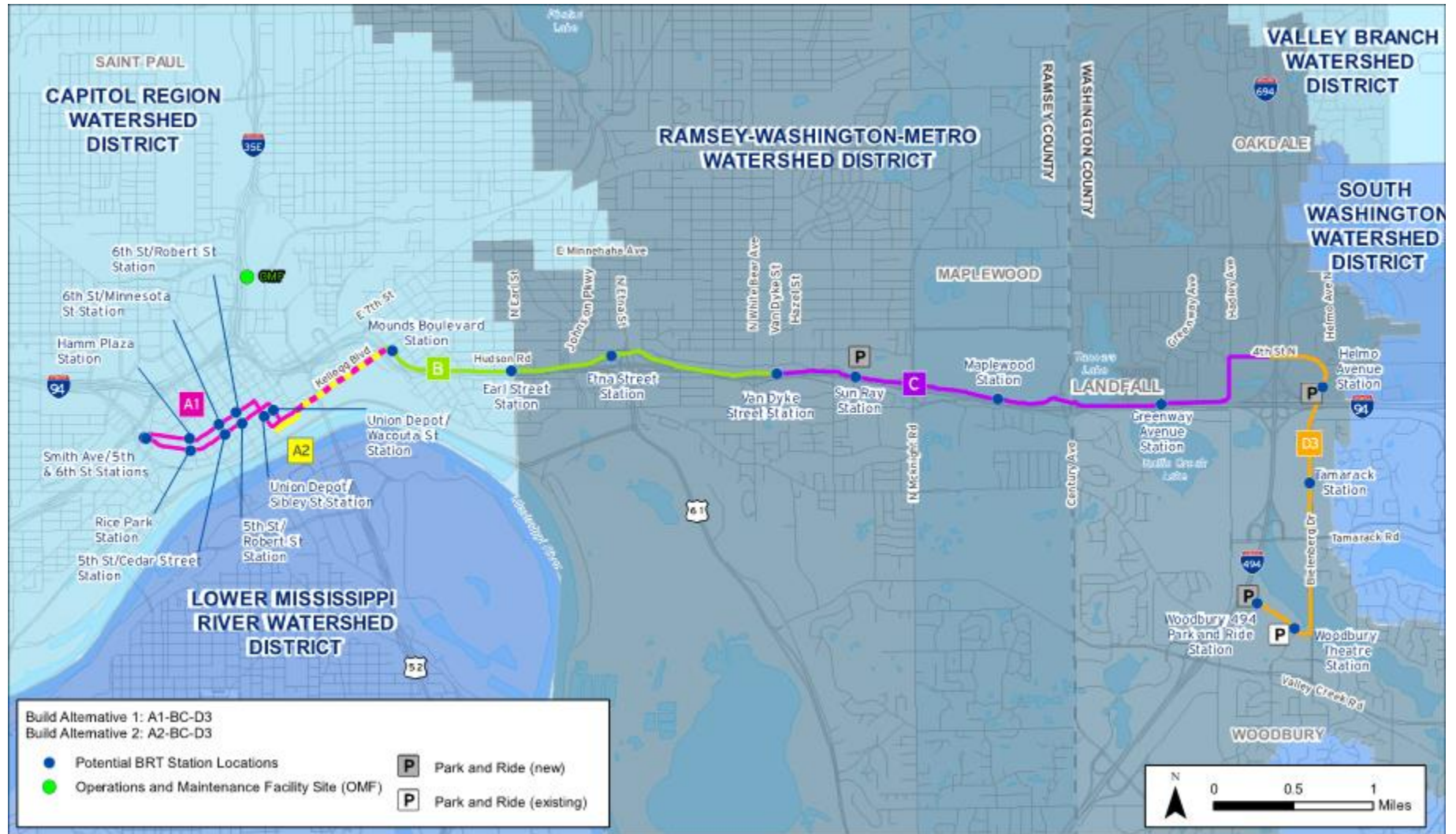
The cities, counties and MnDOT may have additional design considerations regarding stormwater and water quality for locations within their rights-of-way.

The Project would be subject to regulation at the time the Council submits the Project design for the permitting authorities to approve, which the Council would complete during the Project’s Engineering Phase, for the design to address the most accurate anticipated impacts.

**Figure 5.5-1** shows the watershed district boundaries in the Project area.



FIGURE 5.5-1: WATERSHED DISTRICT BOUNDARIES





## WATERSHED DISTRICTS

The CRWD's and RWMWD's rules comply with provisions of the Minnesota Statutes,<sup>51</sup> Minnesota Rules,<sup>52,53</sup> the Metropolitan Surface Water Management Act,<sup>54</sup> the Watershed Management Plans,<sup>55</sup> final Watershed Rules,<sup>56</sup> and other approved regional plans.<sup>57</sup>

### Capitol Region Watershed District

If a project cannot reduce stormwater volume on site, the CRWD's alternative volume-reduction methods allow a permit applicant to build volume-reduction BMPs in an offsite location, preferably within the same subwatershed, and to utilize banked credits. A project that cannot achieve this must pay into the District Stormwater Impact Fund, which covers the cost to construct volume-reduction BMPs within the watershed. CRWD's board annually sets the District Stormwater Impact Fund's unit cost for construction. The applicant shall incorporate effective nonpoint source pollution reduction BMPs to achieve 90 percent removal of total suspended solids (TSS) from runoff generated by a 2.5-inch rainfall.

### Ramsey-Washington Metro Watershed District

RWMWD has the same requirements as CRWD regarding infiltration system BMPs, volume-reduction, and water quality goals for reducing TSS.

## MINNESOTA POLLUTION CONTROL AGENCY

The MPCA administers the NPDES Construction Stormwater Permit program, which requires that permit applicants have a Stormwater Pollution Prevention Plan that details temporary and permanent erosion-prevention and sediment-control BMPs that a project would use during construction. The NPDES permit also requires permanent treatment of stormwater runoff at sites where construction activity results in a net increase of 1 acre or more of impervious surface area.

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<sup>51</sup> "Water," *Minnesota Statutes, Chaps. 103A-103G*. Available at: <https://www.revisor.mn.gov/statutes/part/WATER>. Accessed October 2018.

<sup>52</sup> "Metropolitan Water Management," *Minnesota Rules, Chap. 8410*. Available at: <https://www.revisor.mn.gov/rules/8410/>. Accessed October 2018.

<sup>53</sup> "Wetland Conservation," *Minnesota Rules, Chap. 8420*. Available at: <https://www.revisor.mn.gov/rules/8420/>. Accessed October 2018.

<sup>54</sup> *Metropolitan Surface Water Management Act (Chapter 509, Laws of 1982, Minnesota Statute Section 103B.201 to 103B.255 as amended)*. Available at: <https://www.revisor.mn.gov/statutes/cite/103B>. Accessed October 2018.

<sup>55</sup> *Capitol Region Watershed District. 2010 Watershed Management Plan. September 1, 2010.* <https://www.capitolregionwd.org/wp-content/uploads/2018/12/2010-Watershed-Management-Plan.pdf>. Accessed March 2019.

<sup>56</sup> *Capitol Region Watershed District. Capitol Region Watershed District Rules. Revised June 5, 2019.* Available at: <https://www.capitolregionwd.org/wp-content/uploads/2019/07/06-05-19-CRWD-Amended-Signed-Rule.pdf>. Accessed June 2019.

<sup>57</sup> *Ramsey-Washington Metro Watershed District. Ramsey-Washington Metro Watershed District Rules. Revised April 1, 2015.* Available at: [https://www.rwmwd.org/wp-content/uploads/RWMD\\_District\\_Rules\\_04-01-15.pdf](https://www.rwmwd.org/wp-content/uploads/RWMD_District_Rules_04-01-15.pdf). Accessed October 2018.



The Clean Water Act of 1972<sup>58</sup> requires states to develop lists of “impaired” waters – those that do not meet quality standards set by states despite the use of technology-based regulations and other required controls. The law requires that states rank their impaired waters by priority and calculate these waters’ total maximum daily loads (TMDLs), which is the maximum amount of a pollutant that can be present in a waterbody for it to still meet water quality standards.

The MPCA maintains and updates biennially the list of Minnesota’s impaired waters. Project areas with stormwater discharge points within 1 mile of impaired waters must use additional BMPs that include more stringent stormwater treatment.

**Table 5.5-1** lists the four impaired waters that fall within 1 mile of the Project’s potential limits of disturbance. All four would receive runoff from the Project area. The table includes information about the MPCA impaired waters within the study area, including the types of impairments and their respective TMDL status according to the EPA.

**TABLE 5.5-1: IMPAIRED WATERS WITHIN 1 MILE OF THE PROJECT POTENTIAL LIMITS OF DISTURBANCE**

Name	Impairments	EPA-Approved TMDL Plan <sup>a</sup>
<b>Mississippi River</b> (Minnesota River to Metropolitan Wastewater Treatment Plant)	<ul style="list-style-type: none"> <li>• Mercury</li> <li>• Fecal coliform</li> <li>• Polychlorinated biphenyl</li> <li>• Perfluorooctane sulfonate</li> <li>• Turbidity</li> </ul>	TMDL plan for mercury and turbidity
<b>Battle Creek</b> (Battle Creek Lake to Pig’s Eye Lake)	<ul style="list-style-type: none"> <li>• Aquatic macroinvertebrate bioassessments</li> <li>• Fishes bioassessments</li> <li>• Chloride</li> </ul>	TMDL plan for aquatic macroinvertebrate bioassessments, fishes bioassessments, chloride
<b>Tanners Lake</b>	<ul style="list-style-type: none"> <li>• Mercury</li> <li>• Chloride</li> </ul>	TMDL plans for mercury and chloride
<b>Battle Creek Lake</b>	<ul style="list-style-type: none"> <li>• Mercury</li> <li>• Chloride</li> </ul>	TMDL plans for mercury and chloride

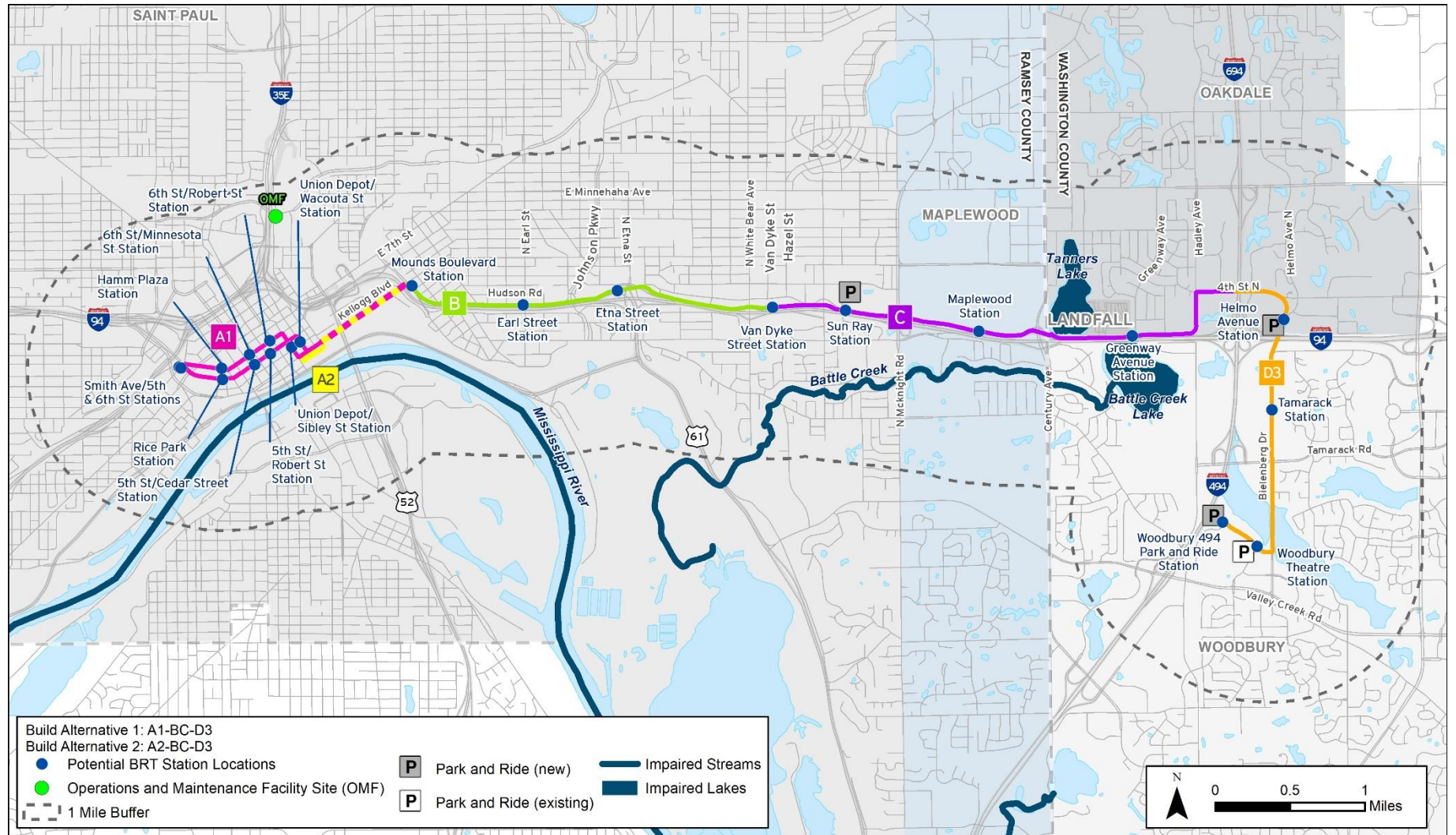
<sup>a</sup> As of December 2016.

**Figure 5.5-2** shows the locations of these impaired waters.

<sup>58</sup> “Federal Water Pollution Control Act.” Title 33, USC, Sec. 1251(a) et seq. (1972). Available at: <https://www.epa.gov/sites/production/files/2017-08/documents/federal-water-pollution-control-act-508full.pdf>. Accessed October 2018.



FIGURE 5.5-2: IMPAIRED WATERS IN THE PROJECT AREA







## REGULATORY REQUIREMENTS SUMMARY

Table 5.5-2 summarizes the detention and infiltration requirements in the Project area.

**TABLE 5.5-2: AGENCY STORMWATER DETENTION AND INFILTRATION REQUIREMENTS**

Agency	Wet Pond BMP Requirements				Infiltration BMP Requirements	
	Permanent Pool Volume	Permanent Pool Depth	Discharge Rates	Slopes	Water Quality Volume	Drawdown Time
CRWD	Remove 90% TSS and 60% Total Phosphorus (TP) from the 2.5" storm event (NURP water quality event)	Average depth of 3'-6' with maximum 10' depth unless recirculation provided	2-, 10- and 100-year storm peak discharge rate < existing conditions	1:3 above the normal water level (NWL) and below benches 10'-wide bench at slope 1:10 above and below the NWL	1.1" of runoff from new and reconstructed impervious surfaces	48 hours
RWMWD	Remove 90% TSS and 60% TP from the 2.5" storm event (NURP water quality event)	Average depth of 3'-6' with maximum 10' depth unless recirculation provided	2-, 10- and 100-year storm peak discharge rate < existing conditions	1:3 above the NWL and below benches 10'-wide bench at slope 1:10 above and below the NWL	1.1" of runoff from new and reconstructed impervious surfaces	48 hours
MPCA	1,800 cubic feet per acre of surface area drained	Average depth of 3'-6' with maximum 10' depth unless recirculation provided	5.66 cubic feet per second, per acre of surface area for the 1" water quality storm event	1:3 above the NWL and below benches 10'-wide bench at slope 1:10 above and below the NWL	1.0" of runoff from new impervious surfaces	48 hours

<sup>a</sup> U.S. Environmental Protection Agency. "Nationwide Urban Runoff Program (NURP)." Available at: [https://www3.epa.gov/npdes/pubs/sw\\_nurp\\_vol\\_1\\_finalreport.pdf](https://www3.epa.gov/npdes/pubs/sw_nurp_vol_1_finalreport.pdf). Accessed October 2018.

Source: Watershed district requirements as of September 2018



### 5.5.1.2. Methodology

The resource study area is the potential limits of disturbance for each Build Alternative, and it includes the impaired waters within 1 mile of the limits that may receive stormwater discharge from the Project. This distance complies with the NPDES requirements for identifying impaired waters or sensitive resources.

The resource study area extends from downtown Saint Paul to Woodbury (see **Figure 5.5-1**) and includes the following immediate potential limits of disturbance along each of the alignments;

- Areas upstream and generally to the north that may contribute runoff into or through the Project corridor
- Areas downstream to which the Project would route runoff

The Council quantified potential impacts to stormwater and water quality by calculating Project-related changes to impervious surfaces. Water cannot penetrate impervious surfaces such as roadway, guideway and parking lot pavements; sidewalks; rooftops; and other hard surfaces, prohibiting rainwater infiltration and natural groundwater and surface water recharge. Rain and snowmelt, collectively referred to as stormwater, “run off” these surfaces instead, picking up pollutants as they travel to nearby waterbodies. The Project’s analysis assumes it would construct the BRT guideway with impervious concrete and asphalt, and it also assumes that aerial structures and some station infrastructure would be impervious.

### STORMWATER ISSUES RESOLUTION TEAM

The Project’s Stormwater Issue Resolution Team (IRT) developed BMP strategies and locations throughout the Project corridor. The team met several times with stakeholders to collect data, learn about existing water resource issues, and determine opportunities for and constraints to constructing stormwater BMPs. The process informed the direction presented in this section. The Stormwater IRT included representatives from the following organizations:

- Ramsey County
- Washington County
- MnDOT
- Metro Transit
- City of Saint Paul
- City of Maplewood
- City of Oakdale
- City of Woodbury
- RWMWD
- CRWD

### AVAILABLE DATA

The Stormwater IRT organizations and other sources provided the Council with the best available data for the Project corridor to develop the preliminary stormwater management BMPs. Because the data is not yet of design-level detail, the Council expects to advance design for the BMPs as more information becomes available for elements such as soil types, infiltration potential and contamination, and storm sewer elevations and pipe sizes.



## 5.5.2. Affected Environment

In general, the stormwater and water quality resource study area varies from highly altered, urbanized and developed conditions in the corridor's western sections to suburban, mostly developed conditions in the eastern sections.

The Build Alternatives are entirely located in the Mississippi River major watershed, so all drainage from the Project would eventually flow into the Mississippi River. MPCA lists the Mississippi River as impaired due to mercury, fecal coliform, polychlorinated biphenyl, perfluorooctane sulfonate and turbidity. The Build Alternatives would be located within several of the small, interconnected subwatersheds that comprise the major watershed. The CRWD (2010) and RWMWD (2017) watershed management plans identified these subwatersheds.

The subsections below describe existing drainage conditions within the resource study area relative to the specific alignments of the Build Alternatives.

### 5.5.2.1. Alignment A1 (Smith Avenue to Mounds Boulevard)

Existing drainage areas for Alignment A1 are located within the City of Saint Paul in CRWD's Downtown subwatershed. This alignment has a mix of Saint Paul and private right-of-way, and most of the area is impervious. The contributing drainage area is characterized by urban roadway with curb and gutter and grass boulevards with runoff conveyed by catch basins and underground storm sewer. All drainage from the area flows toward the Mississippi River.

### 5.5.2.2. Alignment A2 (Union Depot to Mounds Boulevard)

Like Alignment A1, the existing drainage areas for Alignment A2 are located within the City of Saint Paul in the CRWD's Downtown subwatershed. This alignment has a mix of Saint Paul and private right-of-way, and most of the area is impervious. The contributing drainage area is characterized by urban roadway with curb and gutter and grass boulevards with runoff conveyed by catch basins and underground storm sewer. All drainage from the area flows toward the Mississippi River.

### 5.5.2.3. Alignment B (Mounds Boulevard to White Bear Avenue)

Alignment B existing drainage areas are located entirely within the City of Saint Paul. The alignment travels within both the CRWD and RWMWD, and its contributing drainage area is characterized by urban roadway with curb and gutter and grass boulevards, undeveloped and vegetated roadside ditches, and vegetated median areas. The alignment crosses the Phalen Creek, Urban, Mississippi River Bottomlands and Beltline subwatersheds.

Alignment B's infrastructure typically includes regularly placed catch basins that convey runoff to stormwater management facilities, wetlands and trunk storm sewer pipes. The RWMWD-owned Beltline Interceptor storm sewer pipe system crosses the alignment at the TH 61 and I-94 interchange. This system consists of a 72-inch diameter reinforced concrete pipe that conveys significant amounts of stormwater runoff from the east side of Saint Paul that discharge to the Mississippi River.

The Phalen Creek subwatershed drains the area immediately adjacent to the Project guideway from Kellogg Boulevard to Maple Street. This area's contributing drainage area includes urban roadway with some vegetated median areas between Mounds Boulevard and I-94. The drainage here collects in the trunk system along I-94 and flows toward the Mississippi River. MnDOT and the City of Saint Paul own the right-of-way. This portion of the corridor is compact with limited space between the residential neighborhood to the north and I-94 to the south of Hudson Road.

The Urban subwatershed begins at Maria Avenue, and it covers the residential areas north and south of I-94. The Urban watershed continues to Earl Street and the boundary between the CRWD and RWMWD. MnDOT and the



City of Saint Paul own the right-of-way. This portion has contributing drainage area characteristics like those of the Phalen Creek subwatershed. Drainage collects in a trunk storm sewer running along Hudson Road, which crosses I-94 along Cherry Street and discharges into the Mississippi. The City of Saint Paul has flooding concerns downstream of this area. Like the Phalen Creek subwatershed, this area has limited space to the north and south of Hudson Road for use as stormwater management areas.

The Mississippi River Bottomlands subwatershed drains the section of Alignment B from Earl to Kennard streets, and areas just north of the proposed guideway from Kennard Street to White Bear Avenue. MnDOT and the City of Saint Paul own the right-of-way in this portion of Alignment B. This area's contributing drainage area includes urban roadway with some undeveloped, vegetated median located around the TH 61 interchange. The City of Saint Paul is concerned about flooding in the TH 61 and Johnson Parkway areas downstream, and in a few areas containing contaminated soils, and MnDOT is concerned about its ability to implement future improvements to I-94 in this area. These issues reduce the potential available space for stormwater management adjacent to I-94. All drainage from the area flows toward the Mississippi River.

The Beltline subwatershed covers the drainage from TH 61 to White Bear Avenue to the north and south of the proposed guideway. This area's contributing drainage area includes urban roadway, grass boulevards and curb and gutter with catch basins and storm sewer to convey storm runoff. The storm sewer discharges into the MCES interceptor, which eventually discharges to the Mississippi River. The City of Saint Paul and private entities own right-of-way in this subwatershed.

#### 5.5.2.4. Alignment C (White Bear Avenue to I-694)

Alignment C existing drainage areas are within the RWMWD and the cities of Saint Paul, Maplewood, Landfall and Oakdale. The Battle Creek subwatershed drains the area between White Bear Avenue and Ruth Street into Suburban Pond, which outlets southward to Battle Creek before discharging into the Mississippi River. This area's contributing drainage area includes urban roadway and vegetated boulevards that create runoff that flows to storm sewers that drain to trunk storm lines along the south side of I-94. These lines then drain into the Suburban Pond by Van Dyke Street. MnDOT primarily owns the right-of-way.

Along Sun Ray Shopping Center and 3M campus properties, the corridor's contributing drainage area includes urban roadway that transitions to a mix of urban and rural roadway east of Century Avenue. Alignment C spans the Battle Creek, Tanners Lake and Battle Creek Lake subwatersheds, all of which drain into the Mississippi River.

The Battle Creek subwatershed drains portions of Alignment C between Ruth Street and Century Avenue. West of McKnight Road, a trunk storm sewer runs to the west along I-94 towards the Suburban Pond, which drains to Battle Creek and the Mississippi River. RWMWD has identified the Suburban Pond as having flooding issues, but these concerns extend throughout the watershed and could impact any proposed stormwater management measures. A large trunk storm sewer also runs to the south along McKnight toward Battle Creek. Battle Creek does not meet water quality standards due to nutrients and mercury. The Battle Creek portion of Alignment C falls within the cities of Saint Paul and Maplewood. Much of the Project corridor falls within MnDOT right-of-way, however, other right-of-way owners include Cities of Saint Paul and Maplewood, along with private property owners of Sun Ray Shopping Center and 3M.

The Tanners Lake subwatershed drains a portion of Alignment C between Century Avenue and Hadley Avenue North. Most of the existing drainage in this area is along Hudson Boulevard North, which has a rural section on the north side that conveys runoff to roadside ditches or to Tanners Lake, and an urban section on the south side that keeps runoff directly from entering the I-94 corridor. The Tanners Lake portion of Alignment C falls within the cities of Oakdale and Landfall. Most of the proposed corridor is within the City of Oakdale's right-of-way. Tanners Lake is impaired due to mercury. Tanners Lake contains an outfall in the south portion of the lake that drains to Battle Creek Lake, which is impaired due to mercury and chloride.



The Battle Creek Lake subwatershed includes a portion of Alignment C at the eastern end of Alignment C. The contributing drainage area is characterized by rural roadway that conveys surface water runoff to vegetated roadside ditches. The area drains south toward Battle Creek Lake, which discharges to Battle Creek. The Battle Creek Lake portion of Alignment C falls within the city of Oakdale.

### 5.5.2.5. Alignment D3 (I-694 to Woodbury 494 Park-and-Ride)

Alignment D3 existing drainage areas are within the RWMWD, and the area’s contributing drainage area include roadside ditches (undeveloped and vegetated) within the City of Oakdale, urban roadway within the City of Woodbury, and other impervious areas. Alignment D3 is located entirely within the Battle Creek Lake subwatershed.

The Battle Creek Lake subwatershed, as it relates to Alignment D3, has a contributing drainage area consisting mostly of rural road segments that convey surface runoff to vegetated roadside ditches. The area north of I-94 within the City of Oakdale drains south and west, through a few wetlands and the I-94/I-494 interchange, toward Battle Creek Lake. The City of Woodbury has seen flooding downstream of the I-94/I-494 interchange at Weir Drive. The area south of I-94 within the City of Woodbury drains west to Battle Creek Lake via a series of storm sewers, ditches and wetlands – one of which is the Tamarack Reserve. The entire Alignment D3 corridor discharges to Battle Creek.

## 5.5.3. Environmental Consequences

### 5.5.3.1. Operating Phase (Long-Term) Impacts

#### BUILD ALTERNATIVE 1 (A1-BC-D3)

Build Alternative 1 would include new and reconstructed impervious surfaces including guideway, roadways, sidewalks and trails, parking facilities, station platforms, and other structures such as bridges and retaining walls.

**Table 5.5-3** summarizes Project-related changes to impervious surface area within the areas immediately impacted by Project construction for Build Alternative 1 that are considered in the regulatory requirements for control of stormwater runoff volume. The impervious surfaces provide an indicator as to how much runoff is generated in the Project area.

**TABLE 5.5-3: BUILD ALTERNATIVE 1 (A1-BC-D3) CHANGES TO IMPERVIOUS AREA**

Alignment	Existing Impervious Area (Acres)	New and Reconstructed Impervious Area (Acres) <sup>a</sup>
Alignment A1	0.7	0.7
Alignment B	10.2	18.2
Alignment C	13.4	24.9
<i>With Hazel Street Station Option</i>	<i>13.4</i>	<i>24.9</i>
<i>With Dedicated Guideway Option at Hadley Avenue and 4th Street</i>	<i>14.7</i>	<i>30.1</i>
Alignment D3	20.4	29.0

<sup>a</sup> Includes the existing impervious area reconstructed as part of the Project and new surfaces.



### Alignment A1 (Smith Avenue to Mounds Boulevard)

Alignment A1 would include 10 stations throughout downtown Saint Paul (see **Figure 5.5-1**). This alignment would primarily utilize existing roadways, and each proposed station would include reconstructed impervious sidewalks and roadways. The alignment would use Kellogg Boulevard to connect with Alignment B. Because the surface areas around the stations are predominantly impervious, the mitigation measures will be focused on addressing volume control.

This alignment would add or reconstruct 0.7 acres of impervious surface resulting from reconstruction of impervious surfaces at the station locations, which will require volume control but not rate control as the rates into the storm sewer system will remain unchanged.

### Alignment B (Mounds Boulevard to White Bear Avenue)

Like Alignment A1, Alignment B is in a highly urbanized area of Saint Paul and has significant impervious surface area. Alignment B proposes to reconstruct Mounds Boulevard and Hudson Road from 3rd Street East to Griffith Street to accommodate a dedicated guideway. This will involve relocating noise walls along I-94 and reconfiguring Hudson Road. Moving east from Griffith Street, the dedicated guideway diverges from Hudson Road and crosses over Johnson Parkway and TH 61 on a new BRT-exclusive bridge to connect into Hudson Road east of TH 61. The Council proposes several new trail connections in the TH 61 area north and south of I-94. The BRT vehicle would run in mixed traffic on a reconstructed Hudson Road to the east of Kennard Street, where a new dedicated guideway would continue to the east, crossing underneath White Bear Avenue.

This alignment would add or reconstruct 18.2 acres of impervious surface, which will require volume and rate control to use existing storm sewer systems.

### Alignment C (White Bear Avenue to I-694)

Alignment C continues the dedicated guideway from Van Dyke Street, crossing underneath Ruth Street, to the Sun Ray Shopping Center, at which the Build Alternative would reconstruct Old Hudson Road to accommodate two-way traffic on Old Hudson Road and on the dedicated guideway. The guideway would diverge from Old Hudson Road on the east side of the Sun Ray Shopping Center and operate on a new BRT-exclusive bridge over McKnight Road. East of McKnight Road the dedicated guideway continues along the north side of Hudson Road. The alignment would reconstruct the access to and from 8th and 19th streets on Hudson Road to accommodate the dedicated guideway. East of 19th Street, the alignment would reconstruct Hudson Road to Century Avenue (TH 120) along what is now called Hudson Service Road, with a dedicated guideway. The dedicated guideway would operate on a new BRT-exclusive bridge over Century Avenue and again intersect with Hudson Road on the east side of Century Avenue. The alignment would construct new access to businesses on the west side of Tanners Lake on Hudson Road and new access from Hudson Road to Century Avenue. It would reconstruct Hudson Road east of Century Avenue to accommodate BRT in mixed traffic.

BRT along the east side of Tanners Lake would run in mixed traffic along Hudson Road until Greenway Avenue. Alignment C would reconstruct Hudson Road starting east of Dellwood Lane. At Greenway Avenue the guideway would have dedicated lanes on the north and south sides of Hudson Road until the road turns into Hadley Avenue. The south driveway access to Apostolic Bible Institute on Hadley Avenue would be relocated and reconstructed the north.

This alignment would add or reconstruct 24.9 acres of impervious surface, which will require volume and rate control to use existing storm sewer systems.



### Hazel Street Station Option

This option would include a station at Hazel Street instead of the station at Van Dyke Street. This option would include sidewalks connecting the station with Old Hudson Road, Wilson Avenue and Ruth Street. The estimated change in impervious surface area from this option would be the same as it would be with a station at Van Dyke Street (see **Table 5.5-3**); therefore, this option would not produce additional long-term impacts to stormwater or water quality.

### Dedicated Guideway Option at Hadley Avenue and 4th Street

As Hadley Avenue begins and heads north, this option would reconstruct Hadley Avenue to accommodate a dedicated guideway on the east and west sides of the street. This option would close the south driveway access to Apostolic Bible Institute and reconstruct it to the north. This option would operate BRT in a dedicated guideway, except where it would accommodate turning movements through the intersection of Hadley Avenue North and 4th Street North. This option also includes work to accommodate the widening of 4th Street North, including replacing and reconstructing the bridge over I-694.

This option would add or reconstruct an additional 5.2 acres of impervious surface to Alignment C for a total of 30.1 acres, which would require volume and rate control to use existing storm sewer systems.

### Alignment D3 (I-694 to Woodbury 494 Park-and-Ride)

Alignment D3 would begin at I-694 and continue east before turning south to the Helmo Avenue (Park-and-Ride) Station. Reconstruction of adjacent streets would be part of the work in and around Helmo Avenue Station on Helmo Avenue, 4th Street North and Hudson Boulevard. The guideway would continue south on a new multi-modal bridge over I-94 connecting Helmo Avenue to Bielenberg Drive.

After crossing I-94, the roadway expands to allow for four lanes of local traffic bisected by a dedicated two-lane center running guideway from I-94 to Nature Path along Bielenberg Drive. The alignment would then return the section to four-lane mixed traffic as Bielenberg Drive is milled and overlaid to Guider Drive. This alignment would reconstruct Guider Drive from Bielenberg Drive to Queens Drive, and it would mill and overlay Guider Drive to the Woodbury 494 Park-and-Ride station. Alignment D3 would construct trails along the newly reconstructed Bielenberg Drive; build a new median and turn lanes along Tamarack Road and reconstruct portions to tie down every crossroad.

This alignment would add or reconstruct 29 acres of impervious surface, which would require volume and rate control to use existing storm sewer systems.

### BUILD ALTERNATIVE 2 (A2-BC-D3)

Alignment A2 includes one station at Union Depot Station, with minor sidewalk and roadway reconstruction to accommodate the station. Alignment A2 also utilizes existing Kellogg Boulevard to connect with Alignment B. This alignment would add or reconstruct 0.1 acres of impervious surface, compared to 0.7 acres for Alignment A1, resulting from reconstruction of impervious surfaces at the Union Station location, which would require volume control but not rate control as the rates into the storm sewer system would remain unchanged.

**Table 5.5-4** summarizes Project-related changes to impervious surface area within the areas immediately impacted by Project construction for Build Alternative 2 that are considered in the regulatory requirements for control of stormwater runoff volume. Build Alternative 2 would produce the same long-term impacts to impervious surfaces as Build Alternative 1.



**TABLE 5.5-4: BUILD ALTERNATIVE 2 (A2-BC-D3) CHANGES TO IMPERVIOUS AREA**

Alignment	Existing Impervious Area (Acres)	New and Reconstructed Impervious Area (Acres) <sup>a</sup>
Alignment A2	0.1	0.1
Alignment B	10.2	18.2
Alignment C	13.4	24.9
<i>With Hazel Street Station Option</i>	13.4	24.9
<i>With Dedicated Guideway Option at Hadley Avenue and 4th Street</i>	14.7	30.1
Alignment D3	20.4	29.0

<sup>a</sup> Includes the existing impervious area reconstructed as part of the Project and new surfaces.

### SUMMARY OF OPERATING PHASE (LONG-TERM) IMPACTS BY ALTERNATIVE

The Build Alternatives include both new impervious surface as well as reconstructed impervious surfaces, including guideway, roadways, sidewalks and trails, parking facilities, station platforms, and other structures such as bridges and retaining walls. **Table 5.5-5** summarizes Project-related changes to existing and new and reconstructed impervious surface area within the areas immediately impacted by Project construction for the two Build Alternatives that are considered in the regulatory requirements for control of stormwater runoff volume.

**TABLE 5.5-5: SUMMARY OF BUILD ALTERNATIVES' CHANGES TO IMPERVIOUS AREA**

Alternative	Existing Impervious Area (Acres)	New and Reconstructed Impervious Area (Acres) <sup>a</sup>
<b>Build Alternative 1</b>	<b>44.7</b>	<b>72.8</b>
<i>With Hazel Street Station Option</i>	44.7	72.8
<i>With Dedicated Guideway Option at Hadley Avenue and 4th Street</i>	46.0	78.0
<b>Build Alternative 2</b>	<b>44.1</b>	<b>72.2</b>
<i>With Hazel Street Station Option</i>	44.1	72.2
<i>With Dedicated Guideway Option at Hadley Avenue and 4th Street</i>	45.4	77.4

<sup>a</sup> Includes the existing impervious area reconstructed as part of the Project and new surfaces.

### 5.5.3.2. Construction Phase (Short-Term) Impacts

#### BUILD ALTERNATIVE 1 (A1-BC-D3)

Build Alternative 1 construction activities associated with utilities, guideway pavement areas and structures, park-and-ride facilities, and Project-specific roadway and sidewalk improvements would disturb soils. These disturbed soils combined with Project area runoff could potentially erode soil surfaces and drainage ways, form gullies and





deposit sediment in adjacent waterbodies. Without temporary BMPs (required through the permitting process), these activities could destabilize slopes and affect water quality.

Construction impacts would also occur in small, isolated areas in which temporary retaining walls or soil berms would be located to minimize wetland fill. Some construction staging areas would reside on temporary impervious pavement, which may increase stormwater runoff in some locations. The Council would determine short-term impacts to specific locations during future Project phases, but estimates these impacts would not extend more than 10 feet from the final Project limits.

Construction activities for Build Alternative 1 also would likely require temporary dewatering to install structure abutments and walls, and to do grading activities.

### BUILD ALTERNATIVE 2 (A2-BC-D3)

Build Alternative 2 would produce the same short-term impacts to stormwater and water quality as Build Alternative 1.

## 5.5.4. Avoidance, Minimization and/or Mitigation Measures

Build Alternative 1 would require mitigation measures for all Project-related new and reconstructed impervious surfaces, which range in size from 73 to 78 acres. **Table 5.5-6** lists the volume requirements for Build Alternative 1 to treat Project-related new and reconstructed impervious areas draining to each low point.

**TABLE 5.5-6: BUILD ALTERNATIVE 1 (A1-BC-D3) WATER QUALITY REQUIREMENTS**

Alignment	Total Volume Required <sup>a</sup> (ac-ft)	Approximate Volume Available at Primary BMP Sites (ac-ft)	Volume Needed at Secondary/ Alternative BMP Sites (ac-ft)
Alignment A1	0.1	0.0	0.1
Alignment B	1.7	0.9	0.8
Alignment C	2.3	2.2	0.1
<i>With Hazel Street Station Option</i>	2.3	2.2	0.1
<i>With Dedicated Guideway Option at Hadley Avenue and 4th Street</i>	2.8	2.2	0.6
Alignment D3	2.7	2.9	0.0

<sup>a</sup> Based on Capitol Region and Ramsey-Washington Metro watershed districts' rules.

Figure 5.5-3, Figure 5.5-4 and Figure 5.5-5 show the Stormwater IRT-vetted potential BMP locations.



FIGURE 5.5-3: ALIGNMENT B POTENTIAL STORMWATER BEST MANAGEMENT PRACTICES LOCATIONS

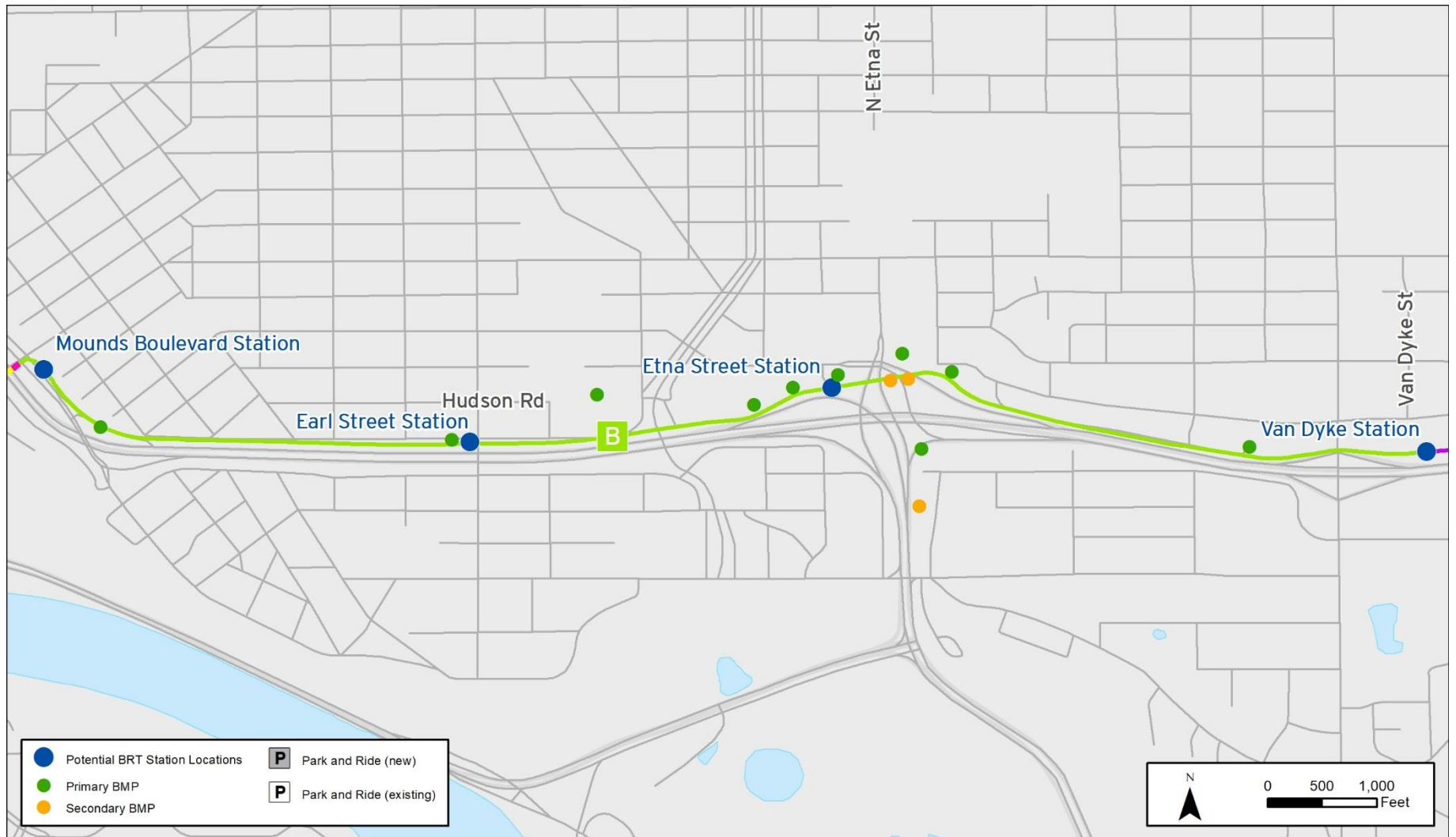




FIGURE 5.5-4: ALIGNMENT C POTENTIAL STORMWATER BEST MANAGEMENT PRACTICES LOCATIONS

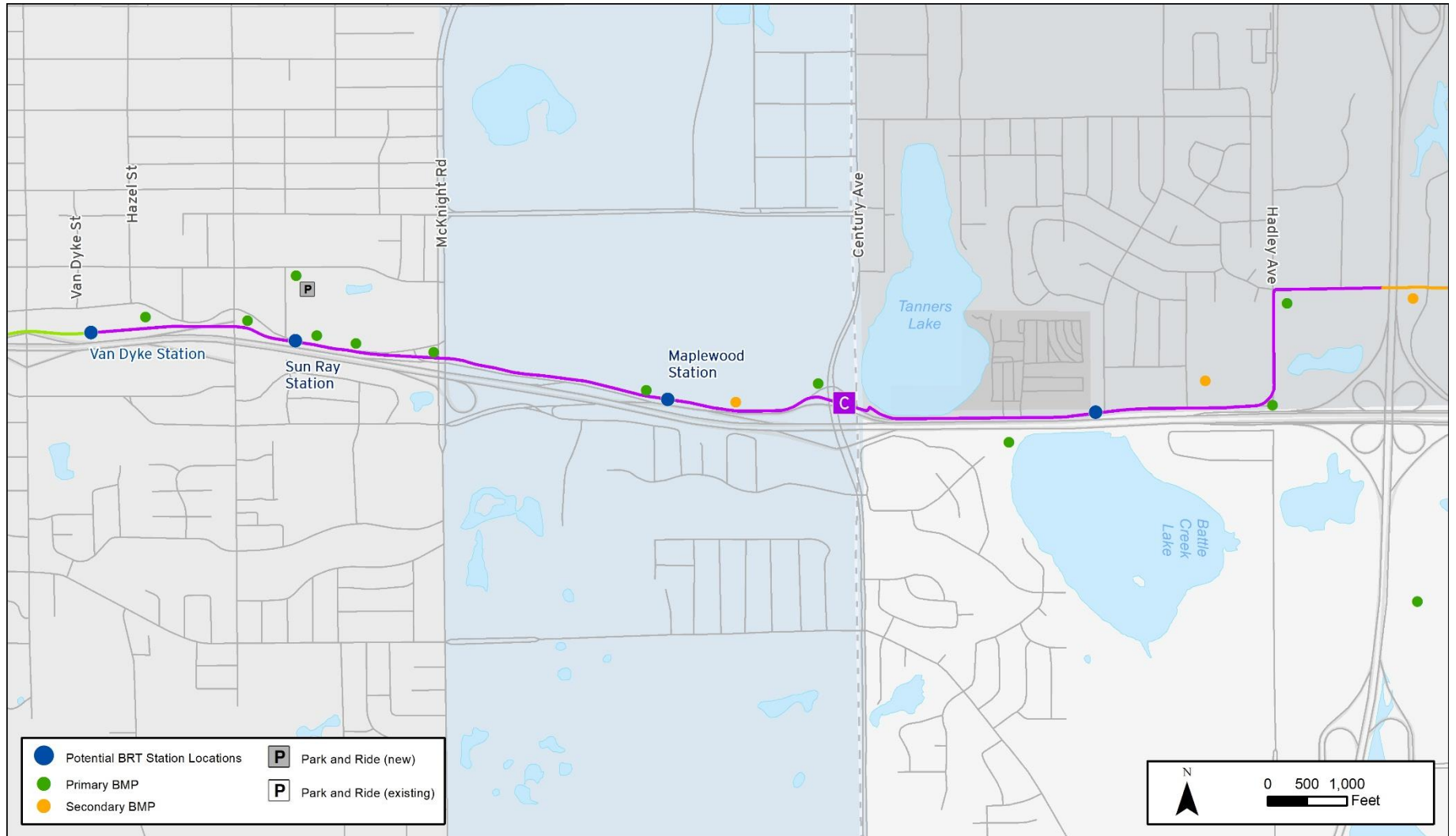
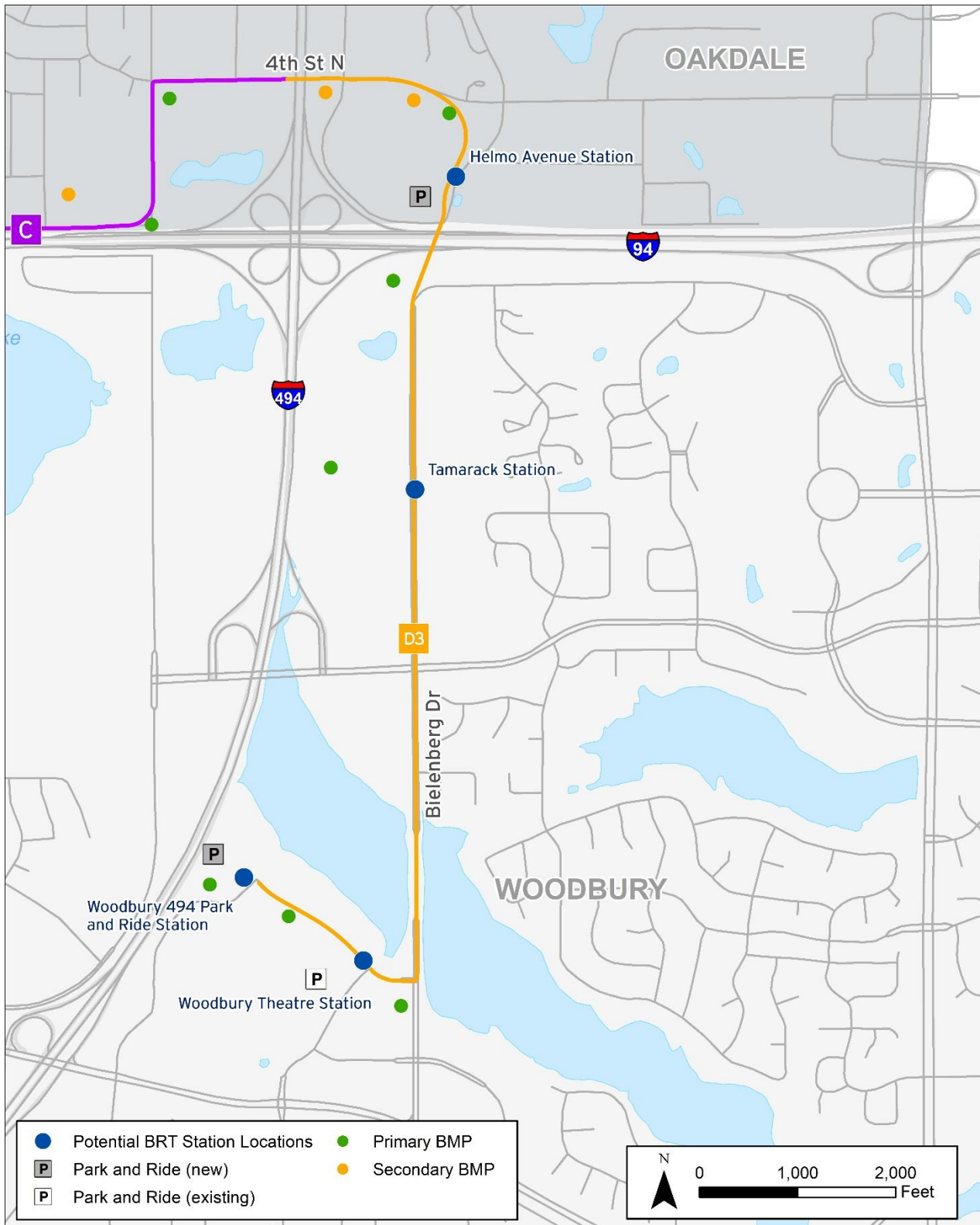




FIGURE 5.5-5: ALIGNMENT D3 POTENTIAL STORMWATER BEST MANAGEMENT PRACTICES LOCATIONS





The Stormwater IRT met multiple times to determine preferences for BMP types and locations (see **Section 5.5.1.2** for more information). The team created a “toolbox” that included the following BMP types:

- Bioretention basins/vegetated swales
- Filtration/infiltration basins
- Wet stormwater detention ponds
- Dry stormwater detention basin
- Pond retrofits
- Enhanced filtration practices
- Underground storage or filtration/infiltration
- Tree trenches
- Permeable pavements
- Stormwater pollution-control devices
- Stormwater harvesting and reuse.

The team asked Stormwater IRT members to rank based on their preferences, and the team used the rankings to select potential BMP types as site constraints and water quality regulations allowed.

The Stormwater IRT identified and reviewed more than 50 potential BMP sites, carrying forward primary and secondary sites to demonstrate the Project’s ability to meet regulatory requirements. **Table 5.5-6** includes the volume required for each Build Alternative 1 alignment, the anticipated volumes available within primary BMP locations, and the volume needed to meet the requirements from secondary BMP locations or alternative BMPs. The Council considered the following information:

- Stakeholders generally preferred surficial BMPs for ease of maintenance and familiarity for maintenance staff, therefore primary and secondary BMP locations include these types of BMPs
- Due to space constraints, surficial BMPs would not always be possible; therefore, the Council will conduct further analysis to determine the best locations for alternative BMPs
- BMP locations gave consideration to avoiding park lands, regionally significant ecological areas and other environmentally sensitive areas

The watershed districts also require rate control and TSS removal. The rate control portion is particularly important within RWMWD because this district has general flooding and conveyance-capacity concerns throughout. The BMPs proposed thus far are all able to provide some level of rate control. The Council will perform hydrologic modeling of the current and proposed conditions as the Project design advances to assess the efficiency of the proposed BMPs and what, if any, additional rate-control measures would be required. All proposed BMPs could also remove TSS, and the Council would implement additional stormwater pollution control devices as needed to meet the watershed districts’ requirements for TSS removal and pretreatment for filtration/infiltration systems.

Design considerations for locations within regionally significant ecological areas include limiting impacts to native trees and area, limiting impacts to habitat and wildlife movement, and placing BMP’s as close to the built facility as possible to limit impacts. The Council will consider these elements as the Project design advances.



Figure 5.9-1, Figure 5.9-2, Figure 5.9-3, Figure 5.9-4 and Figure 5.9-5 in Section 5.9 subsection **Biological Environment (Endangered Species and Wildlife Habitat)** show the locations of regionally significant ecological areas.

The MPCA, DNR, the Council, CRWD and RWMWD are involved with protecting natural resources during the construction phase of the Project. Construction documents would include erosion-control measures, dewatering and establishing the final surfaces, and these activities would be designed to meet the various agencies' requirements. The contractor would also be part of this process. The Council will give special consideration to environmentally sensitive areas along the Project corridor.

Build Alternative 2 would require the same mitigation measures as Build Alternative 1 for all Project-related new and reconstructed impervious surfaces, which range in size from 72 to 77 acres. **Table 5.5-7** lists the volume requirements for Build Alternative 2 to treat Project-related new and reconstructed impervious areas draining to each low point. The Stormwater IRT-vetted potential BMP locations for Build Alternative 2 are the same as for Build Alternative 1 (see **Figure 5.3-3**, **Figure 5.3-4** and **Figure 5.3-5**).

**TABLE 5.5-7: BUILD ALTERNATIVE 2 (A2-BC-D3) WATER QUALITY REQUIREMENTS**

Alignment	Total Volume Required <sup>a</sup> (ac-ft)	Approximate Volume Available at Primary BMP Sites (ac-ft)	Volume Needed at Secondary/ Alternative BMP Sites (ac-ft)
Alignment A2	0.0	0.0	0.0
Alignment B	1.7	0.9	0.8
Alignment C	2.3	2.2	0.1
<i>With Hazel Street Station Option</i>	2.3	2.2	0.1
<i>With Dedicated Guideway Option at Hadley Avenue and 4th Street</i>	2.8	2.2	0.6
Alignment D3	2.7	2.9	0.0

<sup>a</sup> Based on Capitol Region and Ramsey-Washington Metro watershed districts' rules.



## 5.6. Geology, Groundwater and Soils

This section evaluates Project-related impacts to geology, groundwater and soils.

### 5.6.1. Regulatory Context and Methodology

#### 5.6.1.1. Regulatory Context

Minnesota has few regulations related to geologic resources, aside from groundwater dewatering. Parties must have a DNR water appropriation permit to dewater in excess of 1 million gallons per year or 10,000 gallons per day.

The NPDES regulates discharge from dewatering. The system requires a permit for all construction activities that disturb more than 1 acre of land. If the water is contaminated, parties must obtain from the MPCA an individual NPDES permit, or they can discharge groundwater to the sanitary sewer system – if the Council’s Environmental Services Division approves this action.

#### 5.6.1.2. Methodology

The analysis identified surface geology, bedrock geology and groundwater resources using the geologic atlases of Ramsey County<sup>59</sup> and Washington County,<sup>60</sup> and it used the DNR’s Cooperative Groundwater Monitoring program data to identify approximate groundwater depths.

### 5.6.2. Affected Environment

The analysis defined the study area for geology, groundwater and soils as the area within ½-mile of the potential limits of disturbance, which captures the surrounding area that the Project could affect.

#### 5.6.2.1. Geology

Glacial ice and meltwater during the last glaciation (Wisconsinan Stage) primarily deposited the surface sediments of both Ramsey and Washington counties. The advance and retreat of the Superior lobe and Grantsburg sublobe, an offshoot of the Des Moines lobe, and meltwater from these lobes deposited the sediments through most of the study area. The St. Croix Moraine, a hilly landscape formed near the edge of the Superior lobe, is present in most of the study area. As glacial ice from the Superior lobe retreated, the Glacial River Warren

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<sup>59</sup> Meyer, G.N.; Swanson, L., C-07, Geologic atlas of Ramsey County, Minnesota, *Minnesota Geological Survey*, 1992. Available from the University of Minnesota Digital Conservancy at: <https://conservancy.umn.edu/handle/11299/58233>. Accessed October 2018.

<sup>60</sup> Bauer, Emily J., C-39, Geologic Atlas of Washington County, Minnesota, *Minnesota Geological Survey*, 2016. Available from the University of Minnesota Digital Conservancy at: <https://conservancy.umn.edu/handle/11299/178852>. Accessed October 2018.



deepened and left sediments ranging from gravel to sand to silt along the terraces of the river. The analysis did not identify karst features,<sup>61</sup> or geologic hazards, within the study area.<sup>62</sup>

### 5.6.2.2. Groundwater

The analysis reviewed groundwater data from the DNR's Cooperative Groundwater Monitoring program.<sup>63</sup> According to the data, static water levels across the study area varied from approximately 36 feet from the land surface in downtown Saint Paul (Minnesota Department of Health (MDH) Unique Well No. 200517) to approximately 245 feet from the land surface in eastern Maplewood (MDH Unique Well No. 200054). According to the geologic atlases for Ramsey and Washington counties, susceptibility to groundwater pollution across the study area ranges from moderately susceptible to very highly susceptible.<sup>64, 65</sup> The western portion of the study area east of downtown Saint Paul and in the vicinity of White Bear Avenue, the 3M campus and Battle Creek Lake includes areas very susceptible to groundwater pollution.

### 5.6.2.3. Soils

The analysis used soil data was from digital surveys of Ramsey and Washington counties produced by the Soil Survey Geographic (SSURGO) dataset of the NRCS,<sup>66</sup> considered by technical experts to be Minnesota's best available soil data. **Attachment A-5-2** includes details about the soil types within the study area.

**Figure 5.6-1** shows soil erosion susceptibility, based on DNR information. Erosion susceptibility in the study area varies from low-medium (light orange on the figure) to medium-high (light green).<sup>67</sup>

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<sup>61</sup> A karst feature is an irregular limestone region in which erosion has produced sinkholes, underground streams and caverns.

<sup>62</sup> Minnesota Department of Natural Resources. "Karst Feature Inventory Points Shapefile," 2015. Available at: <https://gisdata.mn.gov/dataset/geos-karst-feature-inventory-pts>. Accessed July 2018.

<sup>63</sup> Minnesota Department of Natural Resources. Cooperative Groundwater Monitoring Program, 2016. Available at: <http://www.dnr.state.mn.us/waters/cgm/index.html>. Accessed July 2018.

<sup>64</sup> Minnesota Department of Natural Resources. Ramsey County Geologic Atlas. 1992. Available at: [https://www.dnr.state.mn.us/waters/groundwater\\_section/mapping/status.html](https://www.dnr.state.mn.us/waters/groundwater_section/mapping/status.html). Accessed August 2015.

<sup>65</sup> Minnesota Department of Natural Resources. Washington County Geologic Atlas. 1990. Available at: [https://www.dnr.state.mn.us/waters/groundwater\\_section/mapping/status.html](https://www.dnr.state.mn.us/waters/groundwater_section/mapping/status.html). Accessed August 2015.

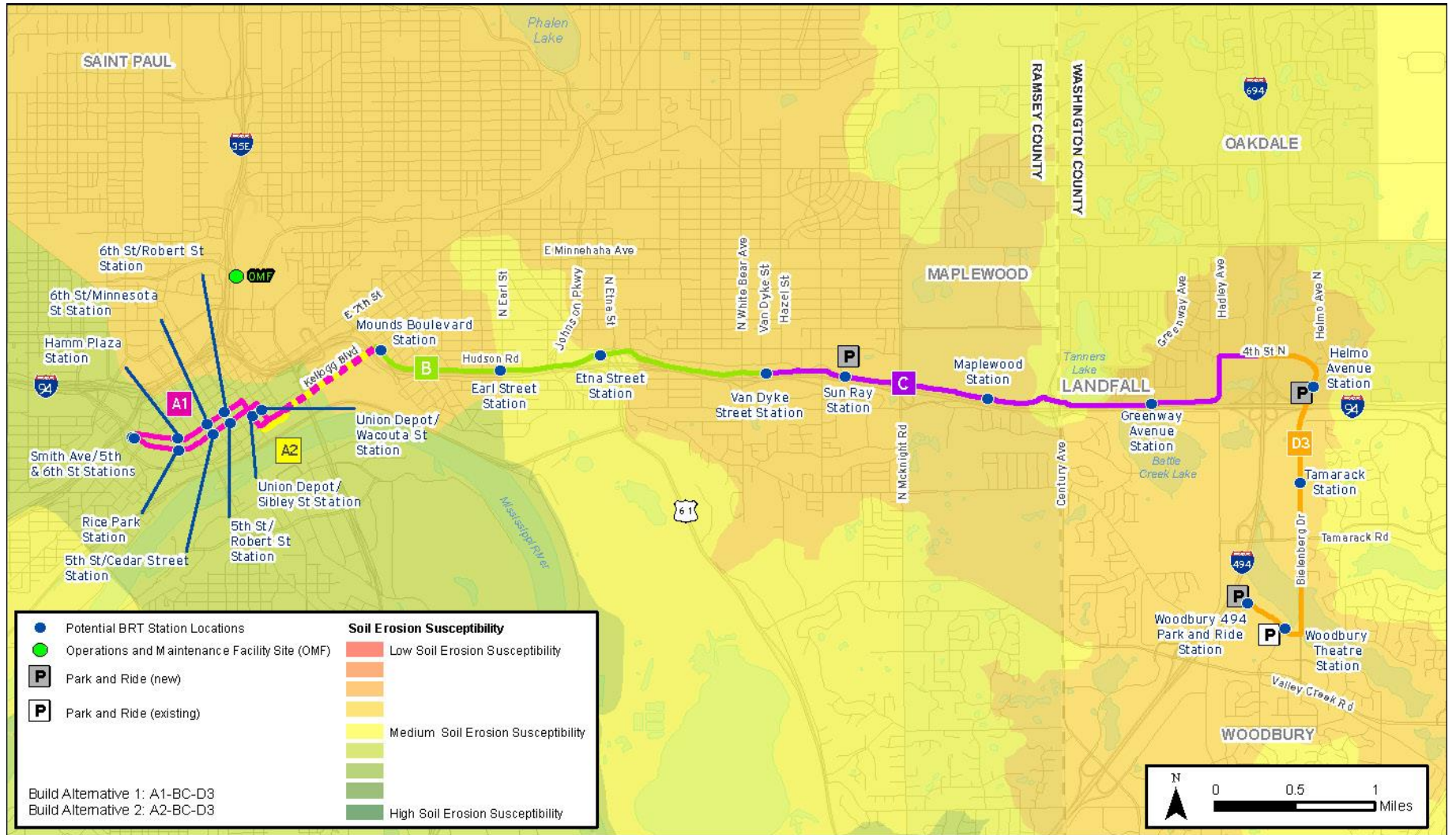
<sup>66</sup> U.S. Department of Agriculture. Natural Resources Conservation Service Web Soil Survey. Available at: <http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>. Accessed July 2018.

<sup>67</sup> Minnesota Department of Natural Resources. Available at: <http://arcgis.dnr.state.mn.us/ewr/whaf/Explore/>. Accessed September 2018.





FIGURE 5.6-1: ERODIBLE SOILS IN THE RESOURCE STUDY AREA





**ALIGNMENT A1 (SMITH AVENUE TO MOUNDS BOULEVARD),  
ALIGNMENT A2 (UNION DEPOT TO MOUNDS BOULEVARD),  
ALIGNMENT B (MOUNDS BOULEVARD TO WHITE BEAR AVENUE) AND  
ALIGNMENT C (WHITE BEAR AVENUE TO I-694)**

Most of Alignments A1, A2, B and C are located on developed land or previously disturbed land adjacent to roadways. Disturbed soils exist within these areas.

Steep slopes and soils with moderate erosion hazard exist within portions of the study area for these alignments. Most of these soils are associated with the Mississippi River Valley and Bluff Creek area and are outside of the potential limits of disturbance. Some steep slopes exist along interchanges with I-94, including the interchange at TH 61 and the crossing of I-694.

The SSURGO database generally classifies soils within the study area for these alignments as poorly drained to somewhat excessively drained; however, most of the area within the potential limits of disturbance is urban land. DNR mapping shows this area as between medium and high soil erosion susceptibility.

### **Hazel Street Station Option**

The area in the vicinity of intersection of Hazel Street and Old Hudson Road is developed or previously disturbed land. This area has an urban land classification. DNR mapping shows the area as low-medium soil erosion susceptibility.

### **Dedicated Guideway Option at Hadley Avenue and 4th Street**

The west side of Hadley Avenue at 4th Street is developed. The east side of Hadley Avenue immediately adjacent to the roadway is not developed. DNR mapping shows the area as having between low and medium soil erosion susceptibility.

### **ALIGNMENT D3 (I-694 TO WOODBURY 494 PARK-AND-RIDE)**

Most of the soil within the study area for Alignment D3 is located on developed land or previously disturbed land adjacent to roadways. Some steep slopes and soils with a moderate erosion hazard rating exist within small portions of the Alignment D3 study area.

The SSURGO database generally classifies the soils within the Alignment D3 study area as well-drained to somewhat excessively drained and with a slight erosion hazard rating. The SSURGO database classifies about half the soils within the potential limits of disturbance as well-drained with a slight erosion hazard rating. The database does not rate 14 percent of the soils, and it rates the remaining soils as a combination of very poorly drained, poorly drained, moderately well drained, excessively drained and somewhat excessively drained with slight to moderate hazards for erosion. DNR mapping shows the area as between low and medium soil erosion susceptibility.

## **5.6.3. Environmental Consequences**

### **5.6.3.1. Operating Phase (Long-Term) Impacts**

#### **BUILD ALTERNATIVE 1 (A1-BC-D3)**

After construction, there will be no exposed soils. All soils within the construction limits will be either turf-established, or covered with impervious surface, not changing the underlying conditions of the soils, geology or groundwater. Therefore, Build Alternative 1 would not produce long-term impacts to geology, groundwater or soils.



Neither the Hazel Street Station Option nor the Dedicated Guideway Option at Hadley Avenue and 4th Street would produce long-term impacts to geology, groundwater or soils.

#### **BUILD ALTERNATIVE 2 (A2-BC-D3)**

Build Alternative 2 would not produce long-term impacts to geology, groundwater or soils.

#### **5.6.3.2. Construction Phase (Short-Term) Impacts**

##### **BUILD ALTERNATIVE 1 (ALTERNATIVE A1-BC-D3)**

Physical impacts to geology and soils would occur during construction, however the analysis did not identify karst formations (geologic hazards) in the study area; therefore, Build Alternative 1 would not produce short-term impacts to geologic features or hazards.

The potential limits of disturbance include soils with slight and moderate erosion hazard ratings. Erosion is unlikely under ordinary climatic conditions in areas with a slight erosion hazard. Erosion is likely in areas with a moderate erosion hazard rating, and the Project would apply erosion-control measures in these areas as needed. The potential limits of disturbance also include poorly drained soils that may require corrections (such as removal or replacement with stable soils or treatment in-place) for construction of the guideway, pavement or other structures. If construction activities remove these soils, the Project would need to dispose of the excavated soils off-site or reuse them in areas that do not require consolidated soils.

Because most of the Project would follow the existing roadway network, the FTA and Council do not anticipate substantial grading in areas with steep slopes or other constraints; however, it does anticipate the need for grading in a few locations with steep slopes adjacent to roadways, such as areas where the guideway would be located between I-94 and the frontage road. The Council would utilize additional slope stabilization measures and potential retaining walls at these locations to mitigate the potential for erosion.

Neither the Hazel Street Station Option nor the Dedicated Guideway Option at Hadley Avenue and 4th Street would produce short-term impacts to geology, groundwater or soils.

##### **BUILD ALTERNATIVE 2 (A2-BC-D3)**

Build Alternative 2 would produce the same short-term impacts to geology, groundwater or soils as Build Alternative 1.

#### **5.6.4. Avoidance, Minimization and/or Mitigation Measures**

The Council does not anticipate impacts to geology, groundwater or soils from the Project; therefore, the FTA and Council do not propose avoidance, minimization and mitigation measures for either Build Alternative 1 or Build Alternative 2. All Project-related construction activities would adhere to the applicable grading and erosion-control standards and permitting requirements of MPCA, MnDOT, CRWD, RWMWD and the corridor communities.



## 5.7. Hazardous Materials and Contamination

This section evaluates Project-related impacts to hazardous materials and contamination.

### 5.7.1. Regulatory Context and Methodology

#### 5.7.1.1. Regulatory Context

The MPCA oversees regulations pertaining to contaminated materials management and cleanup plan approvals; petroleum underground storage tank registration and removal; asbestos abatement and NPDES permitting. Additionally, the MDH regulates groundwater and asbestos abatement and the Minnesota Department of Agriculture (MDA) regulates pesticide contamination. Activities that encounter contaminated materials must follow state and federal requirements for safe handling and disposal under the purview of the MPCA.

#### 5.7.1.2. Methodology

To identify and evaluate sites potentially containing regulated materials (pollutants, contaminants and/or hazardous materials), the Council completed a Phase I ESA in 2018<sup>68</sup> and a Phase II ESA in 2019.<sup>69</sup>

#### PHASE I ENVIRONMENTAL SITE ASSESSMENT

The Phase I ESA identified the possible risk for soil and groundwater contaminants that have the potential to migrate from nearby sites to the Project study area. The Phase I ESA was based on the MnDOT Office of Environmental Stewardship (OES) guidelines for completion of Phase I ESAs using a modified version of the American Society of Testing and Materials (ASTM) methodology E1527-13. The study area for the Phase I ESAs was 500 feet from the centerlines of the proposed Project alignments within the Build Alternatives. The Project's potential limits of disturbance provides a more refined study area, and the analysis used it to identify potential construction-related impacts. Further, the Council refined the Project potential limits of disturbance after completing the Phase I ESA, which found some additional potential limits of disturbance outside of the 500-foot study area. MnDOT reviewed these areas and found them to be low-risk; therefore, the Council did not need to update its assessment. Alignments B, C and D3 reflect these sites.

This Phase I ESA provided a risk ranking related to the potential risk associated with possible contamination in the area based on existing or past uses. Sites without identified environmental conditions were referred to as “no-risk.” Sites with identified environmental conditions were ranked as high-, medium- or low-risk sites. Sites were noted as *de minimis* in the Phase I ESA if there generally was no identified threat to human health or the environment based on the review. MnDOT OES defines the following sites as either high-, medium- or low-risk:

- Low environmental risk sites:
  - Hazardous waste generators
  - Railroad lines
  - Current lumber yards

<sup>68</sup> WSB & Associates Inc. and HNTB Corporation. Modified Phase I Environmental Site Assessment, Gold Line Bus Rapid Transit Alignments A, B, C and D3. August 2018.

<sup>69</sup> SEH Inc. Phase II Environmental Site Assessment, METRO Gold Line Bus Rapid Transit Alignments A, B, C and D3. August 2019.



- Golf courses
- Some farmsteads, residences and commercial properties with poor housekeeping practices
- Medium environmental risk sites:
  - All closed leaking underground storage tanks (LUST) sites;
  - All sites with underground storage tanks or aboveground storage tanks
  - Machine shops
  - All sites with historical vehicle repair activities
  - All bulk grain/feed storage
  - All historical lumber yards
  - All closed agricultural release sites
  - Graveyards
- High environmental risk sites:
  - Active and inactive MPCA Voluntary Investigation and Cleanup Program and Minnesota Environmental Response and Liability Act/Superfund sites
  - All active and inactive dump sites
  - All active LUST sites
  - All dry cleaners (with onsite or unknown chemical processing)
  - All bulk chemical/petroleum facilities
  - All active agricultural release sites
  - Railroad facilities (fueling, yards or maintenance)
  - Clandestine chemical/drug laboratories
  - All historical industrial sites with likely chemical use at the premises

## PHASE II ENVIRONMENTAL SITE ASSESSMENT

The Phase II ESA evaluated site-specific risks and identified actions to minimize or avoid these risks. The Phase II ESA investigated the presence of contamination and identified restrictions associated with potential soil reuse based on MPCA guidance at high and medium risk sites, as identified in the Phase I ESA. The sites chosen for investigation also included locations of new easements or acquisitions and areas of design features that would likely require subsurface work including excavation, foundations, dewatering, or infiltration that were not identified as high or medium risk sites in the Phase I ESA.

The Phase II ESA included collecting soil and groundwater samples for laboratory analysis. During May and June 2019, the Phase II ESA investigation encompassed 108 soil borings, 21 test pits and 10 hand auger borings. These samples were taken throughout Alignments B, C and D3. The Council did not sample Alignments A1 and A2 in downtown Saint Paul because there will be minimal subsurface disturbance based on the guideway operating along existing streets. Additionally, subsurface work for the Project will be limited to the proposed station locations, avoiding subsurface utilities outside of these areas. The Council will manage any contaminated materials encountered during construction in accordance with a Response Action Plan (RAP) that will be completed for the Project prior to construction. Prior to construction, the Council will also develop a Construction Contingency Plan (CCP), which is a document that provides guidance on how to address and manage potential contamination at a site when the specific environmental issues are previously unknown.



The Phase II ESA identified three categories of soil in the Project study area. These categories are based on the types and levels of contamination encountered, if any, and defined based on regulatory levels and guidelines, where established, by the MPCA, MDH and MDA. Soil results were compared to the MPCA Residential Soil Reference Values (Tier 1 SRVs), Industrial Soil Reference Values (Tier 2 SRVs) and Screening Soil Leaching Values (SLVs), and the MPCA document “Best Management Practices for the Off-Site Reuse of Unregulated Fill (Guidance Document c-rem1-012012). Soil results were also compared to the MDA soil cleanup goals for Lists 1, 2, 3 and certain unique chemistry pesticides. Groundwater results were compared to the MDH Health Based Guidance (HBG) values that have been established for drinking water. These values are used as a proxy for evaluating the chemicals detected in groundwater; however, for construction purposes, the treatment limits for groundwater dewatering discharge would be established in the individually issued discharge permit for the project. The Phase II ESA found the following three categories of soil in the Project study area:

- **Unregulated Material:** Soil meets all MPCA requirements to be classified as unregulated material that can be reused anywhere on or off the Project without restriction.
- **Regulated Reuse Material:** Soil contains debris or other field indications of contamination and/or soil laboratory analytical results exceed the Tier 1 Residential SRVs for one or more contaminants but are less than the Tier 2 Industrial SRVs for those contaminants detected. The soil is considered impacted and may be reused on-site in certain restricted locations pre-determined with proper permitting.
- **Regulated Material:** Soil laboratory analytical results exceed the Tier 2 Industrial SRVs for one or more contaminants. The soil is considered impacted and any material removed as part of Project construction is required to be disposed at a landfill permitted to accept the material.

## 5.7.2. Affected Environment

### 5.7.2.1. Phase I Environmental Site Assessment Sites

Potentially contaminated properties are often located in previously developed industrial and commercial areas, which are typical land uses within the Project area. **Table 5.7-1** shows the number of sites within the Phase I ESA study area and potential limits of disturbance containing potentially hazardous or regulated materials or other sources of potential contamination based on the Phase I ESA for Alignments A1, A2, B, C, and D3.

**TABLE 5.7-1: NUMBER OF HIGH-, MEDIUM- AND LOW-RISK SITES WITHIN THE PHASE I ENVIRONMENTAL SITE ASSESSMENT STUDY AREA**

Alignment	High-Risk Sites		Medium-Risk Sites		Low-Risk Sites	
	Phase I ESA Study Area	Potential LOD	Phase I ESA Study Area	Potential LOD	Phase I ESA Study Area	Potential LOD
Alignment A1	85	32	79	21	18	4
Alignment A2	40	5	22	3	2	0
Alignment B	11	7	31	14	15	3
Alignment C	8	4	18	7	15	7
<i>With Hazel Street Station Option</i>	8	4	18	7	15	7



Alignment	High-Risk Sites		Medium-Risk Sites		Low-Risk Sites	
	Phase I ESA Study Area	Potential LOD	Phase I ESA Study Area	Potential LOD	Phase I ESA Study Area	Potential LOD
<i>With Dedicated Guideway Option at Hadley Avenue and 4th Street</i>	8	4	18	7	15	7
Alignment D3	2	2	6	4	11	6

### 5.7.2.2. Phase II Environmental Site Assessment Sites

Error! Reference source not found. shows lists by alignment the soil categories encountered based on the Phase II ESA investigation. The Phase I ESA results in **Table 5.7-1** are used to evaluate impacts for Alignments A1 and A2.

**Figure 5.7-1, Figure 5.7-2, Figure 5.7-3, Figure 5.7-4, Figure 5.7-5, Figure 5.7-6, and Figure 5.7-7** show the regulated material and regulated reuse material sites identified from the Phase I ESA and investigated during the Phase II ESA.

**TABLE 5.7-2: NUMBER OF SITES IDENTIFIED AS CONTAINING REGULATED MATERIAL, REGULATED REUSE MATERIAL, OR UNREGULATED MATERIAL BASED ON THE PHASE II ESA**

Alignment <sup>a</sup>	Regulated Material Sites	Regulated Reuse Material Sites	Unregulated Material Sites	Total
Alignment B	6	23	42	71
Alignment C	0	12	25	37
<i>With Hazel Street Station Option</i>	0	12	25	37
<i>With Dedicated Guideway Option at Hadley Avenue and 4th Street</i>	0	12	25	37
Alignment D3	0	6	25	31
<b>TOTAL</b>	<b>6</b>	<b>41</b>	<b>92</b>	<b>139</b>

<sup>a</sup> Alignments A1 and A2 located in downtown Saint Paul were not included in the Phase II ESA. These alignments will require minimal subsurface disturbance since the guideway will be along existing streets and construction limited to station locations. Additionally, there were substantial barriers to subsurface investigation due to the density of subsurface utilities.

Contaminants detected in soil analytical samples were typical of an urban area and included low levels of petroleum hydrocarbons, metals, and Polycyclic Aromatic Hydrocarbon (PAHs). In addition, small amounts of debris, including brick, bituminous, concrete, and slag, were identified in fill materials at a number of sample locations. An area investigated for the Phase II ESA appeared to be part of the former Johnson Parkway dump, located near the intersection of Hudson Road and Wakefield Avenue within Alignment B. Test pits in this area



revealed soil with 10 to 60% debris consisting of concrete, metal, glass, and other refuse, and moderate concentrations of petroleum, metals, herbicides, polychlorinated biphenyl (PCBs) and PAHs in soil analytical samples (See **Figure 5.7-2** for test pit locations B030, B031, B032, B033, B035, B036, B037, B038, and B038r). The Phase II ESA identified low level concentrations of contaminants in groundwater analytical samples (petroleum hydrocarbons and PAHs).

The Minnesota Department of Health (MDH) has identified Per- and Polyfluorinated Alkyl Substances (PFAS) as an emerging contaminant of concern in the area east of St. Paul. The Lake Elmo/Oakdale Special Well and Boring construction Area (SWBCA) was established by the MDH Well Management Program (updated 2007) to regulate construction, repair and sealing of regulated wells and borings within the SWBCA. The boundary of the SWBCA follows Century Avenue on the west and I-94 on the south. A small portion of the Project area (from Century Avenue to I-494) lies partially within the SWBCA. The Phase II ESA did not include analysis of groundwater samples for PFAS because work completed by MDH prior to the Phase II ESA indicated that PFAS is confined to deeper bedrock aquifers in the I-94/I-694 area, at the eastern Project limit. MDH also detected trace levels of PFAS in surface waters in the area, including Tanners Lake and Battle Creek Lake.

### 5.7.3. Environmental Consequences

#### 5.7.3.1. Operating Phase (Long-Term) Impacts

##### BUILD ALTERNATIVE 1 (A1-BC-D3)

The Project's operations would not produce hazardous or regulated materials, and it would not install permanent storage tanks. The Council would collect and dispose of oils, grease and other waste materials from vehicle maintenance and repair in accordance with recognized industry BMPs for bus maintenance facilities.

Acquiring contaminated land or land that contains hazardous or regulated materials for the Project adds cost and potential liability risks, the extent of which would be based on the types and extents of the contamination. As the Project design advances during the Project Development and Engineering phases, the Council will continue to review the potential limits of disturbance for additional operations-related impacts. The Council will use the findings of the Phase II ESA to avoid, to the extent possible, acquiring land with known contamination that is not easily remediated or contained.

##### BUILD ALTERNATIVE 2 (A2-BC-D3)

Build Alternative 2 would have the same long-term Project-related impacts as Build Alternative 1.

#### 5.7.3.2. Construction Phase (Short-Term) Impacts

##### BUILD ALTERNATIVE 1 (A1-BC-D3)

Short-term impacts typically result from earthwork or other disturbances at or in proximity to contaminated areas that might result in the release of hazardous or contaminated materials. However, based on the results of the Phase II ESA, the majority of soils within the limits of disturbance consist of urban fill materials with low levels of petroleum, metals and polycyclic aromatic hydrocarbons (PAHs) which are all products of diffuse industrial and/or combustion emissions, not from point source releases. In addition, small amounts of debris, including brick, bituminous, concrete, and slag, were identified in fill materials at a number of sample locations. Most detected parameters were at concentrations below the Minnesota Pollution Control Agency Unregulated Fill Criteria (MPCA UFC), therefore the soil would be unrestricted for re-use anywhere. Materials at some locations that exceeded the MPCA UFC because of analytical results and/or debris content are regulated but can be re-used as fill material in the limits of disturbance (such as in the base, grade, or slope of the guideway) where geotechnically suitable. Six





locations had one or more parameters exceeding the MPCA UFC in soil. Any soil excavated in these locations will be properly managed and disposed at a permitted landfill. With one exception, no contaminated area identified by the Phase II ESA presents a risk of adverse effects due to ground disturbing activities (such as causing adverse effects beyond the area of disturbance or contributing to groundwater contamination). The exception is the former Johnson Parkway dump (described in **Section 5.7.2.2.**) where ground disturbance presents a risk of causing potential adverse effects. However, material excavated from the dump will be properly managed and groundwater depth in the area which is greater than 30 feet below ground surface indicates it is less likely to be impacted by disturbance of dump material.

Short-term construction impacts can also result from spills of hazardous materials during construction. In addition to construction impacts, people present within and adjacent to the Project construction area could potentially be exposed to hazardous materials. Site workers may be exposed through physical contact with, or ingestion or inhalation of, contaminants uncovered in excavations. Occupational Health and Safety Administration guidelines will be followed during construction. Exposure to passersby would likely be limited to inhalation of contaminant vapors emanating from freshly uncovered contaminants. Public exposure through physical contact with contaminated material or contaminant ingestion would be prevented by site access barriers.



FIGURE 5.7-1: ALIGNMENT A1 HAZARDOUS AND CONTAMINATED SITES

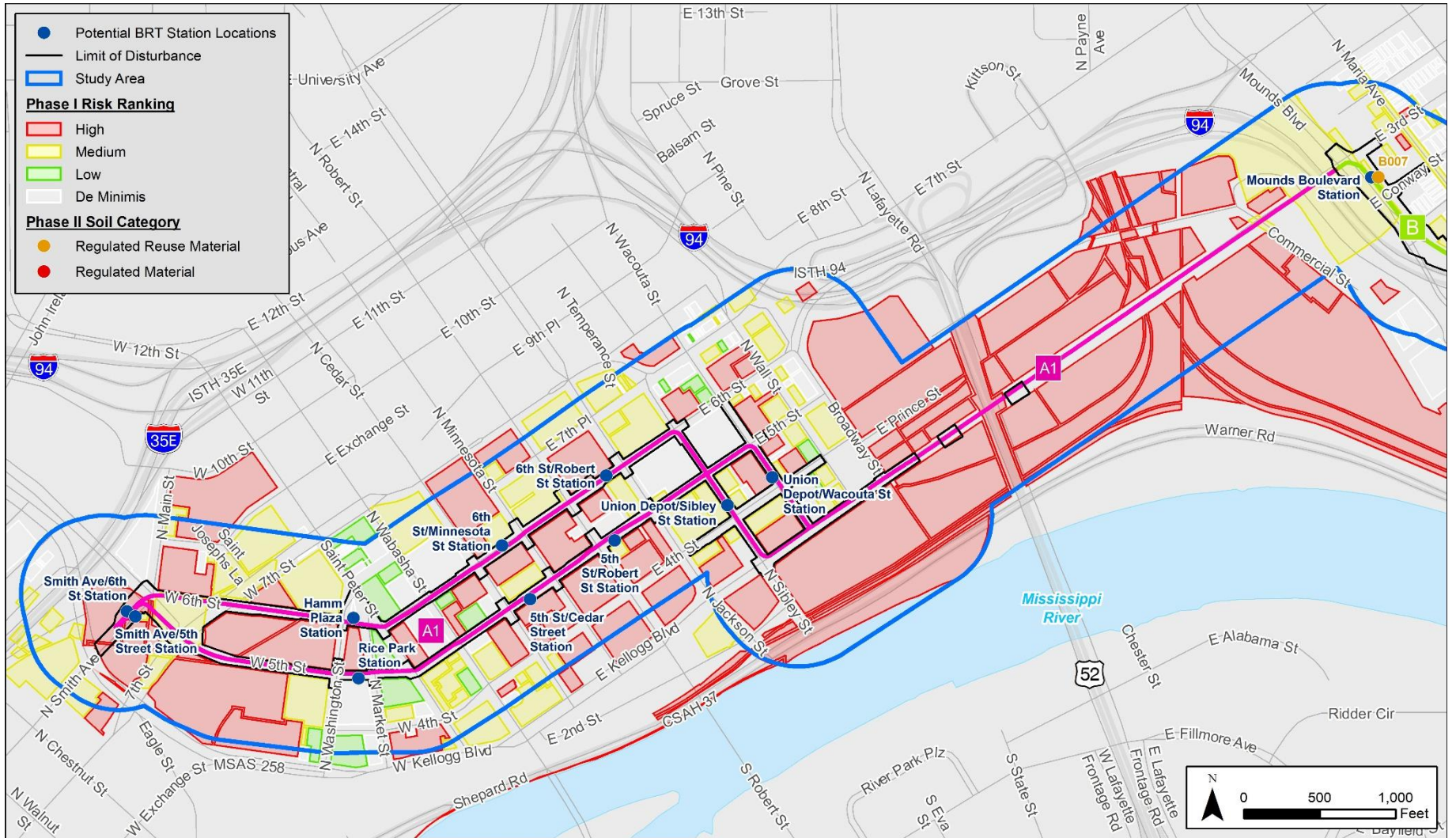




FIGURE 5.7-2: ALIGNMENT B HAZARDOUS AND CONTAMINATED SITES

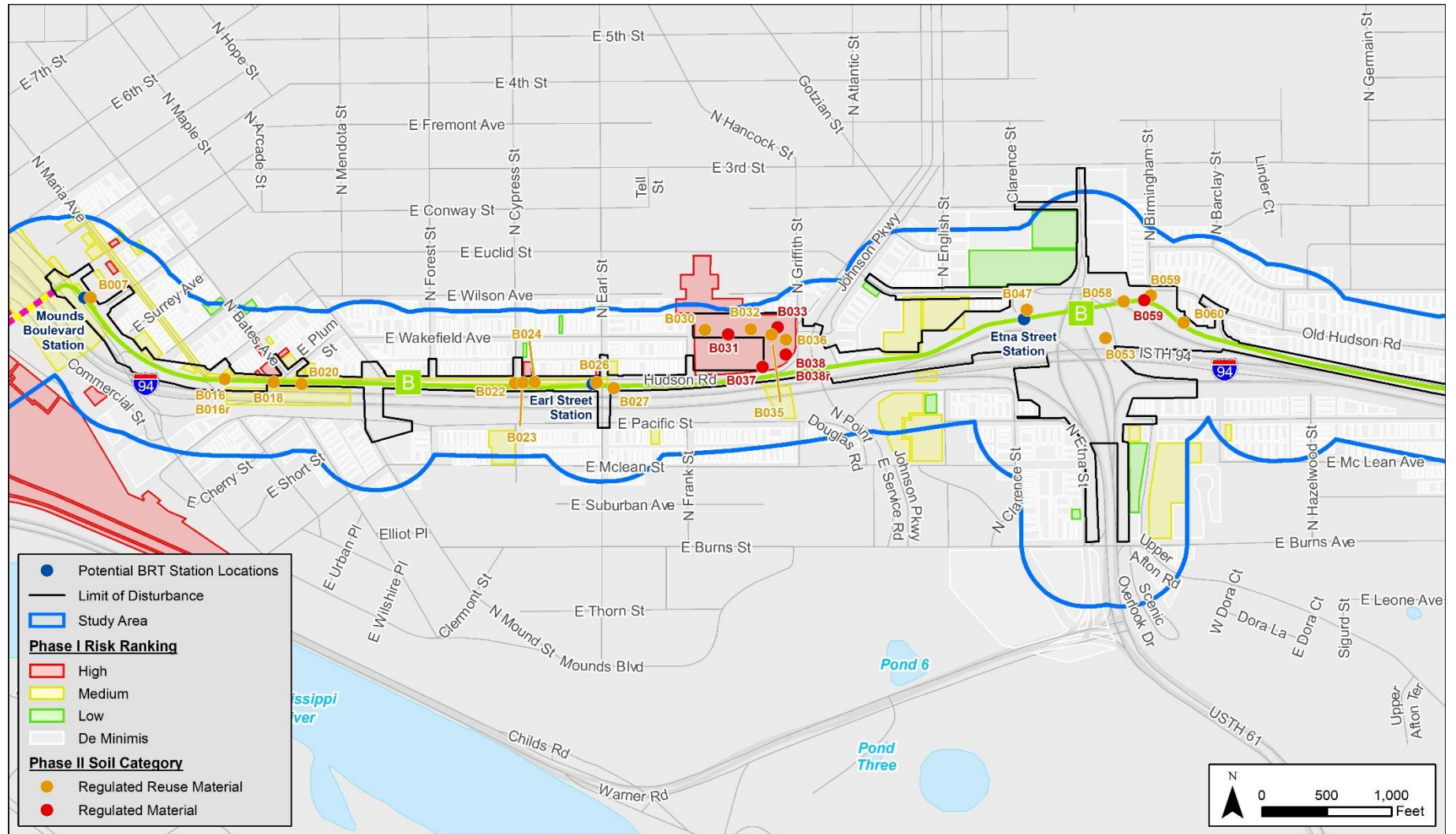




FIGURE 5.7-3: ALIGNMENTS B AND C HAZARDOUS AND CONTAMINATED SITES

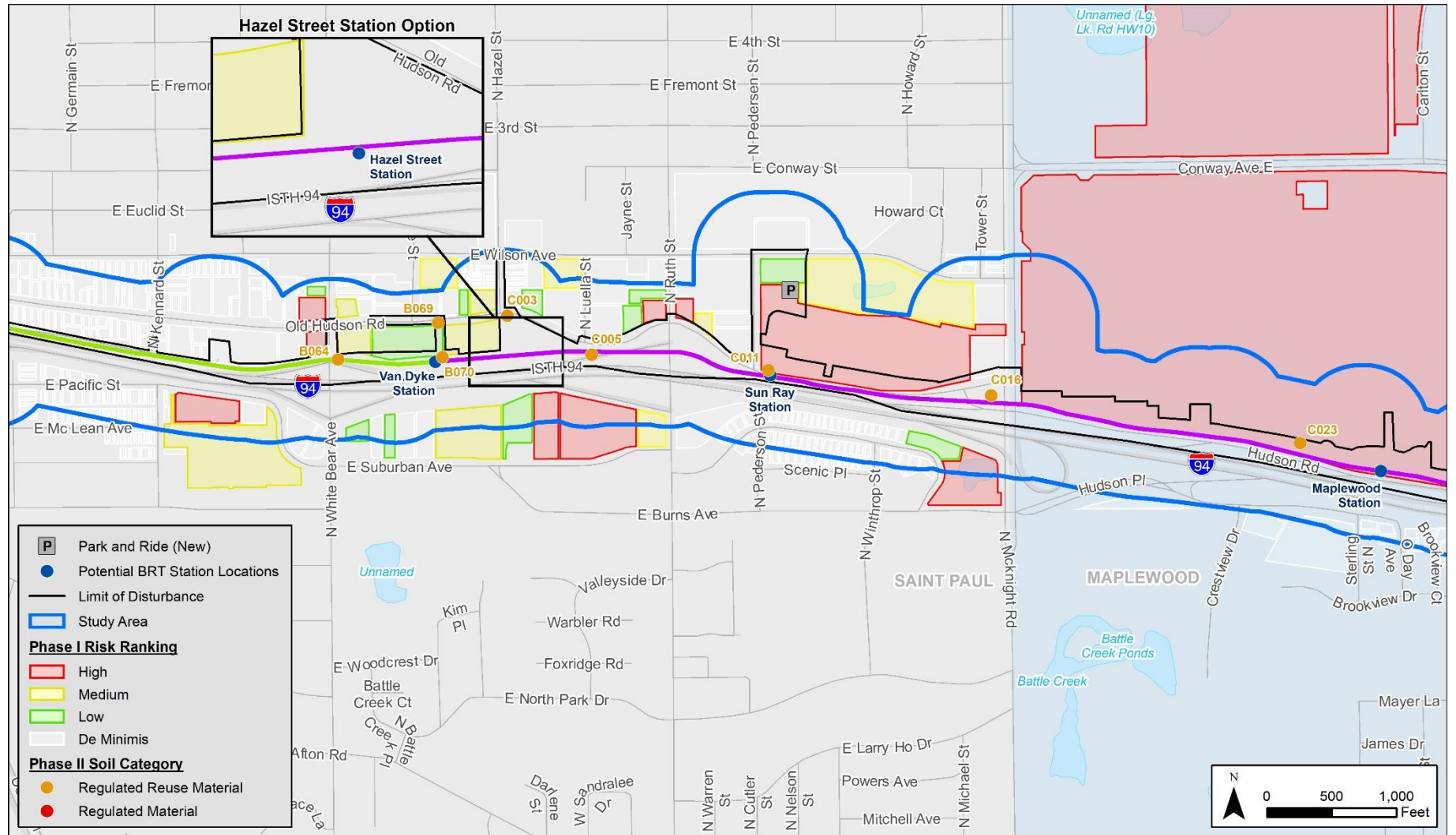




FIGURE 5.7-4: ALIGNMENT C HAZARDOUS AND CONTAMINATED SITES

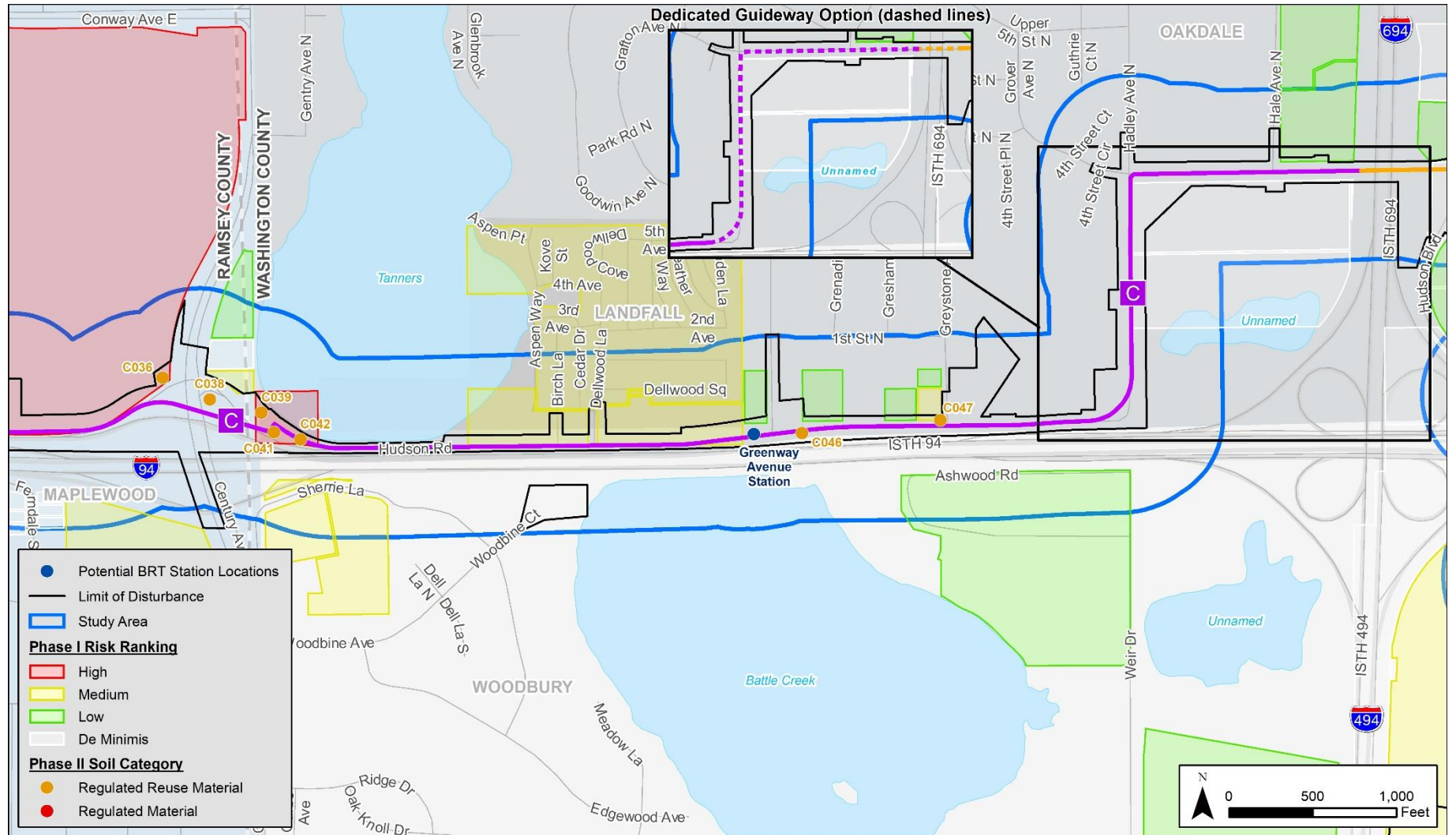


FIGURE 5.7-5: ALIGNMENT D3 HAZARDOUS AND CONTAMINATED SITES

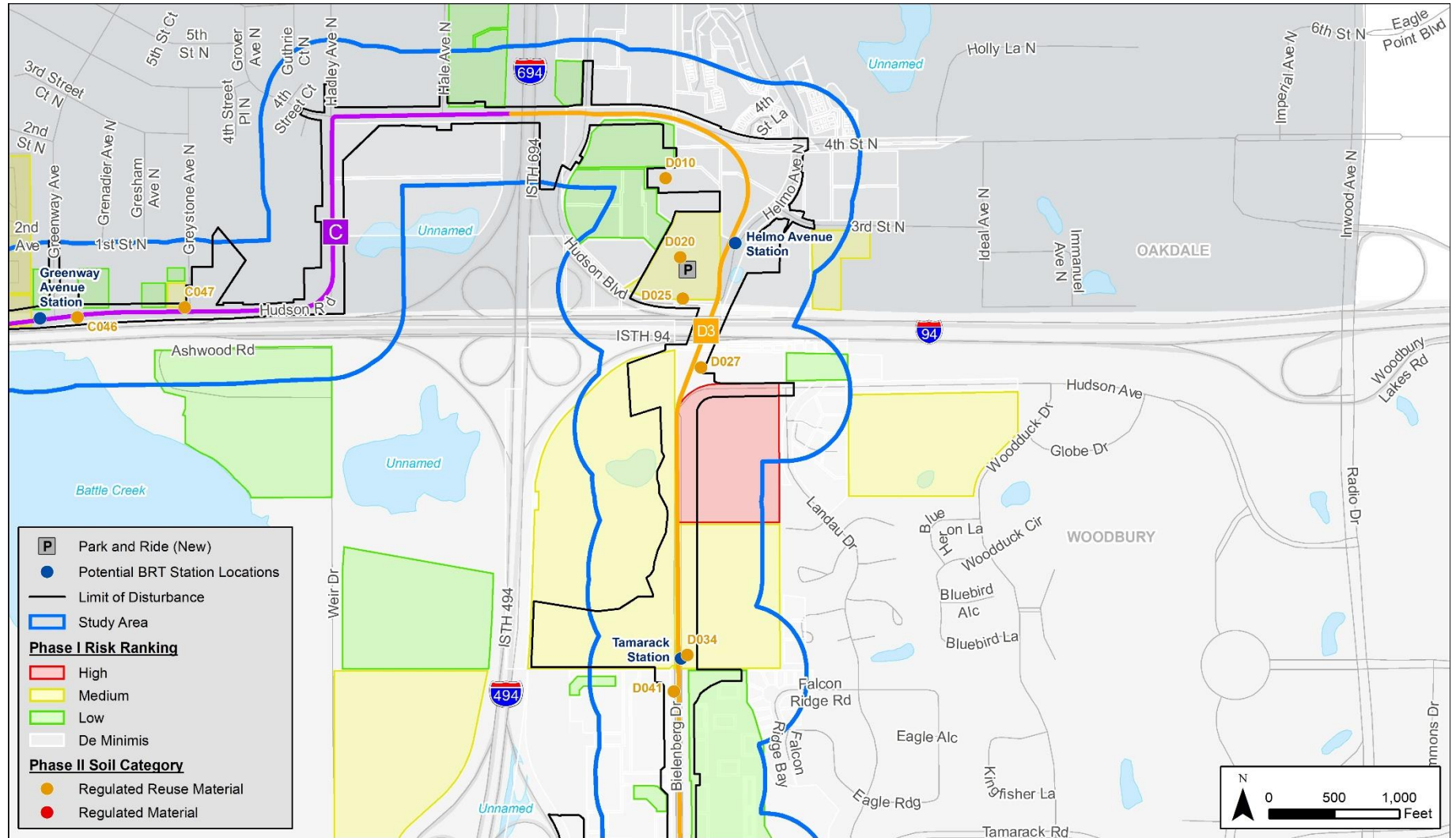
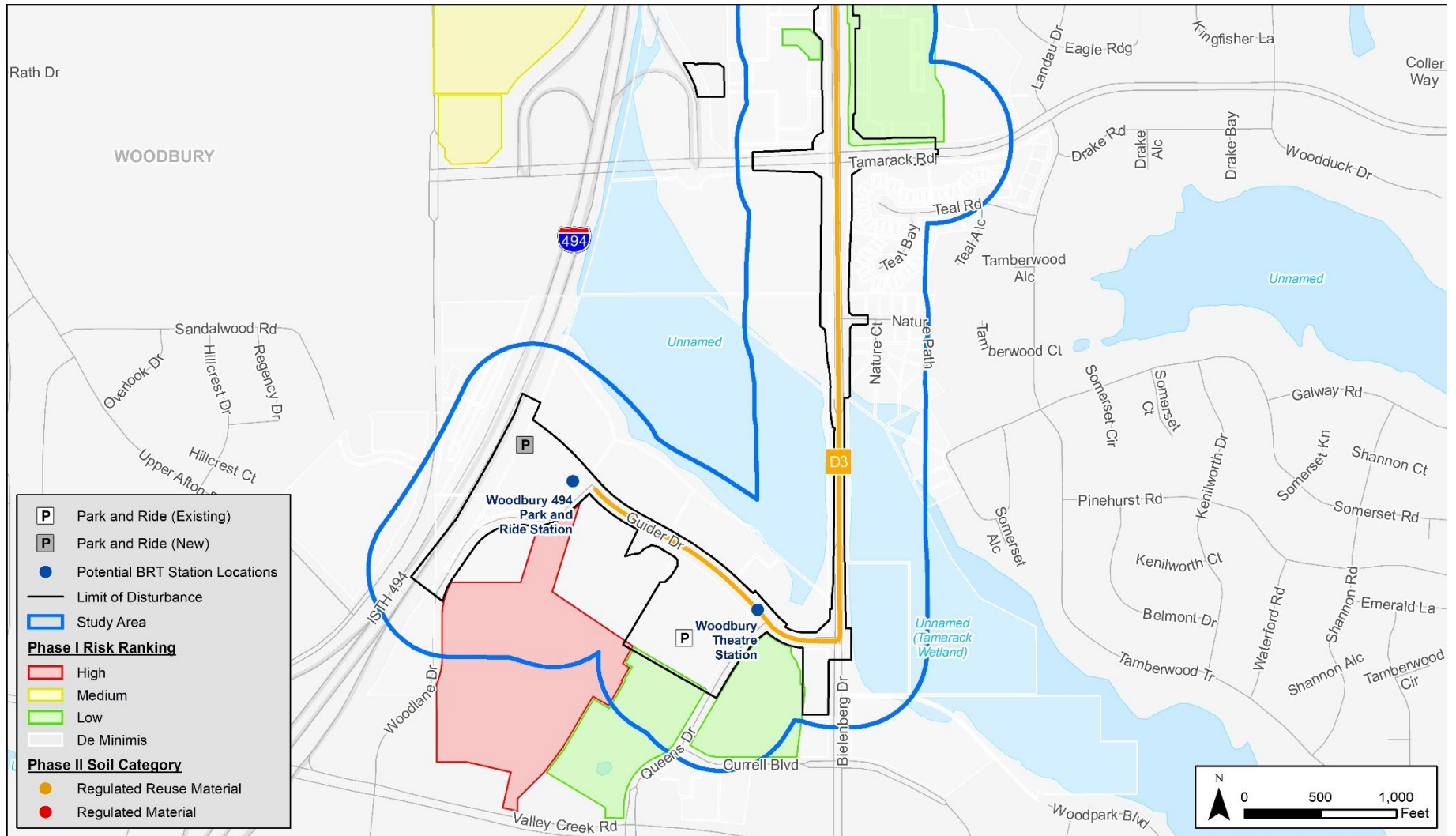




FIGURE 5.7-6: ALIGNMENT D3 HAZARDOUS AND CONTAMINATED SITES





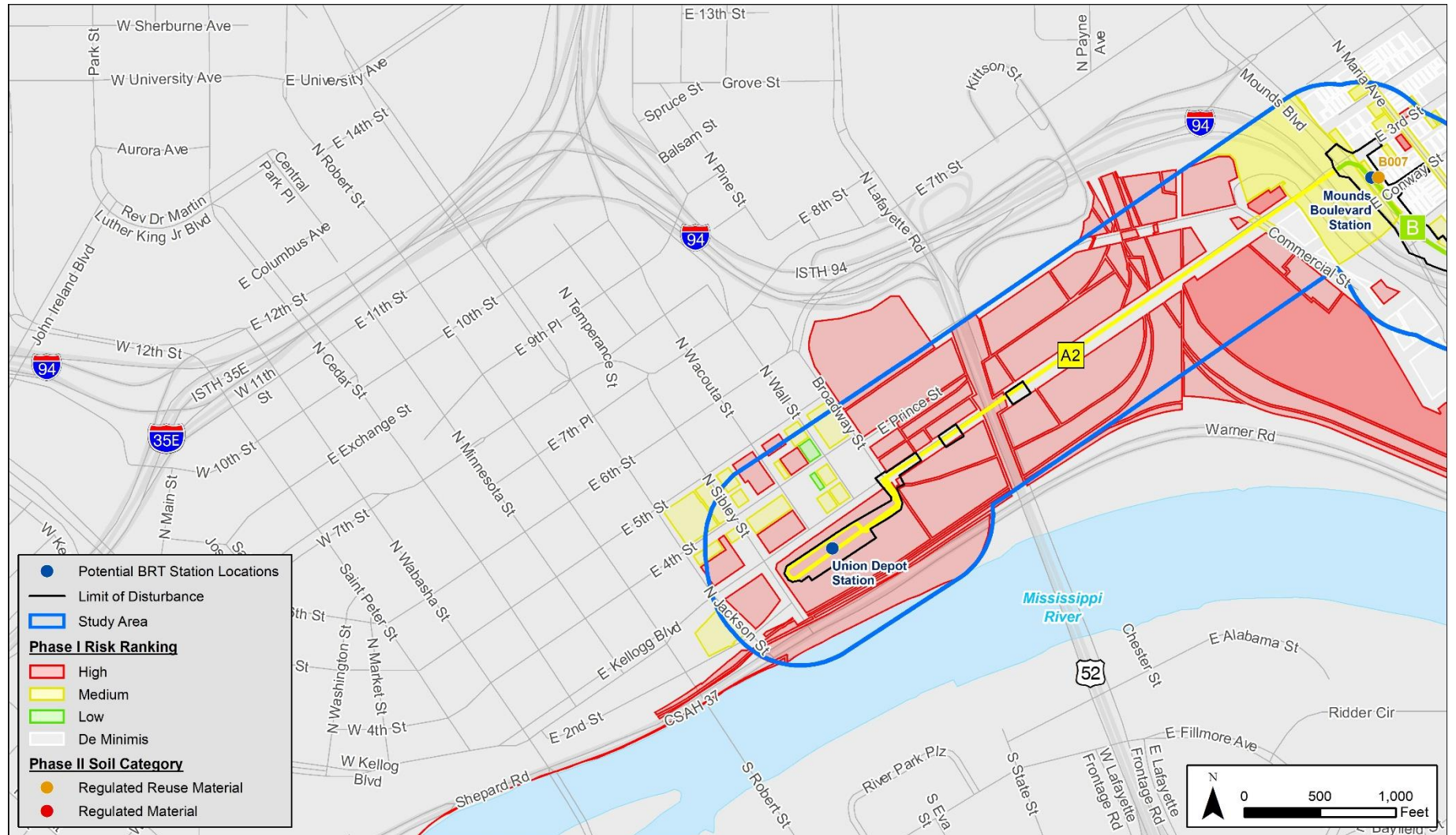
## BUILD ALTERNATIVE 2 (A2-BC-D3)

Alignment A2 under this Build Alternative would terminate at Union Depot and would not impact the portion of the Project area west of Union Depot to Smith Avenue; therefore, Alignment A2 would produce fewer short-term impacts to sites potentially containing hazardous or regulated materials or other sources of potential contamination than Alignment A1 under Build Alternative 1. The impacts along the remainder of Alignment BC-D3 would be the same as Alternative 1. **Figure 5.7-7** shows the regulated material and regulated reuse material sites identified from the Phase I ESA and investigated during the Phase II ESA.





FIGURE 5.7-7: ALIGNMENT A2 HAZARDOUS AND CONTAMINATED SITES





#### 5.7.4. Avoidance, Minimization and/or Mitigation Measures

Avoidance, minimization and mitigation measures apply to both Build Alternative 1 and Build Alternative 2 and will continue to be reviewed throughout the design phase of the Project. Avoidance and minimization are anticipated to include limiting or eliminating stormwater ponding and infiltration in contaminated areas, reducing or eliminating ground disturbance in contaminated areas, or removing and remediating contaminated soils if they are encountered.

The Council has undergone the initial environmental due diligence steps with the completion of the Phase I ESA and Phase II ESA. Based on the results of these documents and continued design to avoid and minimize impacts to contaminated areas, where disturbance of hazardous and contaminated material cannot be avoided, the next step the Council will take is to enter into the MPCA Brownfield program so that appropriate letters of assurance may be requested. Available letters of assurance include the following:

- Technical Assistance Letter
- No Association Determination
- Retroactive No Association Determination
- No Action Letter or No Further Action Letter
- Off-Site Source Determination Letter
- Certification of Completion

The targeted letters for this Project include No Association Determinations and No Further Action letters; the other letters require a level of investigation and/or remediation that would be beyond the scope of the project. Details on the two letters are provided below:

##### *No Association Determination*

The No Association Determination (NAD) provides statutory liability protection to non-responsible parties who purchase sites with pre-existing contamination and who undertake and complete response actions as approved by MPCA. The response actions and, therefore, the NAD are specifically tied to proposed actions at the site and to proposed future land use. Three conditions are necessary to obtain a NAD: the property must have an identified release (revealed by Phase II ESA); the party receiving the assurance must not be a responsible party for the identified release; and the party receiving the assurance must have an ownership interest in the site (as defined in Minnesota Environmental Response and Liability Act 115B.03).

##### *No Action Letter/No Further Action Letter*

The No Action and No Further Action Letters are administrative decisions stating that, based on review of submitted documents, the MPCA will not take specific administrative or enforcement action or will not refer the site to the United States Environmental Protection Agency's Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) list, prepare a Hazardous Ranking System score, or recommend that the site be placed on the Superfund list known as the Permanent List of Priorities (PLP). The No Action Letter is used at sites, at which no cleanup is required. The No Further Action Letter is used at sites at which a cleanup was conducted.

The Council will also develop a Response Action Plan (RAP) prior to the start of construction that addresses proper management techniques for the management (handling, storage treatment, and disposal) of hazardous materials, contaminated media (soil, groundwater, sediment, etc.), and other regulated materials/wastes. The Council will also develop as part of the RAP, a Construction Contingency Plan (CCP) for handling previously



unknown contaminants that construction activities discover. All contaminated media encountered during construction will be managed in accordance with state and federal regulations and in keeping with MPCA BMPs and the RAP/CCP. For any petroleum or chemical release that is encountered or may occur, the Minnesota Duty Officer would be contacted within 24 hours of the release, and the Officer would then immediately make the required agency contacts.

The Council will assess structures for asbestos-containing materials, lead-based paint and other regulated materials/wastes before demolition. The Council will prepare a demolition and disposal plan for identified contaminants that construction activities may discover.

## 5.8. Noise and Vibration

This section evaluates Project-related impacts to noise and vibration.

### 5.8.1. Regulatory Context and Methodology

#### 5.8.1.1. Regulatory Context

The analysis assessed noise and vibration according to the FTA's *Transit Noise and Vibration Impact Assessment Manual*,<sup>70</sup> which is consistent with FHWA's guidance regarding the level of analysis needed for transit-only projects that require only limited participation from FHWA.<sup>71</sup> To be considered "transit-only," the Project had to meet the following criteria:

- The FTA is the lead agency in the NEPA environmental review process, and FHWA has limited participation as a cooperating agency
- The main transportation purpose of the project, as stated in the purpose and need, is transit-related and not highway-related
- The project does not use federal-aid highway funds

The Project would relocate existing noise barriers along I-94 within the Project area to accommodate the BRT dedicated guideway, so the Council used FHWA's Traffic Noise Model Version 2.5 to demonstrate that relocated and replaced barriers would mitigate noise with the same effectiveness as the existing barriers (see **Attachment A-5-3** for analysis of existing noise barriers).

The MPCA enforces the State of Minnesota's established noise rules.<sup>72</sup> **Section 5.8.1.4** discusses MPCA's noise criteria and their applicability to the Project.

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<sup>70</sup> Federal Transit Administration. *Transit Noise and Vibration Impact Assessment Manual*. 2018. Available at: <https://www.transit.dot.gov/research-innovation/transit-noise-and-vibration-impact-assessment-manual>. Accessed November 2018.

<sup>71</sup> Federal Highway Administration. "Noise Policy FAQs – Frequently Asked Questions". 2015. Available at: [http://www.fhwa.dot.gov/environment/noise/regulations\\_and\\_guidance/faq\\_nois.cfm#A10](http://www.fhwa.dot.gov/environment/noise/regulations_and_guidance/faq_nois.cfm#A10). Accessed November 2018.

<sup>72</sup> "Noise Pollution Control," Chap. 7030, Minnesota Rules. Available at: <https://www.revisor.mn.gov/rules/7030/full>. Accessed November 2018.



### 5.8.1.2. Understanding Noise and Vibration

#### NOISE

Small changes in air pressure above and below the standard atmospheric pressure produces sound; noise is sound that is usually unwanted. The following three parameters define noise:

##### Level

A sound's "level," expressed in decibels (dB), is the magnitude of air-pressure change above and below atmospheric pressure. Typical sounds fall between 0 dB (the lower limits of human hearing) and 120 dB (the highest sound levels experienced in the environment). Humans perceive a 3 dB change in sound level as a barely noticeable change outdoors, and a 10 dB change in sound level as a doubling (or halving) of the sound.

##### Frequency

The frequency (pitch or tone) of sound, expressed in hertz (Hz), or cycles per second, is the rate of air-pressure changes. Human ears can detect a wide range of frequencies from about 20 Hz to 20,000 Hz; however, human hearing is not effective at high and low frequencies, so analyses use the A-weighting system (dBA) to correlate sound with human response to noise. Acousticians widely use the dBA sound level as the most appropriate descriptor for environmental noise.

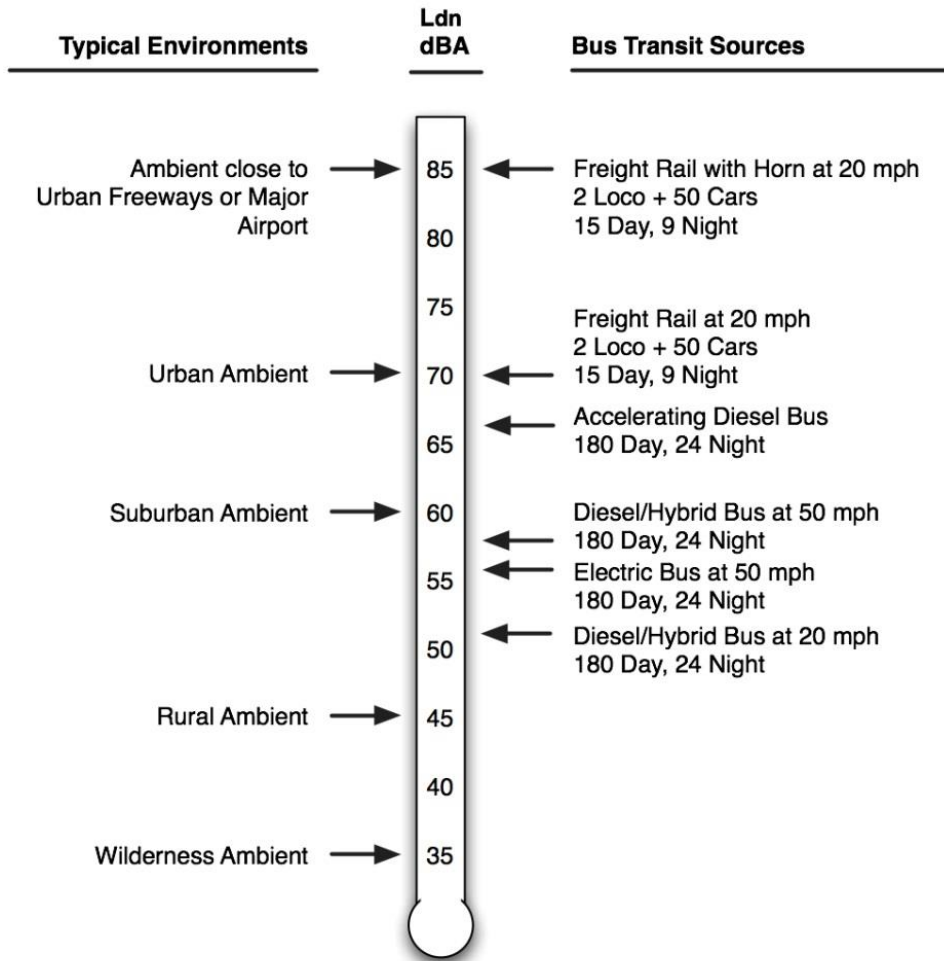
##### Time Pattern

Because environmental noise is constantly changing, it is common to condense this information into a single number called the "equivalent" sound level (Leq). The Leq represents the changing sound level over a period – typically one hour or 24 hours for transit-noise assessments. The common noise descriptor used for transit project analyses is the day-night sound level (Ldn). Most federal agencies have adopted Ldn to describe how people respond to noise in their environment. Ldn is a 24-hour cumulative A-weighted noise level that includes all noises that happen within a day, with a 10 dB penalty for nighttime noise (10 p.m. to 7 a.m.). This nighttime penalty means that any noise events at night are equivalent to 10 similar events during the day.

**Figure 5.8-1** illustrates typical Ldn values for various transit operations.



**FIGURE 5.8-1: TYPICAL NOISE LEVELS FROM TRANSIT OPERATIONS**



**VIBRATION**

Most people do not experience ground-borne vibration or ground-borne noise every day, and they are not environmental concerns as common as airborne noise. Smooth roadways create hardly any noticeable vibration levels. Normal human activities in a building generate most perceptible indoor vibrations; construction activities, rough roads, and passenger and freight trains are the sources of most perceptible outdoor ground-borne vibration and ground-borne noise. Passenger trains can include commuter rail, defined as conventional passenger railroad utilizing locomotive-hauled coaches, or rapid transit, also known as heavy rail transit and defined as public transit with tracked vehicles in multiple units operating in exclusive rights-of-way, often with electrical power.

Analyses describe vibration in terms of the displacement, velocity or acceleration of a vibrating surface. The human response to vibration is a function of the average motion over a longer (but still short) time, such as one second. Analyses use a motion's root mean square amplitude over one second to predict human response to vibration.



“Decibel” notation describes the vibration relative to a reference quantity. Analyses use vibration velocity (VdB) to quantify transit-generated vibration. VdB in decibels is the ratio of the root mean square velocity amplitude to the reference velocity amplitude, typically calculated as  $1 \times 10^{-6}$  in./sec.

Background levels in residential neighborhoods are typically 50 VdB or lower; the human vibration threshold is 65 VdB.

Error! Reference source not found. shows common sources of vibration along with human and structural responses to the sources.

#### **FIGURE 5.8-2: TYPICAL LEVELS OF GROUND-BORNE VIBRATION**

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### 5.8.1.3. Methodology

#### NOISE

The analysis used FTA's Detailed Noise Assessment methodology, which included the following steps:

1. Identified noise-sensitive land uses in the corridor using aerial photography, geographic information system (GIS) data and field surveys, typically within 300 feet of the alignment
2. Measured existing noise levels in the Project corridor near sensitive receptors
3. Predicted project noise levels from bus operations at a setback distance of 50 feet, per FTA guidance, using preliminary engineering plans for the Project and information about its anticipated speeds, headways and hours of operation
4. Determined impact contours by calculating the distance to which the noise levels from the Project would exceed FTA's moderate noise impact criteria
5. Determined the locations of noise-sensitive receptors relative to the noise contours calculated above. If no noise-sensitive receptors were within the noise contours, the analysis does not anticipate impacts from the Project
6. Recommended mitigation at locations where anticipated future noise levels would exceed FTA's impact criteria

The Council based its noise analysis on the following weekday operating plan for the Project, which includes more buses than the weekend operating plan and therefore provides a worst-case for the noise analysis:

- Bus operating speeds would range from an average of 10 mph in downtown Saint Paul up to an average of 35 mph in the eastern portion of the corridor
- The operating hours and headways would be as follows:
  - › Early morning (5-6 a.m.): 30-minute headways
  - › AM peak (6-9 a.m.): 10-minute headways
  - › Midday (9 a.m. to 3 p.m.): 15-minute headways
  - › PM peak (3-6 p.m.): 10-minute headways
  - › Early evening (6-8 p.m.): 15-minute headways
  - › Late evening (8 p.m. to midnight): 30-minute headways

The FTA guidance manual<sup>70</sup> provided the bus reference noise level: a sound exposure level (SEL) of 82 dBA at 50 feet and 50 mph.

The Council used the FTA's qualitative assessment methods to evaluate potential short-term Project-related noise impacts.



## VIBRATION

Rubber-tired vehicles such as BRT vehicles typically do not generate enough vibration to cause concern within an environment, except for the following specific situations:

- Roadway irregularities are adjacent to sensitive locations
- The alignment would be very close to highly vibration-sensitive locations
- Vehicles would be operating inside of a building

Per FTA guidance, if none of these situations would apply to a bus or BRT project, the project would not require a vibration assessment. The assumption for the Project is that the new guideway would have smooth surfaces, and, based on the site survey, the guideway would not be near highly vibration-sensitive locations. Therefore, the Council will not assess Project-related long-term impacts to vibration.

Although no highly vibration-sensitive locations are along the Project corridor, vibration-sensitive receptors in downtown Saint Paul may be within the 50-foot vibration-screening distance for theaters and auditoriums. Because these receptors are located on 5th Street, where over 300 buses operate per day already, the addition of the Project's bus operations would not constitute a doubling of events or an increase in the per-event vibration level. As such, the Council does not anticipate Project-related impacts to vibration-sensitive spaces in downtown Saint Paul.

The Council used FTA's qualitative assessment methods to evaluate potential short-term Project-related vibration impacts.

### 5.8.1.4. Noise and Vibration Criteria

This section describes the FTA's and the MPCA's noise impact criteria and their respective applicability to the Council's noise analysis. This section also presents the FTA's noise and vibration construction criteria.

#### FEDERAL TRANSIT ADMINISTRATION NOISE IMPACT CRITERIA

The FTA's guidance manual<sup>70</sup> bases noise impact criteria on well-documented research regarding community response to noise, existing noise levels, and the change in noise exposure due to a project. The Council used FTA's noise criteria to compare anticipated Project noise levels with the existing noise condition (instead of the No-Build Alternative noise condition).

The FTA's noise criteria are based on the land use category of the sensitive receptor. The analysis used the Ldn descriptor to assess transit-related noise at residential land uses (Category 2), where overnight sleep occurs, and the Leq descriptor to assess transit-related noise at other land uses (see **Table 5.8-1**).





TABLE 5.8-1: LAND USE CATEGORIES AND METRICS FOR TRANSIT NOISE IMPACT CRITERIA

Land Use Category	Noise Metric (dBA)	Description of Land Use Category
1	Outdoor Leq(h) <sup>b</sup>	Tracts of land where quiet is an essential element in their intended purpose. This category includes lands set aside for serenity and quiet, such land uses as outdoor amphitheaters and concert pavilions, and National Historic Landmarks with significant outdoor use. Also included are recording studios and concert halls.
2	Outdoor Ldn	Residences and buildings where people normally sleep. This category includes homes, hospitals and hotels and assumes nighttime sensitivity to noise is of utmost importance.
3	Outdoor Leq(h) <sup>b</sup>	Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, theaters, and churches where it is important to avoid interference with such activities as speech, meditation, and concentration on reading material. This category can also include places for meditation or study associated with cemeteries, monuments, museums, campgrounds and recreational facilities, as well as certain historical sites and parks.

<sup>a</sup> Leq(h) is the "equivalent" sound level for the noisiest hour of transit-related activity during hours of noise sensitivity.

Source: Federal Transit Administration

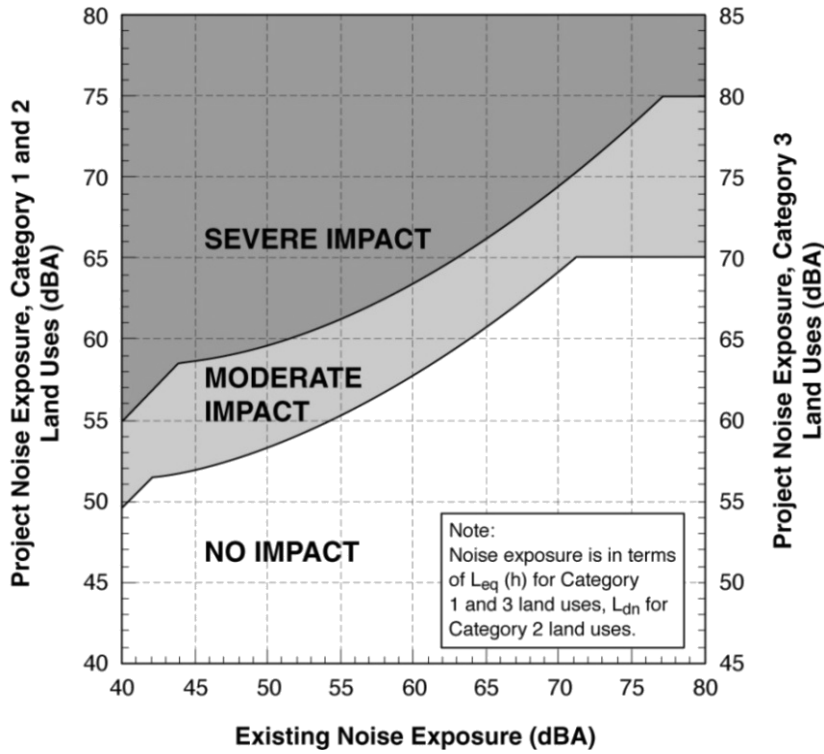
The FTA's noise impact criteria include the following three levels:

- **No impact:** In this range, the Project would have no impact because, on average, an insignificant increase in the number of people would be highly annoyed by the new noise from the Project.
- **Moderate impact:** In this range, most people in the community would notice changes in the cumulative noise level but the change might not cause strong, adverse reactions. In this transitional range, the Council must factor other Project-specific data such as the existing noise level, anticipated level of increase over existing noise levels, and the types and numbers of noise-sensitive land uses the Project would affect.
- **Severe impact:** In this range, a significant percentage of people would be highly annoyed by the new noise from the Project. The Council would implement noise mitigation measures for severe-impact areas unless they are not feasible or reasonable, meaning unless the Council has no practical method of mitigating the noise impact.

**Figure 5.8-3** illustrates existing noise exposure and Project-related noise exposure, and it demonstrates that the FTA's noise impact thresholds vary with existing noise levels.



FIGURE 5.8-3: FEDERAL TRANSIT ADMINISTRATION NOISE IMPACT CRITERIA



MINNESOTA POLLUTION CONTROL AGENCY NOISE STANDARDS

MPCA has an established set of noise standards<sup>73</sup> that provide limits on environmental noise using the descriptors L10 and L50, which represent the noise level exceeded 10 percent (six minutes) and 50 percent (30 minutes) of the time during an hour, respectively. The standards include both daytime and nighttime limits for three different categories of land use, or noise area classifications (NAC), with residential lands included in NAC 1; NACs 2 and 3 are generally for commercial and industrial land uses, respectively.

Table 5.8-2 provides the MPCA’s noise standards.

<sup>73</sup> “Noise Pollution Control,” Chap. 7030, Minnesota Rules. Available at: <https://www.revisor.mn.gov/rules/7030/full>. Accessed November 2018.



**TABLE 5.8-2: MINNESOTA POLLUTION CONTROL AGENCY NOISE STANDARDS**

NAC	L10 Daytime (dBA)	L50 Daytime (dBA)	L10 Nighttime (dBA)	L50 Nighttime (dBA)
1	65	60	55	50
2	70	65	70	65
3	80	75	80	75

Source: Minnesota Rules, Chapter 7030.0040

Buses would pass by a location for approximately 10 seconds, 12 times an hour (assumed 10-minute headways in each direction), for a total of 120 seconds, or two minutes. Because the duration of exposure to project noise<sup>74</sup> does not exceed the L10 or L50 time limits, the Project has no potential to exceed State standards under the assumed operating conditions.

Because the Project's noise would not exceed the MPCA's thresholds, the Council used the more protective criteria from the FTA to assess and mitigate Project-related impacts to noise.

**Section 5.8.2.2** provides information about existing noise levels in the resource study area and existing exceedances of the MPCA's standards. Additionally, the MPCA requires, within reason, local governments to prevent land use activities that would violate the MPCA's noise standards immediately upon establishment of the land use.

**FEDERAL TRANSIT ADMINISTRATION CONSTRUCTION NOISE CRITERIA**

**Table 5.8-3** summarizes the FTA's construction noise criteria, which the analysis used to determine short-term noise impacts. These criteria provide adequate protection for short-term noise impacts, and they allow the Council to implement reasonable mitigation measures for the Project. The Council will work with local governments to take reasonable actions to limit construction noise (see **Section 5.8.4**).

**TABLE 5.8-3: FEDERAL TRANSIT ADMINISTRATION CONSTRUCTION NOISE CRITERIA**

Land Use	8-Hour Leq (dBA) Day	8-Hour Leq (dBA) Night	Noise Exposure (dBA)
30-day Average			
Residential	80	70	75
Commercial	85	85	80
Industrial	90	90	85

Source: Federal Transit Administration

<sup>74</sup> The Federal Transit Administration defines "project noise" as noise due exclusively to new transit sources.



## FEDERAL TRANSIT ADMINISTRATION CONSTRUCTION VIBRATION CRITERIA

The FTA provides guidance for assessing construction vibration. Most construction equipment can cause ground-borne vibration, which rapidly diminishes in strength with distance. Generally, a project requires a quantitative construction vibration assessment only when its construction could damage fragile buildings or interfere with equipment or activities that are highly sensitive to vibration. Examples of such situations include projects that use blasting, pile-driving, pavement-breaking, vibratory compaction, or drilling or excavating the ground near structures that are fragile or highly sensitive to vibration.

The Council did not evaluate the Project quantitatively for construction-related vibration impacts because the Project's vibration-inducing construction activities would not be near highly sensitive structures, and the Council does not anticipate damage or prolonged annoyance from construction vibration. Other Project-related activities such as moving construction equipment could create perceptible vibrations when performed very close to a structure, but these impacts would be temporary and would occur only in a single location at a time.

The analysis provides a qualitative assessment for construction vibration, as the FTA's guidance recommends.

**Table 5.8-4** presents the FTA's construction vibration damage criteria.

**TABLE 5.8-4: CONSTRUCTION VIBRATION DAMAGE CRITERIA**

Building Category	PPV (in/sec)	Approximate VdB
Reinforced-concrete, steel or timber	0.5	102
Engineering concrete and masonry	0.3	98
Nonengineered timber and masonry buildings	0.2	94
Buildings extremely susceptible to vibration damage	0.12	90

The FTA's criteria assess vibration damage in terms of the peak particle velocity (PPV), which is the maximum instantaneous peak of the vibration signal. The qualitative assessment discusses distances to potential damage for nonengineered buildings and daytime annoyance. **Table 5.8-5** presents the FTA vibration criteria for potential annoyance.

**TABLE 5.8-5: GROUND-BORNE VIBRATION LEVEL IMPACT CRITERIA**

Land Use Category	Frequent Events <sup>a</sup> (VdB re 1 micro-inch/sec)	Occasional Events <sup>b</sup> (VdB re 1 micro-inch/sec)	Infrequent Events <sup>c</sup> (VdB re 1 micro-inch/sec)
Category 1: Buildings where vibration would interfere with interior operations	65 VdB	65 VdB	65 VdB
Category 2: Residences and buildings where people normally sleep	72 VdB	75 VdB	80 VdB
Category 3: Institutional land uses with primarily daytime use	75 VdB	78 VdB	dB

<sup>a</sup> "Frequent events" are more than 70 vibration events of the same source per day.

<sup>b</sup> "Occasional events" are between 30 and 70 vibration events of the same source per day.

<sup>c</sup> "Infrequent events" are fewer than 30 vibration events of the same source per day.



## 5.8.2. Affected Environment

This section describes the existing noise-sensitive land uses and noise levels within the resource study area.

### 5.8.2.1. Noise-Sensitive and Vibration-Sensitive Land Uses

The Council identified noise-sensitive and vibration-sensitive land uses based on aerial photography, project drawings and a site survey. The sections below discuss sensitive land uses by alignment.

#### ALIGNMENT A1 (SMITH AVENUE TO MOUNDS BOULEVARD)

The noise-sensitive land uses along Alignment A1 include Rice Park, Mears Park, Landmark Plaza, Hamm Plaza, Ecolab Plaza, Fourth and Sibley Park, Catholic Charities, Ordway Center for the Performing Arts, Roy Wilkins Auditorium, Bruce Vento Nature Park, several hotels, and apartment and condominium buildings. The dominant existing noise source is traffic on local streets.

Vibration-sensitive land uses along Alignment A1 include Catholic Charities, Ordway Center for the Performing Arts, Roy Wilkins Auditorium, several hotels, and apartment and condominium buildings.

#### ALIGNMENT A2 (UNION DEPOT TO MOUNDS BOULEVARD)

The noise-sensitive land uses along Alignment A2 include Bruce Vento Nature Park and an apartment building. The dominant existing noise source is traffic on local streets.

Vibration-sensitive land uses along Alignment A2 include the apartment building.

#### ALIGNMENT B (MOUNDS BOULEVARD TO WHITE BEAR AVENUE)

The noise-sensitive land uses along Alignment B include single-family and multifamily residences, Mounds Theater, and Grace Lutheran Church. The dominant existing noise source is traffic on I-94.

Vibration-sensitive land uses along Alignment B include single-family and multifamily residences, Mounds Theater and Grace Lutheran Church.

#### ALIGNMENT C (WHITE BEAR AVENUE TO I-694)

The noise-sensitive land uses along Alignment C include single-family and multifamily residences, Sun Ray Library, Conway Recreation Center, Apostolic Bible Institute and an assisted-living facility called Peaceful Lodge. The dominant existing noise source is traffic on I-94.

Vibration-sensitive land uses along Alignment C include single-family and multifamily residences, Sun Ray Library, Conway Recreation Center, Apostolic Bible Institute and an assisted living facility called Peaceful Lodge.

#### ALIGNMENT D3 (I-694 TO WOODBURY 494 PARK-AND-RIDE)

The noise-sensitive land uses along Alignment D3 include single-family and multifamily residences, along with Tamarack Nature Preserve. The dominant existing noise source is traffic along I-94 and local streets.

Vibration-sensitive land uses along Alignment D3 include single-family and multifamily residences.

### 5.8.2.2. Existing Noise Measurements

The Council measured existing noise levels at nine representative sites near the Project alignment during November 2013, November 2014 and October 2016. Measurement sites represent a range of existing noise conditions throughout the corridor. Measuring existing noise levels at sensitive locations along the corridor is an important step in the impact assessment, as the thresholds for impact in the FTA bases its noise criteria on



existing noise levels. Noise measurements included long-term (24-hour) and short-term (one-hour) monitoring of the A-weighted sound levels at noise-sensitive locations.

The analysis used long-term noise measurements to characterize existing noise at residential locations, and it used the short-term measurements to characterize existing noise at non-residential locations and to estimate the noise at additional residential locations. Where the Council was unable to take measurements at specific noise-sensitive properties due to access constraints, it instead gathered measurements at nearby public sites that are the same distance from the Project corridor as the noise-sensitive property.

**Table 5.8-7** summarizes the results of the existing noise measurements.



**TABLE 5.8-6: SUMMARY OF EXISTING NOISE MEASUREMENTS**

Site <sup>b</sup>	Alignment	Location	Date	Time	Duration (Hours)	Noise Level (dBA) Ldn <sup>a</sup>	Noise Level (dBA) Leq <sup>a</sup>	Dominant Source	Ambient Conditions Represented
1	A	Rice Park	11/4/14	13:01	1	59	61	Traffic on city streets	Western downtown Saint Paul
2	A	Mears Park	11/4/14	14:45	1	64	66	Traffic on city streets	Western downtown Saint Paul
4	B	935 Hudson Rd	11/21/13	14:00	1	62	64	I-94 traffic	Western Alignment B, with noise barriers
5	B	366 E Wakefield Ave	11/5/14	14:58	1	64	66	I-94 traffic	Middle of Alignment B, with noise barriers
6	B	Grace Lutheran Church	11/21/13	11:00	3 <sup>c</sup>	64	65	I-94 traffic	Eastern Alignment B, without noise barriers
8	C	Peaceful Lodge	11/20/13	12:00	24	77	75	I-94 traffic	Eastern Alignment C, without noise barriers
9	C, D3	409 Hickory Lane N	11/3/14	15:00	24	66	66	Traffic on I-94 and 4th Street	Western Alignment C and northern Alignment D3, away from I-94
17	D3	7547 Nature Ct	10/26/16	15:00	24	65	64	Traffic on Bielenberg Drive	Southern Alignment D3, away from I-94

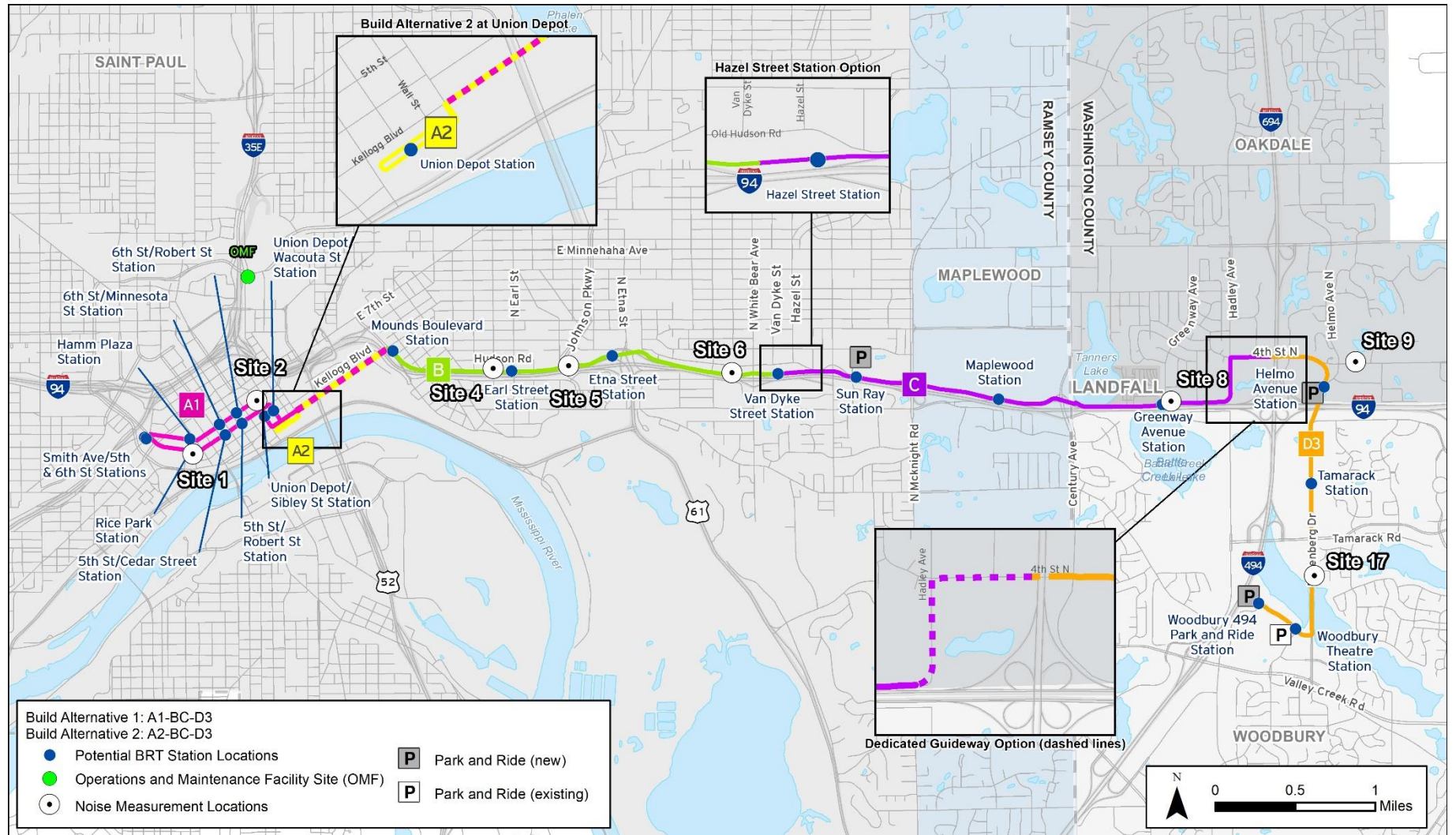
<sup>a</sup> The Federal Transit Administration uses the day-night sound level (Ldn) descriptor for Category 2 (residential) land uses, and the “equivalent” sound level (Leq) descriptor for Category 3 (institutional) land uses.

<sup>b</sup> Sites 7, 10, 11, 12, 13, 14, 15 and 16 were in areas that Project advisory bodies previously considered for alignments but have since eliminated from further evaluation. Site 3 was on Maria Avenue, which did not have a noise barrier at the time of measurement; however, MnDOT has since constructed a barrier in this area, so the site no longer represents the existing noise environment.

<sup>c</sup> The noise monitor stopped recording after several hours, so the Council estimated the day-night sound level (Ldn) from the measurement using methodology from the Federal Transit Administration for estimating an Ldn from partial noise measurements.



FIGURE 5.8-4: EXISTING NOISE MEASUREMENT LOCATIONS







The Council also analyzed the sites in **Table 5.8-7** according to the MPCA's standards, calculating the existing worst-case L10 and L50 at each location using the noise measurement data gathered. **Table 5.8-7** shows the results, which indicate that at most locations along the corridor existing noise sources exceed the L10 and L50 standards. The exceedances are primarily due to roadway noise, although the roadways are not in violation of the standards because traffic noise from most roads is exempt from the MPCA's standards.<sup>75</sup> The analysis measured the higher existing L10 and L50 noise levels closer to I-94 along the corridor; L10 and L50 noise levels are lower farther away from the Interstate. The NAC column provides the residential, commercial and industrial land use at the measure site based on the MPCA standards.

**TABLE 5.8-7: SUMMARY OF EXISTING L10 AND L50 NOISE LEVELS**

Site No.	Alignment	NAC	Measurement Location	L10 (dBA) <sup>a</sup>	L50 (dBA) <sup>a</sup>
1	A	2	Rice Park	63	60
2	A	2	Mears Park	68	63
4	B	1	935 Hudson Rd	66 <sup>b</sup>	63 <sup>b</sup>
5	B	1	366 E Wakefield Ave	67 <sup>b</sup>	66 <sup>b</sup>
6	B	1	Grace Lutheran Church	68 <sup>b</sup>	65 <sup>b</sup>
8	C	1	Peaceful Lodge	78 <sup>b</sup>	76 <sup>b</sup>
9	C, D3	1	409 Hickory Ln N	71 <sup>b</sup>	67 <sup>b</sup>
17	D3	1	7547 Nature Court	68 <sup>b</sup>	57

<sup>a</sup> The L10 represents noise levels exceeded 10 percent (six minutes) of an hour (60 minutes). The L50 represents noise levels exceeded 50 percent (30 minutes) of an hour (60 minutes).

<sup>b</sup> Measured levels that exceed the standards.

### 5.8.3. Environmental Consequences

This section identifies the long-term (operating phase) noise impacts and short-term (construction phase) noise and vibration impacts from the Build Alternatives. Long-term impacts would continue after the Council constructs the Project; short-term impacts would be temporary and associated with construction activities. The long-term noise impact evaluation considered the increase in noise levels for sensitive receptors closest to the Project along the corridor.

#### 5.8.3.1. Operating Phase (Long-Term) Impacts

##### BUILD ALTERNATIVE 1 (A1-BC-D3)

Build Alternative 1 would operate between Smith Avenue in Saint Paul and the Woodbury 494 Park-and-Ride in Woodbury. Because the Project's noise would not exceed MPCA's thresholds, the Council used the more protective FTA criteria to assess Project-related impacts. The assessment anticipates that locations 50 feet from

<sup>75</sup> "Powers and Duties," Chap. 116, Minnesota Statutes, Sec. 116.07, Subd 2a, 2018. Available at: <https://www.revisor.mn.gov/statutes/cite/116.07>. Accessed November 2018.



the Project would have noise levels below the moderate impact criteria. The nearest receptor along Build Alternative 1's alignment is outside of the moderate impact noise contour.

High existing noise levels mean the Project's low levels of bus operations (especially at night) and operating speeds, so Project-related impacts to noise typically would affect only the roadway right-of-way. Additionally, traffic would shift away from sensitive receptors at locations where the Project would modify highway ramps, slightly lowering immediately adjacent noise levels.

**Table 5.8-8**<sup>76</sup> summarizes the assessment, which determined that the Project would not produce long-term impacts to noise. See **Attachment A-5-4** for the noise impact contour figures for the sections included in **Table 5.8-8**. Neither the Hazel Street Station Option nor the Dedicated Guideway Option at Hadley Avenue and 4th Street would produce long-term impacts to noise.

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<sup>76</sup> The Council conducted the noise assessment for Category 2 (residential) land uses, which use the day-night sound level (L<sub>dn</sub>) descriptor, for the entire corridor. Category 3 (institutional) land uses are less sensitive than Category 2, and the analysis includes them within the distances shown.



**TABLE 5.8-8: NOISE IMPACT ASSESSMENT SUMMARY**

Alignment	Section Start	Section End	Speed <sup>a</sup> (mph)	Site No.	Existing dBA	Project <sup>b</sup> dBA at 50 Feet	Moderate Impact Criteria (dBA)	Severe Impact Criteria (dBA)	Distance to Moderate Impact <sup>c</sup> (Feet)	Distance to Nearest Receptor (Feet)	Impact?
<b>A1</b>	Smith Ave	Union Depot	10	1	59	48	57	63	15	20	No
	Union Depot	Mounds Blvd	15	2	64	50	60	65	15	120	No
<b>A2<sup>d</sup></b>	Union Depot	Mounds Blvd	15	2	64	50	60	65	15	120	No
<b>B</b>	Mounds Blvd	Wilson Ave	25	4	62	54	59	64	25	25	No <sup>e</sup>
	Wilson Ave	Earl St	35	4	62	56	59	64	35	75	No
	Earl St	Johnson Pky	30	4	62	55	59	64	25	40	No
	Johnson Pky	Kennard St	30	5	64	55	60	65	30	35	No
	Kennard St	Hazel St	35	6	64	56	60	66	30	55	No
<b>C</b>	Hazel St	McKnight Rd	30	6	64	55	60	66	25	400	No
<i>Hazel Street Station Option</i>			30	6	64	55	60	66	25	400	No
McKnight Rd			30	8	77	55	65	74	15	70	No
Hadley Ave			30	9	66	55	61	67	20	220	No
<i>Dedicated Guideway Option at Hadley Avenue and 4th Street</i>			30	9	66	55	61	67	20	220	No



Alignment	Section Start	Section End	Speed <sup>a</sup> (mph)	Site No.	Existing dBA	Project <sup>b</sup> dBA at 50 Feet	Moderate Impact Criteria (dBA)	Severe Impact Criteria (dBA)	Distance to Moderate Impact <sup>c</sup> (Feet)	Distance to Nearest Receptor (Feet)	Impact?
D3 <sup>f</sup>	I-694	I-94	20	9	66	52	61	67	20	120	No
	I-94	Guider Dr	25	17	65	54	61	66	25	105	No
	Guider Dr	Woodlane Dr	20	17	65	52	61	66	20	120	No

<sup>a</sup> The analysis assumed average bus operating speeds for each section and rounded up to the nearest 5 mph for the noise analysis.

<sup>b</sup> The Federal Transit Administration defines “project noise” as noise due exclusively to new transit sources. The administration’s guidance recommends measuring project noise levels at a setback distance of 50 feet.

<sup>c</sup> The distance to the moderate noise impact contour, the boundary within which moderate noise impact is projected to occur, has been rounded up to the nearest 5-foot interval to ensure sensitive receptors with the potential for noise impact fall within the contour boundary.

<sup>d</sup> Alignment A2 is part of Build Alternative 2, however it is shown in this table because it would produce the same impacts as Alignment A1.

<sup>e</sup> The distance to the moderate noise impact contour has been rounded up to the nearest 5-foot interval. The nearest receptor in this section is not within the moderate noise impact contour and the Project would not produce impacts to it.

<sup>f</sup> The impact assessment for Alignment D3 takes into account traffic increases resulting from the new bridge over I-94, which would also accommodate general vehicle traffic as well as BRT. There are noise-sensitive receptors along Alignment D3, so the analysis assessed impacts of additional traffic. Based on the change in traffic volumes due to the Project, noise would increase an additional 1 dBA. This pushes the noise impact contours along Alignment D3 from 15 to 20 feet and 20 to 25 feet. The nearest receptor is still not within this distance; therefore, incorporating the impacts of general vehicle traffic does not result in a noise impact.



**Table 5.8-9** summarizes the existing noise barriers that Alignment B would relocate to accommodate the BRT dedicated guideway (see the 15% Concept Plans in **Appendix B**). Alignment B would also replace two existing berms with noise barriers between Johnson Parkway and Clarence Street, and between Etna Street and Hazelwood Street. The Council used FHWA’s Traffic Noise Model Version 2.5 to demonstrate that the relocated and replaced noise barriers would mitigate noise with the same effectiveness as the existing barriers (see **Attachment A-5-3**).

**TABLE 5.8-9: NOISE BARRIER RELOCATIONS ALONG ALIGNMENT B**

Location	Distance Moved <sup>a</sup> (Feet)	Direction Moved
Conway Street to Wilson Avenue	0-20	North and South
Wilson Avenue to Plum Street	0-30	South
Maple Street to Forest Street	0-3	South
Forest Street to Cyprus Street	0-15	South
Cypress Street to Earl Street	10-30	South
Earl Street to Frank Street	20-40	South
Frank Street to Johnson Parkway	0-25	South
Johnson Parkway to Clarence Street	10-150	North and South
Etna Street to Hazelwood Street	0-30	North and South
Hazelwood Street to White Bear Avenue	0-5	South

<sup>a</sup> The distance moved for the location specified is given as a range that represents the smallest and greatest movement of the noise barrier within that location.

The analysis also evaluated noise levels from Project park-and-ride facilities. The analysis estimated the Ldn at a setback distance of 50 feet for each park-and-ride lot proposed within the resource study area, using the FTA’s recommended SEL of 101 dBA at 50 feet and assuming the lot would fill up entirely between 5 and 7 a.m. and empty entirely between 5 and 7 p.m.

**Table 5.8-10** summarizes the park-and-ride analysis results.

**TABLE 5.8-10: PARK-AND-RIDE NOISE ANALYSIS**

Park-and-Ride	Spaces	Ldn at 50 Feet	Moderate Impact Criteria	Ldn at Nearest Receptor
Sun Ray	186	57	60	48
Helmo Avenue	100	54	61	NA <sup>a</sup>
Woodbury 494	200	57	61	50
Woodbury Theatre	150	56	61	42

<sup>a</sup> No sensitive receptors are currently within 500 feet of the proposed Helmo Avenue Park-and-Ride.



The nearest receptor to a proposed park-and-ride lot, the Barrington Apartments, is at the south end of Alignment D3 at the Woodbury 494 Park-and-Ride. The closest apartment building to the park-and-ride lot is 100 feet away, and the proposed lot would have 200 spaces. For this building, the Council added the park-and-ride lot 50 dBA noise level to the Project 52 dBA noise level in this area, resulting in a total Ldn of 54 dBA for the building, which is below the moderate impact criterion of 61 dBA in this area, therefore, the Project park-and-ride lots would not produce long-term impacts to noise.

### BUILD ALTERNATIVE 2 (A2-BC-D3)

Build Alternative 2 would not produce long-term impacts to noise. Alignment A1 between Smith Avenue and Union Depot is not part of Build Alternative 2; therefore, the Council's analysis results for that section do not apply to this Build Alternative. **Table 5.8-8** includes the noise impact assessment summary Alignment A2.

#### 5.8.3.2. Construction Phase (Short-Term) Impacts

Construction noise varies greatly depending on the type of activity, equipment, staging process, site layout and the distance to sensitive receptors. Project-generated construction noise is subject to local ordinances in the following Project-area cities:

- **Saint Paul** requires the following: No person shall operate or cause to be operated construction or demolition equipment at any construction site in such a manner that the operation exceeds a L10 noise level of 85 dBA at a distance of 50 feet measured from the source. If the construction site is within or abuts residentially zoned property R-1 through R-4, RT-1, or RT-2, construction sounds levels below 65 dBA are allowed between 7 a.m. and 10 p.m. If the construction site is within or abuts residentially zoned property RM-1 through RM-3, P-1, or PD, construction sounds levels below 55 dBA are allowed between 10 p.m. and 7 a.m.
- **Maplewood** limits construction noise to between 7 a.m. and 7 p.m., Monday to Saturday
- **Landfall** has no specific code related to construction noise
- **Oakdale** allows construction activity from between 7 a.m. to 7 p.m. on weekdays, and 9 a.m. to 5 p.m. on Saturdays
- **Woodbury** limits construction, installation and maintenance of utility and street projects to the hours of 6 a.m. to 10 p.m. daily

### BUILD ALTERNATIVE 1 (A1-BC-D3)

#### Noise

Elevated noise levels during construction are, to a degree, unavoidable for the Project. The Council would require construction equipment to be properly working and muffled. Construction noise levels are subject to local noise ordinances and the MPCA-administered State standards, which also require, within reason, local governments to prevent land use activities that would violate the State standards immediately upon establishment of the land use.

The Council would notify affected communities in advance of any planned, abnormally loud construction activities. To the extent possible, the Council would limit Project-related construction activity to daytime hours; however, the Council anticipates that nighttime construction sometimes may better minimize traffic impacts and increase safety for Project workers and drivers.

For most construction equipment, diesel engines are typically the dominant noise source. For other activities, such as impact pile driving and jackhammering, noise generated by the actual process dominates. Short-term noise during construction of the Project could be intrusive to residents near the construction sites. Most of the



construction would consist of site preparation and paving, and it would include excavation, demolition of pavement and several structures, and use of loaders and vibratory rollers on the BRT guideway. At some locations, more extensive work may occur, such as pile-driving for elevated structures, noise barriers and retaining walls. The Council does not anticipate pile-driving in the downtown Saint Paul area, and the other construction activities would be limited to station areas.

Predictions at noise-sensitive locations depend on the amount of noise during each construction phase, the duration of the noise, and the distance from the construction activities to the sensitive receptor. Conducting a construction noise impact assessment requires knowledge of the equipment likely to be used, the duration of its use, and the way a contractor would use it.

**Table 5.8-11** lists typical construction equipment and their maximum noise levels at a setback distance of 50 feet.<sup>77</sup>

**TABLE 5.8-11: TYPICAL CONSTRUCTION EQUIPMENT NOISE LEVELS**

Equipment Type	Typical Noise Level (dBA), Distance of 50 Feet
Backhoe	80
Compactor	82
Concrete Mixer	85
Concrete Pump	82
Crane, Derrick	88
Crane, Mobile	83
Dozer	85
Grader	85
Loader	85
Paver	89
Pump	76
Roller	74
Truck	88

The Council used the typical noise levels in **Table 5.8-11** to develop an estimated Leq for the set of assumptions in **Table 5.8-12**. Using these assumptions, an eight-hour Leq of 88 dBA is projected at a distance of 50 feet from the construction site. **Table 5.8-12** identifies construction noise predictions for typical roadway construction activities.

<sup>77</sup> Federal Transit Administration. Transit Noise and Vibration Impact Assessment Manual. 2018. Available at <https://www.transit.dot.gov/research-innovation/transit-noise-and-vibration-impact-assessment-manual>. Accessed November 2018.



**TABLE 5.8-12: TYPICAL ROADWAY CONSTRUCTION ACTIVITY NOISE LEVELS**

Equipment	Typical Noise Level (dBA), 50 feet	Equipment Utilization Factor (%) <sup>a</sup>	Leq (dBA)
Grader	85	50	82
Backhoe	80	40	76
Compactor	82	20	75
Loader	85	20	78
Roller	74	20	67
Truck	88	40	84
Crane, Mobile	83	20	76
<b>Total 8-Hour Workday Leq at Distance of 50 Feet:</b>			<b>88</b>

<sup>a</sup> The Equipment Utilization Factor is the percentage of time during a period that a piece of equipment would be operating.

Using the criteria in **Section 5.8.1.4** and the estimated noise levels in **Table 5.8-12**, the Council determined distances for roadway construction noise impacts. For residential land uses, Project-related, short-term impacts to noise could extend approximately 120 feet from the construction site; however, during nighttime construction activities, Project-related short-term impacts to noise could extend approximately 380 feet from the construction site.

A contractor typically will provide specific information about construction equipment and methods as part of a noise-control plan for a project. **Section 5.8.4** includes more information about the Council’s approach to construction noise mitigation, and the Council will continue to evaluate mitigation options as the Project advances to the Engineering Phase.

As **Section 5.8.4** discusses, Alignment B would relocate existing noise barriers. Properties adjacent to these existing noise barriers may experience a temporary increase in noise levels from traffic on I-94 while the Project reconstructs the barriers.

**Vibration**

Temporary vibration impacts could occur in residential areas and at other vibration-sensitive land uses from Project-related construction activities such as excavation, demolition and vibratory compaction, as well as pile-driving at bridges, noise barriers and retaining walls. The potential for vibration impact would be greatest at locations near pile-driving for bridges and other structures, pavement breaking, and at locations close to vibratory compactor operations.

**Table 5.8-13** shows the FTA guidance manual’s vibration levels for typical construction equipment in terms of the maximum levels at a distance of 25 feet. The equipment with the highest vibration level for BRT guideway construction is the vibratory roller, and the impact pile driver has the highest potential vibration level for pile-driving at bridges.





**TABLE 5.8-13: VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT**

Equipment	PPV at 25 Feet (In/Sec)	Approximate VdB at 25 Feet
Pile driver (impact)		
Upper range	1.518	112
Typical	0.644	104
Pile driver (sonic)		
Upper range	0.734	105
Typical	0.170	93
Clam shovel drop (slurry wall)	0.202	94
Hydromill (slurry wall)		
In soil	0.008	66
In rock	0.017	75
Vibratory roller	0.210	94
Hoe ram	0.089	87
Large bulldozer	0.089	87
Caisson drilling	0.089	87
Loaded trucks	0.076	86
Jackhammer	0.035	79
Small bulldozer	0.003	58

The Council used the PPV criteria for potential damage to nonengineered buildings (0.2 in/sec) to determine screening distances for Project-related pile-driving and BRT guideway construction impacts to vibration. For buildings near pile-driving activities, Project-related short-term impacts to vibration could extend approximately 100 feet from the construction site. For buildings near guideway construction activities, Project-related short-term impacts to vibration could extend approximately 30 feet from the construction site.

Using the vibration annoyance criteria for Category 3 (primarily daytime) land uses and frequent vibration events (75 VdB), the Council determined the screening distances for annoyance from pile-driving and BRT guideway construction activities. For buildings near pile-driving activities, Project-related short-term annoyance from vibration could extend to approximately 400 feet from the construction site. For buildings near guideway construction activities, Project-related short-term annoyance from vibration could extend to approximately 100 feet from the construction site.

**BUILD ALTERNATIVE 2 (A2-BC-D3)**

Build Alternative 2 would not produce the same short-term impacts to noise or vibration as Build Alternative 1, however Alignment A1 between Smith Avenue and Union Depot is not part of Build Alternative 2; therefore, the Council’s analysis results for that section do not apply to this Build Alternative.



#### 5.8.4. Avoidance, Minimization and/or Mitigation Measures

The Council does not anticipate that the Project would exceed the MPCA noise standards, so the analysis used the more protective FTA criteria to determine locations for mitigating Project-related impacts to noise.

The Build Alternatives would not produce long-term noise impacts; therefore, the FTA and Council do not propose avoidance, minimization or mitigation measures for either Build Alternative 1 or Build Alternative 2.

Avoidance, minimization and mitigation measures for short-term impacts apply to both Build Alternative 1 and Build Alternative 2. The primary means of mitigating short-term noise and vibration due to Project-related construction activities is a detailed noise and vibration control plan, which the Council will require. A noise and vibration control engineer or acoustician will work with the contractor to prepare the plan according to the contractor's specific construction equipment and methods of construction. A noise- and vibration-control plan includes the following key elements:

- Contractor's specific equipment types
- Schedule and methods of construction
- Maximum noise and vibration limits for each piece of equipment with certification testing
- Prohibitions on certain types of equipment and processes during the nighttime hours without variances
- Identification of specific sensitive sites where near construction sites
- Methods for projecting construction noise and vibration levels
- Implementation of noise and vibration control measures where appropriate
- Acoustic shielding requirements for jackhammers, chainsaws and pavement breakers
- Methods for responding to community complaints

### 5.9. Biological Environment (Endangered Species and Wildlife Habitat)

This section evaluates Project-related impacts to the biological environment. This resource includes an evaluation of endangered species and wildlife habitat.

#### 5.9.1. Regulatory Context and Methodology

The area within 1 mile of the potential limits of disturbance for the Build Alternatives comprises the resource study area for threatened and endangered species. This distance captures the habitat directly adjacent to the Project and the wildlife that it could potentially affect and the potential presence of threatened and endangered species within the greater area around the Project.

The area within ¼-mile of the Build Alternatives comprises the resource study area for terrestrial and aquatic environments that generally could be habitat for wildlife, as well as noxious weeds and invasive species.



### 5.9.1.1. Endangered Species

#### FEDERALLY LISTED SPECIES

The U.S. Fish and Wildlife Service (USFWS) maintains the federal list of threatened and endangered species. Section 7 of the Endangered Species Act of 1973,<sup>78</sup> requires all federal agencies to consider and avoid, if possible, adverse impacts to federally listed threatened or endangered species or their critical habitats that could result from the FTA and Council's direct, regulatory or funding actions. Section 7 also prohibits the taking of any federally listed species by any unauthorized party; the term "taking" at the federal level in this context broadly refers to modifications to habitat that may significantly impair a species' ability to feed, reproduce or otherwise survive.

The Council reviewed the USFWS *County Distribution of Federally Listed Threatened, Endangered, Proposed, and Candidate Species*<sup>79</sup> list and *Information for Planning and Consultation (IPaC) Official Species List*<sup>80</sup> to determine if any federally listed threatened or endangered species or critical habitat has been identified within Ramsey and Washington counties or within any of the proposed study area.

Section 4(d) of the Endangered Species Act<sup>81</sup> directs the USFWS to issue regulations deemed "necessary and advisable to provide for the conservation of threatened species." It allows the USFWS to develop special rules that provide flexibility in implementing the act on behalf of species listed as threatened.

One USFWS rule protects the northern long-eared bat by prohibiting incidental "takes" that may occur from tree-removal activities within 150 feet of a known, occupied, maternity-roost tree during the June 1-July 31 pup season, or within ¼-mile of a hibernation site year around.

#### OTHER FEDERALLY PROTECTED SPECIES

The Bald and Golden Eagle Protection Act of 1940<sup>82</sup> protects bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*) by prohibiting the taking, possession and commerce of such birds except under specified conditions. The USFWS is the responsible agency for this act.

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<sup>78</sup> Endangered Species Act of 1973, as amended, Title 16, USC Sections 1531-1544, U.S. Fish and Wildlife Service. Available at: <https://www.fws.gov/endangered/esa-library/index.html#esa>. Accessed November 2018.

<sup>79</sup> U.S. Fish and Wildlife Service. "County Distribution of Federally-listed Threatened, Endangered, Proposed, and Candidate Species". Available at: [https://www.fws.gov/midwest/endangered/lists/cty\\_inde.html](https://www.fws.gov/midwest/endangered/lists/cty_inde.html). Accessed November 2018.

<sup>80</sup> U.S. Fish and Wildlife Service. Available at: <http://ecos.fws.gov/ipac/>. Species List generated September 2018.

<sup>81</sup> Endangered Species Act of 1973, as amended, Section 4(d), "Definitions". U.S. Fish and Wildlife Service. Available at: <https://www.fws.gov/endangered/laws-policies/section-4.html>. Accessed November 2018.

<sup>82</sup> Bald and Golden Eagle Protection Act of 1940, as amended, Title 16, USC, Sec. 668. Available at: <https://www.fws.gov/midwest/eagle/protect/laws.html>. Accessed November 2018.



The Migratory Bird Treaty Act<sup>83</sup> and the Executive Order on the Responsibility of Federal Agencies to Protect Migratory Birds<sup>84</sup> require the protection of migratory birds and their habitats. The USFWS is the responsible agency for this act.

## STATE-LISTED SPECIES

Minnesota's endangered species law<sup>85</sup> and associated rules<sup>86</sup> regulate the taking, import, transport and sale of state-designated endangered or threatened species. The DNR administers the state law and designates species as endangered, threatened or of special concern within the state.

The analysis used the Natural Heritage Information System (NHIS) database, which the DNR maintains, to identify potential state-listed species within the resource study area.<sup>87</sup> The NHIS database compiles locational records of rare plants and animals, and other rare, sensitive, natural resource features including native plant communities, geologic features and animal aggregations such as nesting colonies. The program stipulates that it cannot make publicly available the known locations of state-listed species.

The Council coordinated with state and local agencies to determine the potential limits of disturbance for each alignment, which it based on the preferred habitats of the identified rare species, in accordance with Minnesota's endangered species law.

### 5.9.1.2. Wildlife Habitat

A given location does not provide a comprehensive list or data source of the wildlife species present within, and to create a project-specific inventory of potentially impacted plants and animals in an urban area would be too complex a process; therefore, regulatory agencies' accepted method for wildlife impact assessment is via wildlife habitat association.

The resource study area has a largely developed/disturbed nature; therefore, the analysis generally classified wildlife habitat into the following two categories:

- Aquatic habitat
  - Includes plant communities dominated by wetlands, lakes, streams and creeks, and support water-dependent species such as fish, frogs and turtles

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<sup>83</sup> *Migratory Bird Treaty Act of 1918, as amended, Title 16 USC, Sec. 703-712. Available at: <https://www.fws.gov/birds/policies-and-regulations/laws-legislations/migratory-bird-treaty-act.php>. Accessed November 2018.*

<sup>84</sup> *Executive Order 13186, Responsibility of Federal Agencies to Protect Migratory Birds, 2001, as amended. Available at: <https://www.fws.gov/birds/management/bird-conservation-partnership-and-initiatives/council-for-the-conservation-of-migratory-birds.php>. Accessed November 2018.*

<sup>85</sup> *"Protection of Threatened And Endangered Species," Chap. 84, Minnesota Statutes, Sec. 84.0895 et seq. 2018. Available at: <https://www.revisor.mn.gov/statutes/cite/84.0895>. Accessed November 2018.*

<sup>86</sup> *"General Restrictions for Permits To Possess Threatened And Endangered Species," Chap. 6212, Minnesota Rules, Parts 6212.1800-6212.2300. 2018. Available at: <https://www.revisor.mn.gov/rules/6212.1800/>. Accessed November 2018.*

<sup>87</sup> *Data used in this analysis was provided by the Minnesota Department of Natural Resources Division of Ecological and Water Resources and is current as of November 2018 per license agreement LA-942. This data is not based on an exhaustive inventory of the state. The lack of data for any geographic area shall not be construed to mean that no significant features are not present.*



- Protected by wetland and public waters regulations (see **Section 5.3**)
- Terrestrial habitat
  - Includes all other plant communities, excluding frequently disturbed areas such as mowed/landscaped areas, right-of-way and farmland, and support species such as white-tailed deer, squirrels, rabbits and birds
  - Not protected by specific regulations other than USFWS critical-habitat designations for federally listed species conservation

The resource study area does not include habitat designated as critical.<sup>88</sup>

To identify habitat types in the resource study area, the Project analysis reviewed current and historical aerial photography,<sup>89</sup> development trends and remaining undeveloped areas with potentially natural native cover (except landscaped areas and right-of-way). The Project conducted field reviews in July 2015 and August 2016 to refine the aquatic habitat locations that the aerial photography review identified (see **Section 5.3** for more information about surface waters in the Project area), and to eliminate disturbed or developed areas that the aerial photography or other surface waters mapping resources did not reflect. The analysis used the aerial photography to identify aquatic and terrestrial habitats and used the field review data and references<sup>90</sup> to develop common habitat-wildlife associations.

## HABITAT QUALITY

The analysis determined the quality of habitat within the resource study area using three state rating/classification systems: the Minnesota Land Cover Classification System (MLCCS), the Regional Significant Ecological Assessment database, and the Minnesota Biological Survey (MBS) Site Biodiversity Significance Ranks.

### Minnesota Land Cover Classification System

The Council reviewed MLCCS data for Ramsey and Washington counties to determine the quality of habitat within the resource study area. The MLCCS provides a general assessment of the quality of native habitat present within each identified natural community. As described in its user manual,<sup>91</sup> the system uses letter grades to indicate the quality of native habitat, with Grade A being the highest quality natural community and Grade D being the poorest condition natural community. This system only applies letter grades to native habitats; it gives “non-native” or “not applicable” rankings to non-native, altered or disturbed communities. The MLCCS data was produced using a combination of aerial photograph interpretation and field surveys. There is a minimum mapping unit of 1 acre for natural vegetation and 2 acres for artificial cover types.

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<sup>88</sup> U.S. Fish and Wildlife Service. Available at: <http://ecos.fws.gov/ipac/> Species List generated September 2018.

<sup>89</sup> U.S. Department of Agriculture. Farm Service Agency. National Agriculture Imagery Program, 2015 and 2017 and Google Earth Pro (1991, 2002, 2003, 2004, 2006, 2009-2018). Available at: <https://www.fsa.usda.gov/programs-and-services/aerial-photography/imagery-programs/naip-imagery/>. Accessed November 2018.

<sup>90</sup> Minnesota Department of Natural Resources. Rare Species Guide, 2015. Available at: <http://www.dnr.state.mn.us/rsq/index.html>. Accessed November 2018.

<sup>91</sup> Minnesota Department of Natural Resources Central Region, Minnesota Land Cover Classification System User Manual, Version 5.4. 2004. Available at: [http://files.dnr.state.mn.us/assistance/nrplanning/community/mlccs/mlccs\\_manual\\_v5\\_4.pdf](http://files.dnr.state.mn.us/assistance/nrplanning/community/mlccs/mlccs_manual_v5_4.pdf). Accessed November 2018.



## Regional Significant Ecological Assessment Database

The DNR maintains a database of ecologically significant terrestrial and wetland areas<sup>92</sup> in the seven-county Twin Cities Metropolitan Area. The assessment is a science-based, landscape scale, coarse-filter assessment that relies on satellite derived land cover and other region-wide databases. The intent of the survey is to identify areas with a high likelihood of having intact native plant communities and/or high-quality native animal habitats. The assessment is based on land cover characteristics including size, shape, connectivity, species diversity, and compatibility of adjacent land uses from different sources in different years.

In 2003 the DNR Central Region conducted a landscape-scale assessment of the seven-county metro area to identify ecologically significant terrestrial and wetland areas. This assessment was based on LandSat data and aerial photo interpretation of grassland. In 2008 the DNR updated the assessment using MLCCS data and in 2011 DNR updated the assessment using National Land Cover Data (NLCD). This database ranks ecological areas based on attributes such as size, shape, cover-type diversity and adjacent land use. The database ranks regionally significant ecological areas with a number 1, 2 or 3 based on their sizes, diversity in vegetation, and biodiversity significance. A No. 3 ranking indicates a larger, more diverse area; a No. 1 ranking indicates the area is smaller and less diverse.

## Minnesota Biological Survey Site Biodiversity Significance Ranks

The MBS assigns a biodiversity significance rank to each site it surveys based on its statewide native biological diversity significance.<sup>93</sup> The MBS' four biodiversity significance rankings ("outstanding," "high," "moderate" and "below") help guide conservation and management in the state.

The MBS assigns a site's biodiversity significance ranking based on the presence of rare species populations; the sizes and conditions of native plant communities within the site; and the landscape context of the site – for example, whether cropland or developed land dominates the landscape in which a site is isolated, or whether other areas with intact native plant communities are connected or close to a site.

## INVASIVE SPECIES

Federal and state laws regulate invasive species. Executive Order 13112<sup>94</sup> established the National Invasive Species Council (NISC) to oversee the coordinated, effective and efficient work federal programs and activities to prevent and control invasive species. The order defines an invasive species as "...an alien (or non-native) species whose introduction does or is likely to cause economic or environmental harm or harm to human health." The NISC produces National Management Plans for invasive species. The current plan, the *2016-2018 National Invasive Species Council Management Plan*,<sup>95</sup> provides information about and a framework for identifying actions for the federal government and its partners to prevent, eradicate and control invasive species, as well as restore ecosystems and other assets that invasive species adversely impact.

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<sup>92</sup> Minnesota Department of Natural Resources. "Regionally significant ecological areas (RSEA)". Available at: <https://www.dnr.state.mn.us/rsea/index.html>. Accessed November 2018.

<sup>93</sup> Minnesota Department of Natural Resources. Minnesota Biological Survey. "MBS Site Biodiversity Significance Ranks". Available at: [https://www.dnr.state.mn.us/eco/mcbs/biodiversity\\_guidelines.html](https://www.dnr.state.mn.us/eco/mcbs/biodiversity_guidelines.html). Accessed November 2018.

<sup>94</sup> "Invasive Species," Vol. 64, Federal Register, No. 25, February 8, 1999, pp. 6183-6186. Available at: <https://www.govinfo.gov/content/pkg/FR-1999-02-08/html/99-3184.htm>. Accessed December 2018.

<sup>95</sup> U.S. Department of the Interior. National Invasive Species Council. "National Invasive Species Management Plan". Available at: <https://www.doi.gov/invasivespecies/management-plan>. Accessed November 2018.



Minnesota has several state laws intended to minimize the introduction and spread of invasive species in the state. The DNR regulates aquatic plants and animals and terrestrial vertebrates, and the Minnesota Department of Agriculture regulates terrestrial plants (noxious weeds) and plant pests.

## NOXIOUS WEEDS

The Federal Noxious Weed Act of 1974<sup>96</sup> regulates federally listed noxious weeds through the U.S. Department of Agriculture (USDA). The act makes illegal the sale, purchase, exchange or receipt of federally listed noxious weeds.

The Minnesota Noxious Weed Law<sup>97</sup> defines a noxious weed as an annual, biennial or perennial plant that the state Department of Agriculture designates as injurious to public health, the environment, public roads, crops, livestock or other property, and it requires that prohibited noxious weeds be controlled or eradicated.<sup>98</sup>

The Council reviewed the Minnesota Noxious Weed location map<sup>99</sup> to identify noxious weed concentrations within the resource study area.

## 5.9.2. Affected Environment

### 5.9.2.1. Endangered Species

#### FEDERALLY LISTED SPECIES

Based on its review of the USFWS's County Distribution list for Ramsey and Washington counties, and the USFWS IPaC Official Species List, the analysis found the following threatened, endangered species within the two counties:

- One threatened mammal species (northern long-eared bat)
- One endangered insect species (rusty patched bumble bee)
- Four endangered mussel species (Higgins eye pearlymussel, snuffbox, winged mapleleaf, and spectaclecase)

The Project resource study area includes the northern long-eared bat, Higgins eye pearlymussel and rusty patched bumble bee.<sup>100</sup> **Table 5.9-1** provides more information about habitat for these species.

Ramsey and Washington counties do not contain designated critical habitat.

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<sup>96</sup> "Noxious Weed Regulations. Title 7, CFR, Chap. 61, Sec. 2803. Available at: <https://www.govinfo.gov/app/details/CFR-1999-title7-vol5/CFR-1999-title7-vol5-part360>. Accessed November 2018.

<sup>97</sup> "Minnesota Noxious Weed Law," Chap. 18, Minnesota Statutes, Secs. 18.76-18.91 et seq. 2018. Available at: <https://www.revisor.mn.gov/statutes/cite/18.76>. Accessed November 2018.

<sup>98</sup> "Control or Eradication Of Noxious Weeds," Chap. 18, Minnesota Statutes, Secs. 18.78 et seq. 2018. Available at: <https://www.revisor.mn.gov/statutes/cite/18.76>. Accessed November 2018.

<sup>99</sup> Minnesota Department of Natural Resources. Invasive Species Program. Minnesota and Federal Prohibited and Noxious Plants by Scientific Name. Available at <https://files.dnr.state.mn.us/eco/invasives/weedlist.pdf>. Accessed November 2018.

<sup>100</sup> U.S. Fish and Wildlife Service. IPaC Information for Planning and Consultation. Available at: <http://ecos.fws.gov/ipac/>. Species list generated September 2018.



**TABLE 5.9-1: FEDERALLY LISTED SPECIES IN RAMSEY AND WASHINGTON COUNTIES**

Scientific Name	Common Name	Status	Habitat	County
<i>Myotis septentrionalis</i>	Northern long-eared bat	Threatened	Hibernates in caves and mines, swarming in surrounding wooded areas in autumn. Roosts and forages in upland forests during spring and summer.	Ramsey and Washington <sup>a</sup>
<i>Lampsilis higginsii</i>	Higgins eye pearlymussel	Endangered	Mississippi River	Ramsey and Washington <sup>a</sup>
<i>Epioblasma triquetra</i>	Snuffbox	Endangered	Mississippi River	Ramsey and Washington
<i>Quadrula fragosa</i>	Winged mapleleaf	Endangered	St. Croix River	Ramsey and Washington
<i>Bombus affinis</i>	Rusty patched bumble bee	Endangered	Grasslands with flowering plants from April through October, underground and abandoned rodent cavities or clumps of grasses above ground as nesting sites, undisturbed soil for hibernating queens to overwinter	Ramsey and Washington <sup>a</sup>
<i>Cumberlandia monodonta</i>	Spectaclecase	Endangered	St. Croix River	Washington

<sup>a</sup> The U.S. Fish and Wildlife Service’s Information for Planning and Consultation website (available at <https://ecos.fws.gov/ipac/>) notes this species as present within the Project area.

### Northern Long-Eared Bat

The northern long-eared bat has the largest distribution range of any federally protected species in Minnesota. According to the USFWS, the northern long-eared bat’s distribution range covers the entire state. However, the species has no documented hibernacula within ¼-mile of the potential limits of disturbance or maternity-roost trees within 150 feet of the potential limits of disturbance.<sup>101</sup>

Bridges and other man-made structures can be summer roosting habitat for several bat species including the northern long-eared bat. The Build Alternatives would modify or replace several bridge structures. Tree removal can also produce impacts to the northern long-eared bat if trees are removed during the roosting season.

<sup>101</sup> Minnesota Department of Natural Resources, U.S. Fish and Wildlife Service. “Townships Containing Documented Northern Long-Eared Bat (NLEB) Maternity Roost Trees and/or Hibernacula Entrances in Minnesota”. Available at: [http://files.dnr.state.mn.us/eco/ereview/minnesota\\_nleb\\_township\\_list\\_and\\_map.pdf](http://files.dnr.state.mn.us/eco/ereview/minnesota_nleb_township_list_and_map.pdf). Accessed November 2018..





The Project's bridge work and tree removal may effect but is not likely to adversely affect the northern long-eared bat; however, the Project falls within the scope and will adhere to the criteria of the Programmatic Biological Opinion for Transportation Projects, which requires consultation with USFWS.<sup>102</sup>

The Council would implement appropriate avoidance and minimization measures for bridge work, temporary and permanent lighting, and tree removal, so the Project would not adversely impact the northern long-eared bat.

### Rusty Patched Bumble Bee

According to the USFWS, the rusty patched bumble bee exists within ¼-mile of the Build Alternatives. This generalist species utilizes grasslands with flowering plants from April through October; nests underground in abandoned rodent cavities or aboveground in clumps of grasses; and its queens hibernate during winter in undisturbed soil.<sup>103</sup> The I-94 right-of-way may contain the species. No grasslands within the I-94 right-of-way will be disturbed by the Project. The Council does not anticipate the Build Alternatives would produce adverse impacts to the species, based on the Project's 15% Concept Plans.

### Other Federally Protected Species

The resource study area includes no known occurrences of bald eagles or golden eagles' nests.

### STATE-LISTED SPECIES

Based on the DNR's Endangered, Threatened Special Concern (ETSC) species data,<sup>104</sup> the analysis identified the following state-listed species – including plants, animals and insects – within Ramsey and Washington counties:

- Endangered species: 36
  - Within Ramsey County, per ETSC Rare Species Guide: 22
  - Within Washington County, per ETSC Rare Species Guide: 30
- Threatened species: 44
  - Within Ramsey County, per ETSC Rare Species Guide: 26
  - Within Washington County, per ETSC Rare Species Guide: 42
- Special-concern species: 69
  - Within Ramsey County, per ETSC Rare Species Guide: 42
  - Within Washington County, per ETSC Rare Species Guide: 55

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<sup>102</sup> U.S. Department of the Interior. "Consistency letter for the 'METRO Gold Line Bus Rapid Transit Project' (TAILS 03E19000-2018-R-1423) under the revised February 5, 2018, Federal Highway Administration, Federal Railroad Administration, Federal Transit Administration Programmatic Biological Opinion for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat. March 19, 2019.

<sup>103</sup> U.S. Fish and Wildlife Service. "Rusty Patched Bumble Bee Fact Sheet". Available at: <https://www.fws.gov/midwest/endangered/insects/rpbb/factsheetrpbb.html>. Accessed November 2018.

<sup>104</sup> Minnesota Department of Natural Resources. "Rare Species Guide: Filtered Search". Available at: [https://www.dnr.state.mn.us/rsq/filter\\_search.html](https://www.dnr.state.mn.us/rsq/filter_search.html). Accessed November 2018



Based on the NHIS database the analysis identified the following state-listed species within Ramsey and Washington counties:

- Endangered species: 32
  - › Within Ramsey County, per NHIS Database: 18
  - › Within Washington County, per NHIS Database: 27
- Threatened species: 42
  - › Within Ramsey County, per NHIS Database: 22
  - › Within Washington County, per NHIS Database: 39
- Special-concern species: 52
  - › Within Ramsey County, per NHIS Database: 35
  - › Within Washington County, per NHIS Database: 52

**Table 5.9-2** includes the state-listed species for which the analysis identified potential habitats within the resource study area.



**TABLE 5.9-2: STATE-LISTED SPECIES IN THE RESOURCE STUDY AREA PER NHIS DATABASE (DATED 11/2018)**

Alignment	Scientific Name	Common Name	Status	Last Observed	Habitat
A1 and A2	<i>Marpissa grata</i>	A Jumping Spider	Delisted	1978	Wetlands, ponds, or rivers near cattail marshes, in grass, and on cattails and willows
	<i>Quadrula nodulata</i>	Wartyback	Threatened	2007	Large rivers; can be found in fine or coarse substrates in areas of slow or moderate current
	<i>Quadrula metanevra</i>	Monkeyface	Threatened	2001	River habitats dominated by stable substrates in water over two meters (6.6 feet) deep
	<i>Actinonaias ligamentina</i>	Mucket	Threatened	2007	Medium to large rivers; substrates that are most preferred include coarse sand and gravel
	<i>Fusconaia ebena</i>	Ebonyshell	Endangered	2007	Large rivers in sand or gravel
	<i>Truncilla donaciformis</i>	Fawnsfoot	Threatened	2007	Large rivers or the lower reaches of medium-sized streams; most commonly found in sand or gravel
	<i>Elliptio crassidens</i>	Elephant-ear	Endangered	2007	Large rivers in mud, sand, or fine gravel
	<i>Arcidens confragosus</i>	Rock Pocketbook	Endangered	2005	Medium to large rivers; may be found in fine substrates such as silt or sand in slow-current areas
	<i>Obovaria olivaria</i>	Hickorynut	Delisted	2004	Large rivers; rarely found in smaller streams
	<i>Lasmigona costata</i>	Fluted-shell	Threatened	2004	Medium to large rivers
	<i>Falco peregrinus</i>	Peregrine Falcon	Special Concern	2011	Previously nested on cliff ledges along rivers or lakes; presently nesting primarily on buildings and bridges in urban settings and use historic eyries on cliffs along Lake Superior and the Mississippi River
	<i>Plethobasus cyphus</i> <sup>a</sup>	Sheepnose	Endangered	2007	Large rivers such as the Mississippi, Ohio, and Tennessee Rivers



Alignment	Scientific Name	Common Name	Status	Last Observed	Habitat
	<i>Schinia lucens</i>	Leadplant Flower Moth	Special Concern	1940	Upland prairie and savannas.
	<i>Bombus affinis</i>	Rusty patched bumble bee	Special Concern	1951	Grasslands and tallgrass prairies
	<i>Anguilla rostrata</i>	American eel	Special Concern	2013	Large rivers, medium rivers and streams
	<i>Ligumia recta</i>	Black Sandshell	Special Concern	2007	Riffle and run areas of medium to large rivers in areas dominated by sand or gravel
B	<i>Besseyia Bullii</i>	Kitten-tails	Threatened	1992	Bluffs and terraces of the St. Croix, Mississippi, and Minnesota River valleys, with many populations occurring in the greater Twin Cities Metropolitan Area
	<i>Cycleptus elongatus</i>	Blue Sucker	Special Concern	2007	Deep, swift water in pools and channels of large rivers with sand, gravel, or rubble bottoms
	<i>Bombus affinis</i>	Rusty patched bumble bee	Special Concern	1951	Grasslands and tallgrass prairies
	<i>Schinia lucens</i>	Leadplant Flower Moth	Special Concern	1940	Upland prairie and savannas.
C	<i>Emydoidea blandingii</i>	Blanding's turtle	Threatened	1992	Wetland complexes and adjacent sandy uplands; calm, shallow waters, including wetlands associated with rivers and streams, with rich, aquatic vegetation
	<i>Bombus affinis</i>	Rusty patched bumble bee	Special Concern	1951	Grasslands and tallgrass prairies
	<i>Schinia lucens</i>	Leadplant Flower Moth	Special Concern	1940	Upland prairie and savannas.
D3	None				

<sup>a</sup> *Plethobasus cyphus* is a federally endangered mussel species. The USFWS does not include this species in its County Distribution of Federally Listed Threatened, Endangered, Proposed, and Candidate Species list for Ramsey or Washington counties. The occurrence record represents dead specimens found in subfossil conditions.



### 5.9.2.2. Wildlife Habitat

The resource study area includes two types of wildlife habitat: terrestrial and aquatic. The terrestrial habitat consists of two community types: deciduous trees/forested areas and grasslands (unmanicured, non-native grasslands located in upland areas). The aquatic habitat is of the wetlands/lakes community type.

#### TERRESTRIAL HABITAT

- Deciduous trees/forested areas
  - A few species this habitat can include are grey squirrels, white tailed deer, common songbirds and bats, among others
  - Tree cover in the resource study area primarily consists of urban boulevard trees with some scattered woodlots. Common trees include aspen, cottonwood, box elder, walnut, maple, locust, various coniferous trees and some oak trees.
- Grasslands
  - A few species this habitat can include are grey squirrels, raccoons, rabbits, field mice, voles, moles, Canada geese, white-tailed deer and red fox, among others
  - Because much of the potential limits of disturbance is located within or adjacent to right-of-way for vehicular traffic; mostly developed, maintained and manicured areas would surround the Build Alternatives

#### AQUATIC HABITAT

- Wetlands/lakes
  - A few species this habitat can include are bald eagles, common reptile and amphibian species, fish species, white-tailed deer and songbirds
  - Some aquatic habitats are located within the potential limits of disturbance (**Section 5.3** identifies wetlands within the resource study area), and a wetland dominated by tamarack trees (Tamarack Swamp) is adjacent to the Project corridor

#### HABITAT QUALITY

The analysis determined the quality of habitat within the resource study area using three state rating/classification systems: the MLCCS, the Regional Significant Ecological Assessment database, and the MBS Site Biodiversity Significance Ranks.

#### Minnesota Land Cover Classification System Ratings

MLCCS rates most of the natural habitat within the resource study area at C or below. One area of habitat, a cattail marsh located within the Tamarack Swamp on the east side of Bielenberg Drive along Alignment D3, earned an MLCCS B rating as a good-quality natural community. The DNR did not rate several sections of the resource study area because the agency did not observe them; however, the DNR likely would have rated these areas at C or below due to the moderate condition of the natural community and obvious past disturbance.

#### Regionally Significant Ecological Areas

The habitat resource study area includes five regionally significant ecological areas. The database ranks two of these areas as 1s (the lowest ranking), and it ranks the other three as 2s (the middle rating). The data evaluated includes assessment of areas in 2003 using LandSat data and aerial photo interpretation of grassland, in 2008 using MLCCS data, and in 2011 using NLCD data. This database ranks ecological areas based on attributes such



as size, shape, cover-type diversity and adjacent land use. The database ranks regionally significant ecological areas with a number 1, 2 or 3 based on their sizes, diversity in vegetation, and biodiversity significance. A No. 3 ranking indicates a larger, more diverse area; a No. 1 ranking indicates the area is smaller and less diverse.

### Minnesota Biological Survey Site Biodiversity Significance Ranks

The resource study area includes the following two MBS-ranked sites for biodiversity significance:

- The Tamarack Nature Preserve – “high” biodiversity significance ranking
- Battle Creek Lake – “below-minimum” biodiversity significance ranking

### INVASIVE SPECIES

Invasive species are generally defined as those species that have been introduced or moved to an area where they have not historically occurred. These species are of concern because they are known to quickly colonize and dominate disturbed areas, crowding out native species. Once established, invasive species tend to persist, and effective eradication may not be feasible. Given the urban landscape and disturbed nature of the resource study area, invasive species are common.

Terrestrial Invasive Species Observations<sup>105</sup> were reviewed to determine the presence of invasive species within the resource study area. Thirty-two records were identified within the resource study area, predominately outside the potential limits of disturbance. Three species were only noted at the western end of the study limits for Build Alternative 1. These include brown marmorated stink bug (*Halyomorpha halys*), common tansy (*Tanacetum vulgare*), and European buckthorn (*Rhamnus cathartica*). Other species noted within the resource study area for both Build Alternatives 1 and 2 include emerald ash bore (*Agrilus planipennis*), leafy spurge (*Euphorbia esula*), and spiny plumeless thistle (*Carduus acanthoides*). One record of emerald ash bore (*Agrilus planipennis*) was noted within the boundary of each of the build alternatives near the southern terminus at Queens Drive and Guider Drive.

Aquatic Invasive Species Observations were reviewed to determine the presence of invasive species within the resource study area. The analysis identified 10 records within the resource study area, predominately located outside the potential limits of disturbance. The analysis noted one species, curly-leaved pondweed (*Potamogeton crispus*), only at the western end of the Build Alternative 1 Project limits. Other species the analysis noted within the resource study area for both Build Alternatives 1 and 2 include common water hyacinth (*Eichhornia crassipes*), purple loosestrife (*Lythrum salicaria*) and zebra mussel (*Dreissena polymorpha*).

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<sup>105</sup> Minnesota Department of Natural Resources. Ecological and Water Resources. “Terrestrial Invasive Species Observations”. Available at: <https://gisdata.mn.gov/dataset/env-invasive-terrestrial-obs>. Accessed November 2018.



## NOXIOUS WEEDS

The analysis reviewed the Minnesota and Federal Noxious Weed List,<sup>106</sup> the DNR Invasive Species Program<sup>107</sup> and the Terrestrial Invasive Species Observations<sup>108</sup> to determine whether the resource study area contains noxious weeds. According to the Noxious Weeds GIS Layers,<sup>109</sup> no noxious weeds are not present in the resource study area. Multiple records previously identified one aquatic noxious weed, Eurasian watermilfoil (*Myriophyllum spicatum*), within the resource study area, but this species is located outside the potential limits of disturbance. The analysis found one record each for two terrestrial noxious weeds, common tansy (*Tanacetum vulgare*) and wild parsnip (*Pastinaca sativa*), located within the resource study area, but neither species is located within the potential limits of disturbance.

### 5.9.3. Environmental Consequences

#### 5.9.3.1. Operating Phase (Long-Term) Impacts

##### BUILD ALTERNATIVE 1 (A1-BC-D3)

##### Endangered Species

##### Federally Listed Species

The Council anticipates the following potential Project-related impacts to federally listed species (see correspondence with the USFWS in **Appendix D**):

- **Higgins eye pearlymussel:** Adverse impacts are not anticipated for the Higgins eye pearlymussel because the Project would not disturb the Mississippi River (or St. Croix River) or its tributaries.
- **Snuffbox mussel:** Adverse impacts are not anticipated for the snuffbox mussel because the Project would not disturb the Mississippi River (or St. Croix River) or its tributaries.
- **Spectaclecase mussel:** Adverse impacts are not anticipated for the spectaclecase mussel because the Project would not disturb the Mississippi River (or St. Croix River) or its tributaries.
- **Winged mapleleaf mussel:** Adverse impacts are not anticipated for the winged mapleleaf mussel because the Project would not disturb the Mississippi River (or St. Croix River) or its tributaries.

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<sup>106</sup> Minnesota Department of Agriculture. *Minnesota Noxious Weed List*. (2016). Available at: [www.dot.state.mn.us/roadsides/vegetation/pdf/noxiousweeds.pdf](http://www.dot.state.mn.us/roadsides/vegetation/pdf/noxiousweeds.pdf). Accessed November 2018.

<sup>107</sup> Minnesota Department of Natural Resources. *Minnesota Invasive Species Program*. (2016). Available at: <http://www.dnr.state.mn.us/invasives/eco/index.html>. Accessed November 2018.

<sup>108</sup> Minnesota Department of Natural Resources. *Ecological and Water Resources*. "Terrestrial Invasive Species Observations". Available at: <https://gisdata.mn.gov/dataset/env-invasive-terrestrial-obs>. Accessed November 2018.

<sup>109</sup> Minnesota Department of Natural Resources. "Eradicate List Noxious Weeds in Minnesota". Available at: <https://mnag.maps.arcgis.com/apps/webappviewer/index.html?id=2e248e0a57fc486fb2493dcf4d5eab4c>. Accessed October 2018.



- **Northern long-eared bat:** The Project's limits of disturbance is not within ¼-mile of known species hibernacula or 150 feet from known species maternity-roost trees. Potential disturbance to other hardwood trees may affect the northern long-eared bat during the roosting season; therefore, the total amount of tree removal for the Project would be approximately 9 acres of trees within the potential limits of disturbance, which is about 8 percent of the tree coverage in the ¼-mile resource study area. As the Council advances the Project design, it will seek opportunities to minimize tree clearing, especially within naturalized areas. The Council does not anticipate Project-related impacts to the northern long-eared bat.
- **Rusty patched bumble bee:** The presence of this species is within ¼-mile of the Project's limits of disturbance and it could be present within the I-94 right-of-way. No grasslands within the I-94 right-of-way will be disturbed by the Project. The Council does not anticipate the Build Alternatives would produce adverse impacts to the species, based on the Project's 15% Concept Plans.
- **Other federally protected species:** The study area does not contain known occurrences of bald eagles' or golden eagles' nests, therefore Project-related impacts are not anticipated to bald or golden eagles.

### State-Listed Species

To evaluate potential impacts to state-listed species, the Council reviewed DNR NHIS data for the area within 1 mile of the Project corridor. Of the 19 species the data identified in the area, 13 have aquatic life cycles and are associated with the Mississippi River. State-listed species are not anticipated to have Project-related impacts because the Project would not disturb the Mississippi River or its tributaries.

The analysis noted documented occurrences of the following six species within 1 mile of the Project corridor:

- **Kitten-tails:** Kitten-tails are a state-listed threatened plant species; however, the species has no records of observation within the potential limits of disturbance. Project-related impacts to the population of kitten-tails are not anticipated.
- **Peregrine falcon:** Peregrine falcons are listed as a species of special concern by the State of Minnesota and are also protected under a variety of federal laws, such as the Migratory Bird Treaty Act. Peregrine falcons prefer nesting on high cliffs or structures, and there are several records of falcons nesting on buildings and structures around Saint Paul in the Mississippi River corridor. After evaluating the study area and considering the peregrine falcons' preferred nesting areas, the Council does not anticipate Project-related impacts to this species.
- **Blanding's turtle:** The Blanding's turtle is a state-listed threatened species that the analysis identified within 1 mile of the Build Alternatives; however, the species has no records of observation within the potential limits of disturbance. Therefore, the Council does not anticipate Project-related impacts to the Blanding's turtle. **Section 5.9.1.2** identifies measures to avoid impacts to the Blanding's turtle during construction.
- **Rusty patched bumble bee:** Rusty patched bumble bee is a state special concern species that the analysis identified within 1 mile of the Build Alternatives. The presence of this species within ¼-mile of the Project alignment may result in potential Project-related impacts due to roadway expansion or development within open spaces along the I-94 right-of-way.
- **Jumping spider:** Jumping spider is a state delisted species that analysis identified within 1 mile of the Build Alternatives however, the species has no records of observation within the potential limits of disturbance. The Council does not anticipate Project-related impacts to the jumping spider.
- **Leadplant flower moth:** Leadplant flower moth is a state special concern species that analysis identified within 1 mile of the Build Alternatives however, the species has no records of observation within the potential limits of disturbance. The Council does not anticipate Project-related impacts to the leadplant flower moth.





The Council does not anticipate long-term Project-related impacts to threatened and endangered species habitat. Threatened and endangered species in the Project area are generalist species that have adapted to the urbanized conditions and low-quality habitat of the resource study area. These species are generally more tolerant of human presence and activities including traffic (pedestrian, bus and vehicular), and they have demonstrated by their presence that they can adapt to an environment.

### Habitat Quality

Wildlife in the Project area are generalist species adapted to the urbanized conditions and low-quality habitat of the resource study area. These species are generally more tolerant of human presence and activities including traffic (pedestrian, bus and vehicular) that can adapt to an environment, as their presence demonstrates.

Additionally, Build Alternative 1 would produce a loss of mostly low-quality habitat. The habitat in these areas is generally located in existing roadside right-of-way or within roadway medians.

Based on the minimal extent of the potential limits of disturbance and the availability of higher-quality adjacent habitat, the Council anticipates negligible Project-related impacts to wildlife habitat.

**Figure 5.9-1, Figure 5.9-2, Figure 5.9-3, Figure 5.9-4 and Figure 5.9-5** show the locations of wildlife habitat within the study area. These figures also show three state ratings/classification systems: the MLCCS, the Regional Significant Ecological Assessment database, and the MBS Site Biodiversity Significance Ranks.

While many impacted trees in the potential limits of disturbance are isolated, some areas have clusters of trees that could be impacted, which may yield a greater loss of habitat.

### Regionally Significant Ecological Areas

The Project or stormwater BMPs may affect four regionally significant ecological areas in the study area that are within or immediately adjacent to the potential limits of disturbance.

Battle Creek Lake is located near the eastern end of Alignment C. The database ranks this area as “2” or of medium regional significance on the 2003 LandSat regionally significant ecological area data set. Within the limits of disturbance there are no significant ecological areas.

Tamarack Nature Preserve is located along the south portion of Alignment D3. The database ranks this area as “2” or of medium regional significance on the 2003 LandSat, 2008 MLCCS and 2011 NLCD regionally significant ecological area data sets. Within the limit of disturbance there are no significant ecological areas as the project will not be outside of the mowed and maintained right-of-way.

The 2008 MLCCS database listed the two remaining areas as regionally significant ecological areas with ranks of “1” or poorer regional significance. The first site is located at the southeast corner of Hadley Avenue and 4th Street and the second site is located between I-494 and Bielenberg Drive south of I-94, and both appear to be predominantly grassland with scattered trees. No significant ecological areas are within the potential limits of disturbance for these two sites.

Stormwater management BMPs may affect Battle Creek Lake and the two grassland sites. In accordance with the Council’s *Thrive MSP 2040* plan,<sup>110</sup> the Project presents an opportunity to enhance these areas by implementing BMPs for habitat restoration and natural resource conservation. These opportunities will be evaluated as design is advanced for the Project.

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<sup>110</sup>Metropolitan Council. *Thrive MSP 2040: One Vision, One Metropolitan Region. Adopted May 28, 2014. Available at: <https://metrocouncil.org/planning/projects/thrive-2040.aspx>. Accessed October 2018.*



### *Minnesota Biological Survey Site Biodiversity Significance Ranks*

The Project would potentially impact only one of the five MBS-ranked sites of biodiversity significance within the resource study area: The Tamarack swamp, which has a “high” biodiversity significance ranking, is located along the southern portion of Alignment D3. It should be noted that Tamarack Nature Preserve extends both east and west of the existing right-of-way for Bielenberg Drive and is mapped as being continuous across the right-of-way. Therefore, calculated impacts to the nature preserve include areas which are not biologically significant.

### **Invasive Species**

Invasive species are common to the urban landscape and disturbed nature of the resource study area. The Build Alternatives would not contribute further to the presence of invasive species in the Project corridor.

### **Noxious Weeds**

No known noxious weeds are within the potential limits of disturbance; however, the resource study area could include other common noxious weeds such as Canada thistle, spotted knapweed and common buckthorn. The long-term impacts of Build Alternative 1 would not contribute further to the presence of noxious weeds in the Project corridor.



FIGURE 5.9-1: ALIGNMENT A1 WILDLIFE HABITAT AND IMPACTS

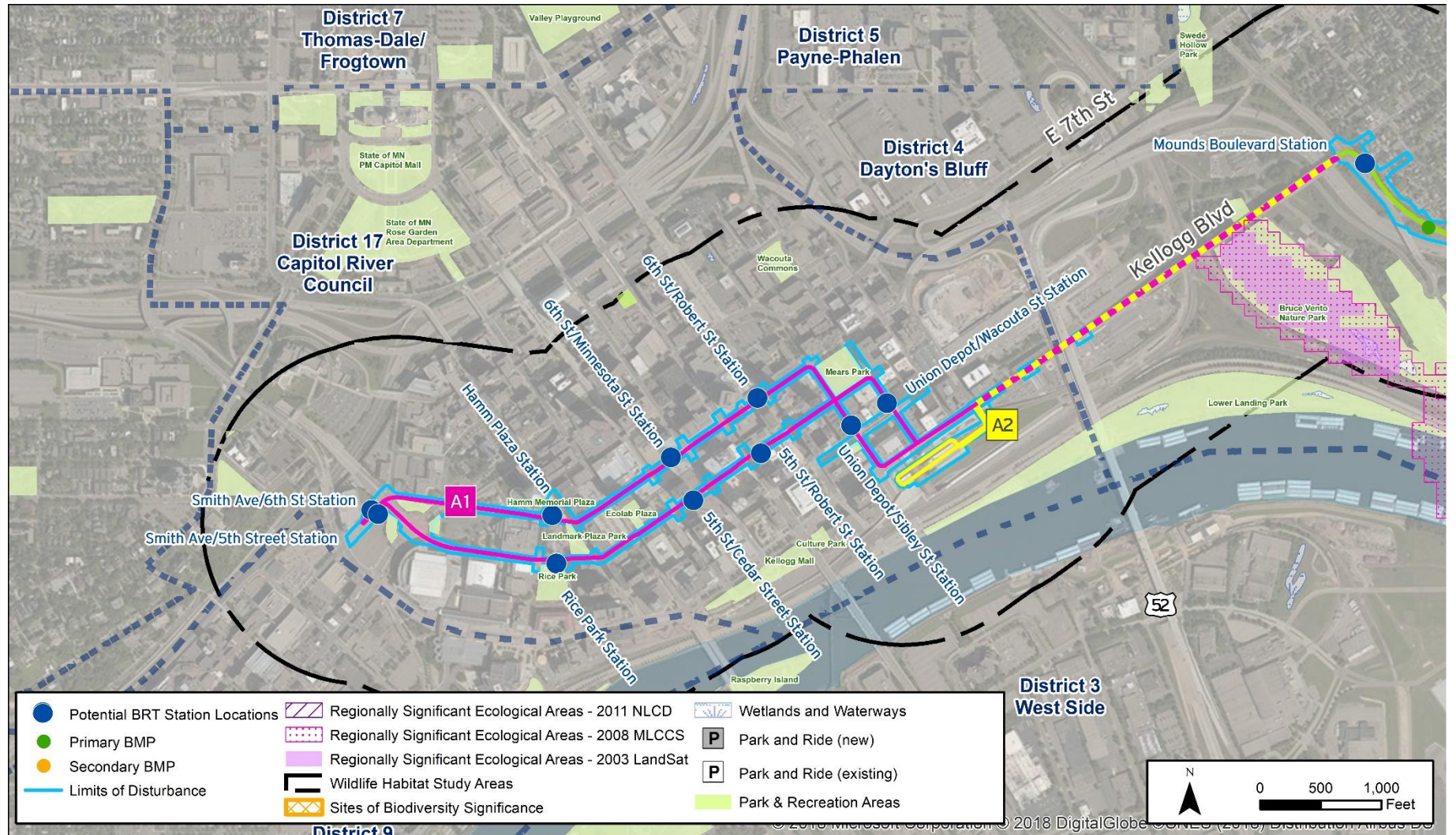




FIGURE 5.9-2: ALIGNMENT B WILDLIFE HABITAT AND IMPACTS

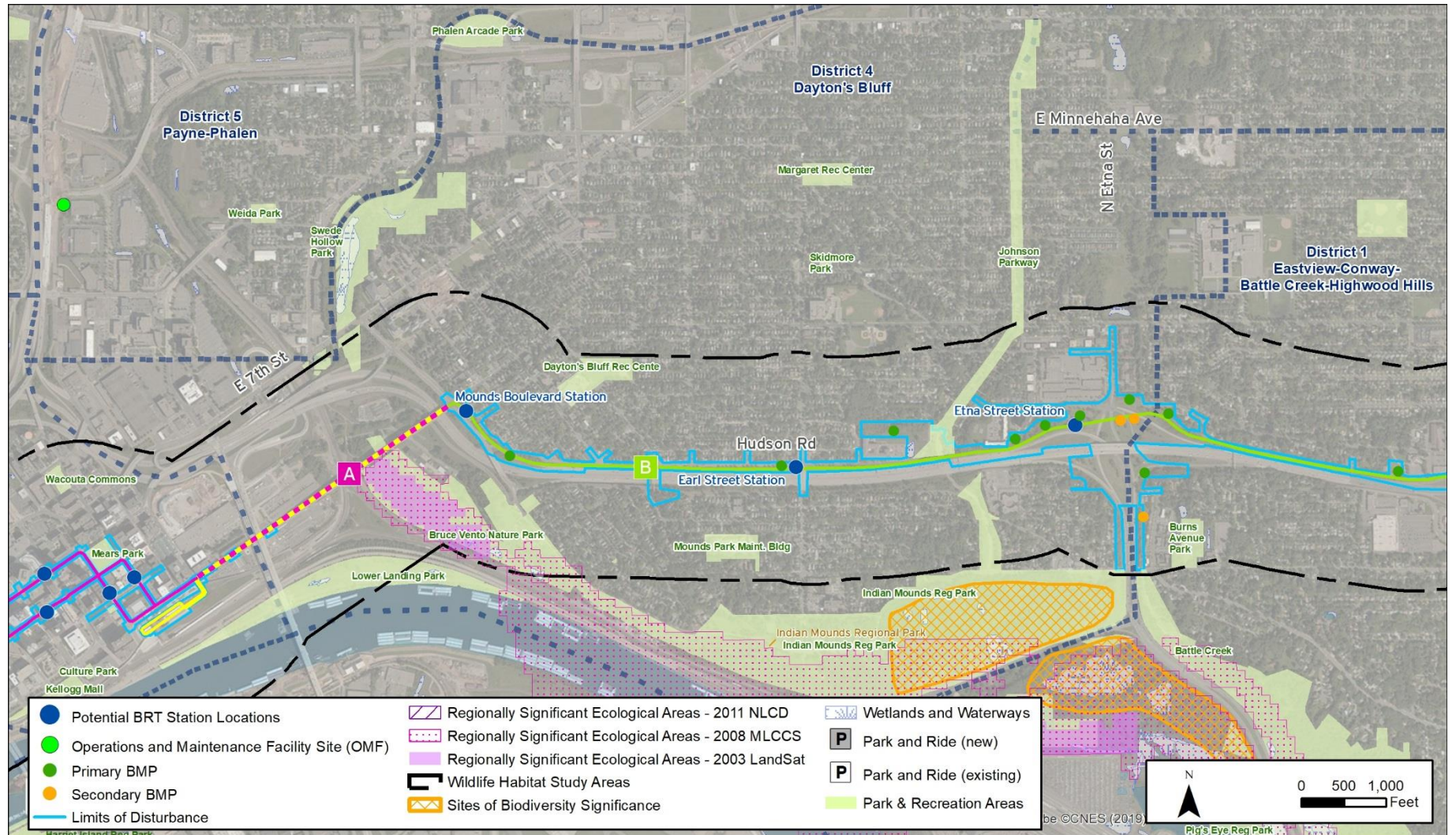




FIGURE 5.9-3: ALIGNMENTS B AND C WILDLIFE HABITAT AND IMPACTS

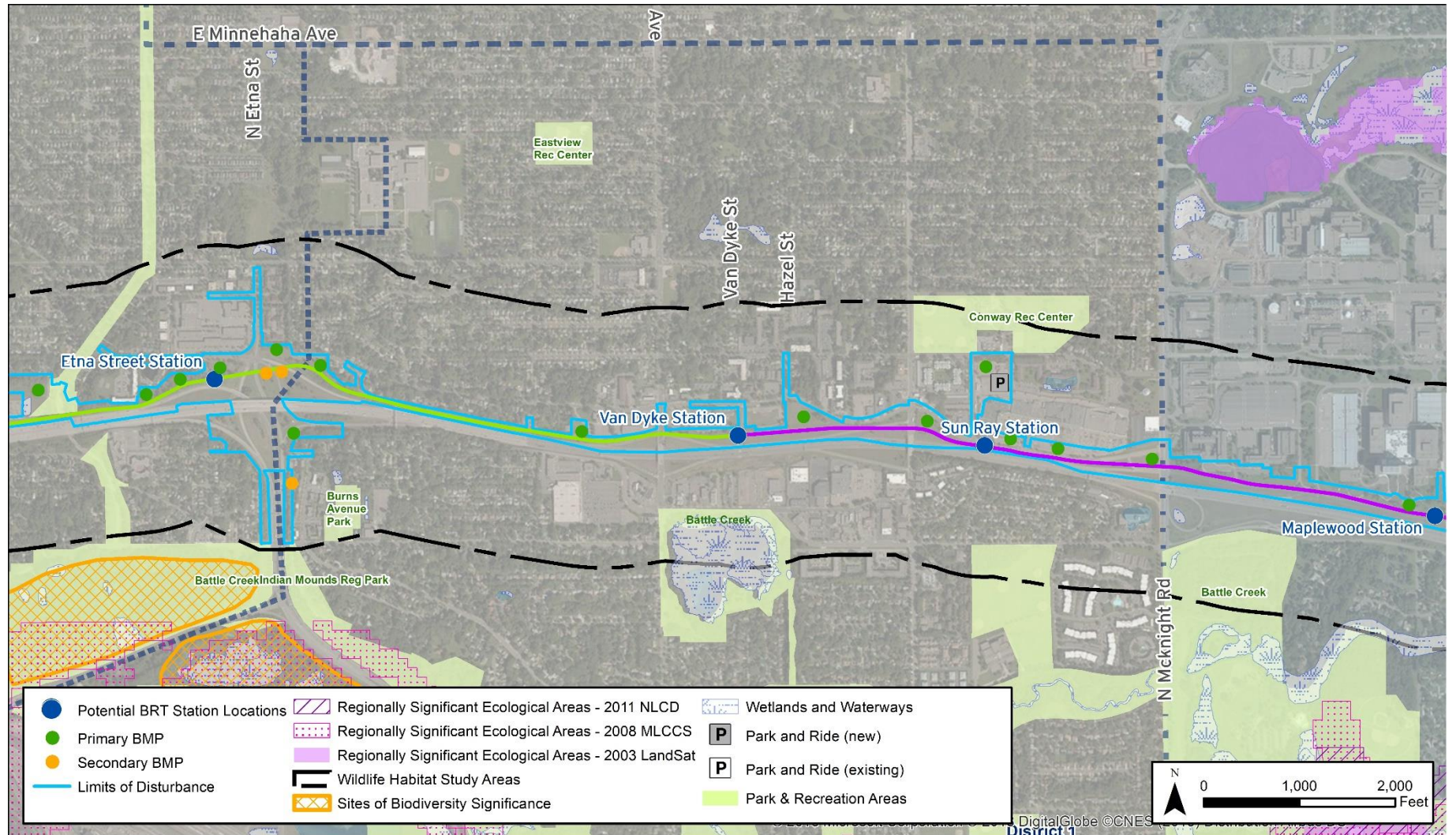




FIGURE 5.9-4: ALIGNMENT C WILDLIFE HABITAT AND IMPACTS

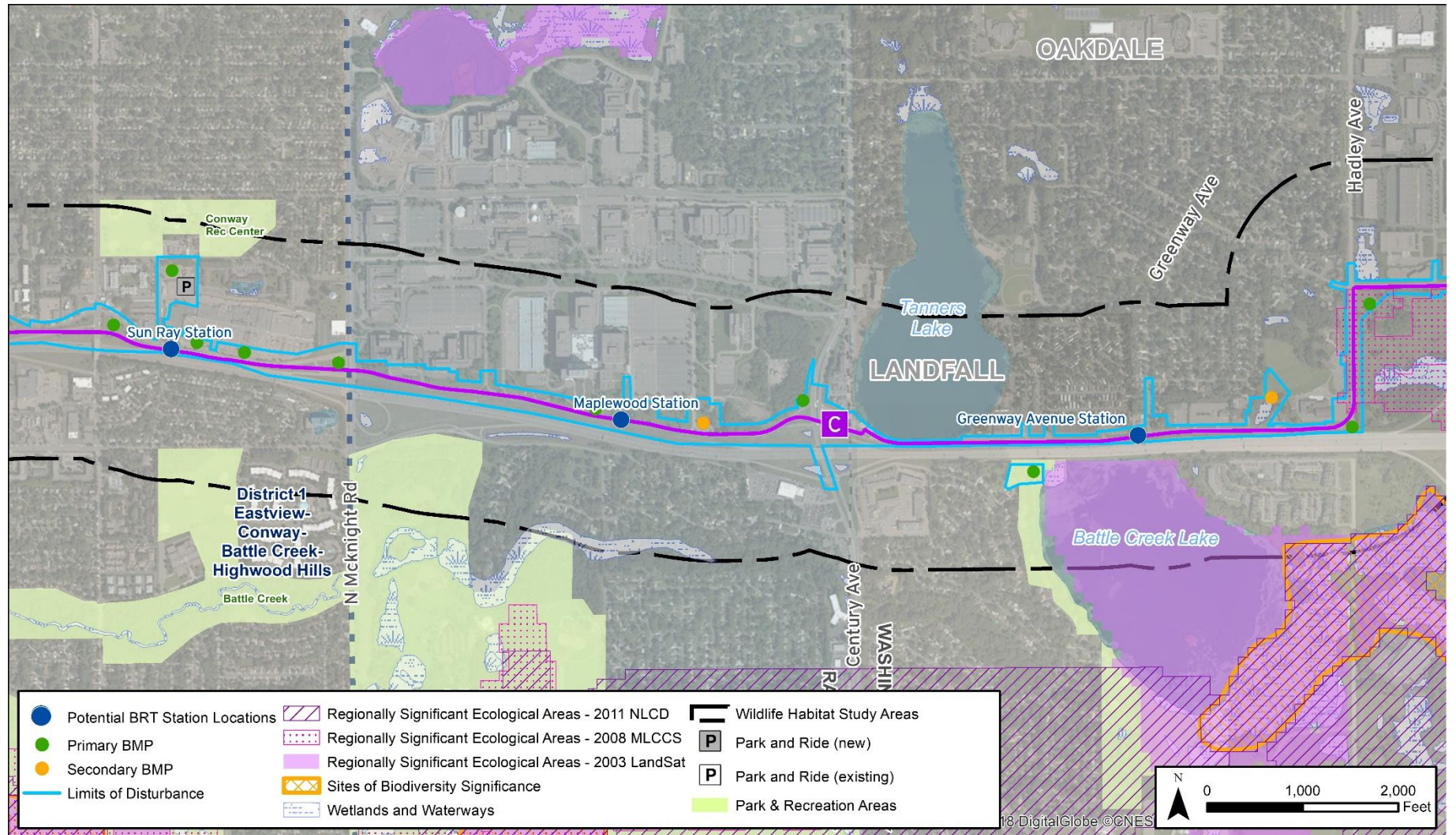
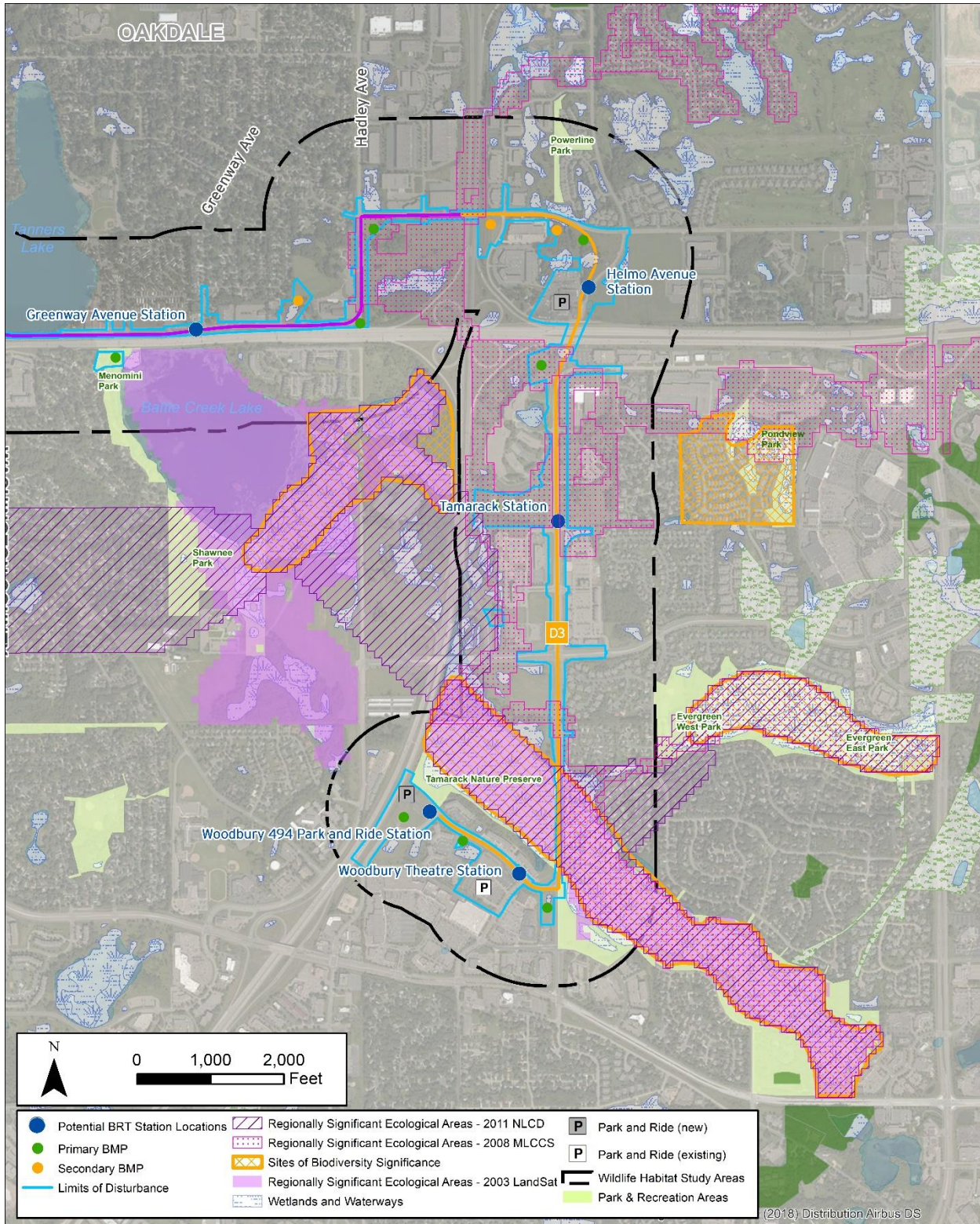




FIGURE 5.9-5: ALIGNMENTS C AND D3 WILDLIFE HABITAT AND IMPACTS





## BUILD ALTERNATIVE 2 (A2-BC-D3)

Build Alternative 1 and Build Alternative 2 would produce the same long-term impacts to the biological environment.

## SUMMARY OF OPERATING PHASE (LONG-TERM) IMPACTS BY ALTERNATIVE

**Table 5.9-3** summarizes the Project's potential impacts to threatened and endangered species and wildlife habitat by alignment. These areas generally include wooded and forested areas and wetlands which would provide habitat to the northern long-eared bat and the Blanding's turtle.





**TABLE 5.9-3: POTENTIALLY IMPACTED SPECIES AND HABITAT BY ALIGNMENT AND ALTERNATIVE**

Alignment	Federally Listed Species	State-Listed Species	Terrestrial Habitat (Acres) <sup>a</sup>	Aquatic Habitat (Acres)	Total Habitat (Acres)
Alignment A1	<ul style="list-style-type: none"> <li>Northern long-eared bat</li> <li>Rusty patched bumble bee</li> </ul>	None	0	0	0
Alignment A2	<ul style="list-style-type: none"> <li>Northern long-eared bat</li> <li>Rusty patched bumble bee</li> </ul>	None	0	0	0
Alignment B	<ul style="list-style-type: none"> <li>Northern long-eared bat</li> <li>Rusty patched bumble bee</li> </ul>	None	3.4	0.3	3.7
Alignment C	<ul style="list-style-type: none"> <li>Northern long-eared bat</li> <li>Rusty patched bumble bee</li> </ul>	Blanding's turtle	1.8	0.9	2.7
<i>With Hazel Street Station Option</i>	<ul style="list-style-type: none"> <li><i>Northern long-eared bat</i></li> <li><i>Rusty patched bumble bee</i></li> </ul>	<i>Blanding's turtle</i>	1.8	0.9	2.7
<i>With Dedicated Guideway Option at Hadley Avenue and 4th Street</i>	<ul style="list-style-type: none"> <li><i>Northern long-eared bat</i></li> <li><i>Rusty patched bumble bee</i></li> </ul>	<i>Blanding's turtle</i>	1.8	0.9	2.7
Alignment D3	<ul style="list-style-type: none"> <li>Northern long-eared bat</li> <li>Rusty patched bumble bee</li> </ul>	None	3.6	3.8	7.4
Build Alternative 1 (A1-BC-D3)			8.8	5	13.8
Build Alternative 2 (A2-BC-D3)			8.8	5	13.8

<sup>a</sup> Includes impacts to wooded and forested areas.



### Endangered Species

The northern long-eared bat and the Blanding’s turtle are state-listed species; however, the Council, with concurrence from the USFWS and DNR (see correspondence in **Appendix D**), do not anticipate Project-related impacts to these species.

### Wildlife Habitat

The conversion of wildlife habitat or undeveloped space to a transportation facility would not have long-term ramifications for the continued persistence of wildlife in a given area. Wildlife that is living in an urban environment will typically find another location like that which is being disturbed. Terrestrial habitat is noted as unmanicured upland grassland with sparse tree/shrub cover and may include trails. These areas provide suitable wildlife habitat for many urban species and may also contain suitable habitat for the rusty patched bumble bee depending upon the maintenance of those areas including mowing and the use of pesticides.

The Build Alternatives would impact 12 percent of all available habitat in the resource study area, resulting in an overall negligible Project-related impact to terrestrial and aquatic wildlife. **Table 5.9-4** summarizes these impacts.

**TABLE 5.9-4: LONG-TERM IMPACTS TO WILDLIFE HABITAT BY ALTERNATIVE**

Alternative	Total Impact (Acres)	Regionally Significant Ecological Areas Potentially Impacted <sup>a, b</sup>	Sites of Biodiversity Significance Potentially Impacted
<b>Build Alternative 1 (A1-BC-D3)</b>	<b>41.5</b>	<b>1</b>	<b>1</b>
<i>Hazel Street Station Option</i>	<i>0</i>	<i>1</i>	<i>1</i>
<i>Dedicated Guideway Option at Hadley Avenue and 4th Street</i>	<i>0</i>	<i>1</i>	<i>1</i>
<b>Build Alternative 2 (A2-BC-D3)</b>	<b>41.5</b>	<b>1</b>	<b>1</b>
<i>Hazel Street Station Option</i>	<i>0</i>	<i>1</i>	<i>1</i>
<i>Dedicated Guideway Option at Hadley Avenue and 4th Street</i>	<i>0</i>	<i>1</i>	<i>1</i>

<sup>a</sup> The limits of disturbance includes one Regionally Significant Ecological Area/Site of Biodiversity Significance, Tamarack Nature Preserve; however, as the Project’s limits of disturbance is within the existing right-of-way, wildlife habitat impacts are not anticipated.

<sup>b</sup> Battle Creek Lake located near the eastern end of Alignment C, and a fallow site at Hadley Avenue and 4th Street, and fallow areas between I-494 and Bielenberg Drive both on Alignment D3 were mapped using the 2003 or 2008 data as a Regionally Significant Ecological Area; however, were not noted on the 2011 Regionally Significant Ecological Areas and therefore are not included as a long-term impacts.

### 5.9.3.2. Construction Phase (Short-Term) Impacts

#### BUILD ALTERNATIVE 1 (A1-BC-D3)

The Project would produce short-term impacts to wildlife habitat due to construction activities including use of heavy equipment and silt fence/construction barriers. These impacts may cause temporary disruptions to wildlife; however, the impacts would be temporary and limited to active construction areas. Additionally, the Project would stabilize areas disturbed by construction with interim and final erosion- and sediment-control measures that include seeding plans that would inhibit the spread of invasive species or noxious weeds. The number of active



construction areas would be the minimum number needed to construct the Project as required by construction permits, and the Council would stabilize inactive disturbed areas with seeding and other forms of erosion-control BMPs.

### BUILD ALTERNATIVE 2 (A2-BC-D3)

Build Alternative 2 would produce the same short-term impacts as Build Alternative 1 to the biological environment including threatened and endangered species, and wildlife habitat.

## 5.9.4. Avoidance, Minimization and/or Mitigation Measures

This section discusses the measures that the Council would use to avoid or minimize impacts to wildlife habitat, especially habitat associated with federally or state-listed species. As the Project advances through the Project Development and Engineering phases, avoidance and minimization of impacts to natural areas and compliance with Thrive MSP 2040 will be continue. This includes implementation of BMPs for habitat restoration and natural resource conservation. Avoidance, minimization and mitigation measures apply to both Build Alternative 1 and Build Alternative 2.

### ENDANGERED SPECIES

To minimize impacts to the rusty patched bumble bee, the Project would replant disturbed land with native, flowering vegetation where possible. The Project would incorporate the use of appropriate lighting, seasonal tree clearing restrictions and implementation of other appropriate mitigation measures to avoid long-term impacts to the northern long-eared bat. During or prior to construction, the Project would utilize measures to avoid or minimize impacts to the northern long-eared bat. These measures include the following activities:<sup>111</sup>

- If assuming the presence of bats, or if bridge assessment or presence or probable absence survey suggests presence of bats, maintain suitable roosting habitat. Design of a new bridge could incorporate suitable roosting sites
- Ensure all operators, employees and contractors working in areas of known or presumed bat habitat are aware of all federal transportation agencies' environmental commitments, including all applicable avoidance and minimization measures
- Direct temporary lighting away from suitable habitat during the active season
- When installing new or replacing existing permanent lights, use downward-facing, full cut-off lens lights (with same intensity or less for replacement lighting), or, for transportation agencies using the Backlight, Uplight and Glare – or BUG – system of the Illuminating Engineering Society,<sup>112</sup> be as close to 0 for all three ratings, with a priority “Uplight” of 0 and “Backlight” as low as practicable

<sup>111</sup> U.S. Department of the Interior. “Consistency letter for the ‘METRO Gold Line Bus Rapid Transit Project’ (TAILS 03E19000-2018-R-1423) under the revised February 5, 2018, Federal Highway Administration, Federal Railroad Administration, Federal Transit Administration Programmatic Biological Opinion for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat. March 19, 2019.

<sup>112</sup> Illuminating Engineering Society. “Addendum A for Illuminating Engineering Society TM-15-11: “Backlight, Uplight, and Glare (BUG) Ratings”. Available at: <http://www.ies.org/pdf/education/ies-fol-addenda-1-%20bug-ratings.pdf> and International Dark-Sky Association. “The BUG System – A New Way to Control Stray Light from Outdoor Luminaires”. Specifier Bulletin for Dark Sky Applications. Issue 1, Vol. 2. 2009. Available at: [http://shop.innovativelight.com/media/cms/BUG\\_ratings\\_3044A7612FA89.pdf](http://shop.innovativelight.com/media/cms/BUG_ratings_3044A7612FA89.pdf). Accessed November 2018.



- Modify all phases/aspects of the Project to avoid tree removal
- Apply time-of-year restrictions for tree removal when bats are not likely to be present, or limit tree removal to 10 or fewer trees per project at any time of year within 100 feet of existing road/rail surface and outside of documented roosting/foraging habitat or travel corridors; conduct visual emergence survey that observes no bats
- Limit tree removal to Project-specified plans and inform contractors about clearing limits and their field markings (e.g., install bright-colored flagging/fencing before clearing any trees so that contractors stay within clearing limits)
- Do not remove documented, still-suitable roosts; trees within ¼-mile of roosts; or documented foraging habitat any time of year
- Complete inspection of all bridges no less than two years before construction to document the use of the structure by bats and other wildlife. For bridges that would require reconstruction or removal, the Council would complete a field survey to identify use of the area by migratory birds before construction begins.

BMPs and permanent stormwater controls would reduce sedimentation to a level that is acceptable for a National Pollutant Discharge Elimination System permit and, therefore, would have no adverse impact on aquatic habitat and associated aquatic wildlife.

Although the Council does not anticipate impacts to the Blanding's turtle, the DNR has established standard construction BMPs that the Project would implement as needed. These BMPs include using overlapping silt fence that allows turtles to bypass the fencing while still capturing the sediment; providing identification information to the contractor to avoid turtles if they are observed in the construction zone; and removing the silt fence after site stabilization to eliminate barriers to turtle movements.

## WILDLIFE HABITAT

The Project would avoid or minimize to the extent possible impacts to regionally significant ecological areas and sites of biodiversity significance as the Council advances the design. The Project would utilize construction and post-construction BMPs (see **Section 5.4**) to lessen impacts to terrestrial and aquatic habitats. Before construction, the Project would implement measures (such as cleaning equipment before bringing it onsite or leaving the site) that limit the spread of noxious weed species and seeds within the potential limits of disturbance.

Areas mapped as regionally significant wildlife habitat should be field verified and to the extent practical these areas should be enhanced as part of the Project. Installation of stormwater BMPs at these locations could be an opportunity to promote habitat restoration and natural resource conservation in accordance with Thrive 2040.

To minimize impacts to the wildlife habitat and to be consistent with Council Thrive 2040, the Project would incorporate the use of appropriate lighting, seasonal tree clearing restrictions and implementation of other appropriate mitigation measures identified to avoid impacts to threatened and endangered species and the following additional measures:

- Maintain an up-to-date regional Natural Resources Inventory and Assessment through field verification of resources
- Conduct tree inventory prior to Project implementation
- Field verify Regionally Significant Ecological Areas and areas to minimize impacts to mature trees and natural habitat loss
- Promote the implementation of BMPs for habitat restoration and natural resource conservation.



- Implement design considerations for locations of stormwater BMPs within or near Regionally Significant Ecological Areas which include, but are not limited to, limiting impacts to native trees and area, limiting impacts to habitat and wildlife movement, and placing BMPs as close to the built facility as possible to limit impacts

## 5.10. Air Quality

This section evaluates Project-related impacts to air quality.

### 5.10.1. Regulatory Context and Methodology

Information included within this section is based on the *Air Quality Approach Memorandum* (see **Attachment A-5-5**). The Council collaborated with the MPCA, Washington and Ramsey counties, and MnDOT to develop the scope and methods of the air quality analysis.

#### 5.10.1.1. Regulatory Context

The NEPA review process requires that large projects receiving federal funding or approvals evaluate potential impacts to air quality<sup>113</sup> in accordance with the Clean Air Act of 1970 and the Clean Air Act Amendments of 1977 and 1990. The EPA regulates air quality and delegates this authority to the state of Minnesota, where the MPCA monitors and enforces the EPA's standards.

#### 5.10.1.2. Methodology

Motorized vehicles affect air quality by emitting airborne pollutants. Changes in traffic volumes, travel patterns, and roadway locations affect air quality by changing the number of vehicles and the levels of congestion levels in an area. The analysis studied potential Project-related air quality impacts from the following two types of pollutants:

- **Criteria pollutants:** Common air pollutants regulated by EPA based on their health and/or environmental effects. Criteria pollutants include ozone, particulate matter (PM<sub>2.5</sub> and PM<sub>10</sub>), carbon monoxide (CO), nitrogen dioxide, lead, and sulfur dioxide.
- **Mobile Source Air Toxics (MSATs):** Toxic compounds with significant contributions from mobile sources which motor vehicles generate. MSATs include acetaldehyde, acrolein, benzene, 1,3-butadiene, diesel particulate matter (diesel PM), ethylbenzene, formaldehyde, naphthalene and polycyclic organic matter.

Air quality is impacted when these two types of pollutants exceed established regulatory thresholds. The analysis assessed potential impacts to air quality by comparing projected concentrations of these pollutants for the Build Alternatives with National Ambient Air Quality Standards (NAAQS).

EPA categorizes the following three geographic designations to areas based on measurements of the criteria pollutant concentrations compared with NAAQS:

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<sup>113</sup> *The National Environmental Policy Act of 1969, as amended. ("The Public Health and Welfare," Title 42, USC, Sec. 4321 et seq. (1969)). Available at: <https://www.gpo.gov/fdsys/pkg/USCODE-2011-title42/pdf/USCODE-2011-title42-chap55-sec4321.pdf>. Accessed November 2018.*



- Attainment area: indicates that concentrations are below NAAQS
- Nonattainment area: indicates that concentrations exceed NAAQS
- Maintenance area: an area that was redesignated as attainment from non-attainment

Because the Project is within a limited maintenance area, EPA requires an evaluation of its potential impacts to air quality. To meet this requirement, the Council evaluated intersection “hot spots” to assess the potential for CO impacts from the Project.

A quantitative evaluation of PM<sub>10</sub> impacts is not required for this project because it is not considered a culpable source of PM<sub>10</sub> or a project of air quality concern regarding PM<sub>10</sub> emissions. The *Air Quality Approach Memorandum* presents the reasons for no detailed analyses for ozone, particulate matter (PM<sub>2.5</sub>), nitrogen dioxide, lead, and sulfur dioxide.

In addition to the criteria air pollutants, EPA also regulates MSATs. The FTA accepts the FHWA guidance for the assessment of MSAT effects for transportation projects in the NEPA review process.

The Council’s evaluation of potential air quality impacts from the Project includes all roadway segments adjacent to and crossing the Build Alternatives.

## 5.10.2. Affected Environment

The Project is located within the Minneapolis-St. Paul Intrastate Air Quality Control Region #131. The Project area is in attainment for ozone, particulate matter (PM<sub>2.5</sub>), nitrogen dioxide, lead, and sulfur dioxide. It is in a maintenance area for particulate matter (PM<sub>10</sub>) and carbon monoxide (CO). In 2010, based on continued compliance with EPA’s CO criteria, EPA approved a limited maintenance plan request for the Twin Cities Metropolitan Area. Maintenance areas must demonstrate continuing compliance with CO standards.

## 5.10.3. Environmental Consequences

### 5.10.3.1. Operating Phase (Long-Term) Impacts

Changes in air quality result from changes in traffic patterns and congestion levels on roadways in the Project area.

#### BUILD ALTERNATIVE 1 (A1-BC-D3)

#### National Ambient Air Quality Standards

The analysis compared projected concentrations of criteria pollutants with NAAQS to assess potential Project-related impacts to air quality in the resource study area. Carbon Monoxide is a traffic-related pollutant that has been of concern in the Twin Cities Metropolitan Area. In 1999, the EPA designated all of Anoka, Hennepin, Ramsey, and portions of Carver, Scott, Dakota, Washington, and Wright Counties as a maintenance area for CO. Due to successful regulatory compliance since 1999, in 2010, EPA redesignated the Twin Cities Metropolitan Area as a limited maintenance area, further reducing the CO evaluation needed. The *Air Quality Approach Memorandum* describes the evaluation of each criteria pollutant.

#### Air Quality Conformity

The 1990 Clean Air Act Amendments require that state implementation plans (SIPs) demonstrate how states with nonattainment and maintenance areas will meet federal air quality standards. The EPA issued final rules on



conformity that require transportation projects to be part of a conforming long-range transportation policy plan (LRTP) and a four-year transportation improvement program (TIP).

The Council's 2040 TPP (2018 Update) identifies the Project (in which it is named the METRO Gold Line), and the Council anticipates the Project would begin operating around 2024. In July 2014, MPCA found the draft 2040 TPP conforms with EPA requirements (see **Attachment A-5-6** for documentation of conformity). The Project is not included in MnDOT's 2019-2022 State Transportation Improvement Program,<sup>114</sup> but the Council includes it in its 2016-2019 Transportation Improvement Program for the Twin Cities Metropolitan Area.<sup>115</sup>

A limited maintenance designation does not require a regional emission modeling analysis; however, federally funded and state-funded projects do require a hot-spot analysis. The limited maintenance plan adopted in 2010 already establishes that the CO emission level and resulting ambient concentrations will continue to attain NAAQS. In accordance with this plan, the Council did not model regional emissions for the Project; it did, however, complete a hot-spot analysis.

### Conformity Analysis

The Council analyzed potential CO impacts on air quality at four intersections within the resource study area for the Project. The analysis modeled future CO concentrations based on forecasted No-Build 2022 traffic volumes as the worst-case conditions (highest emission factors for the originally proposed opening year). The Council collaborated with MPCA to develop the analysis methods, procedures and scope – all of which are EPA- and MPCA-approved for industry-standard analyses.

While the Council now anticipates that 2024 would be the Project's opening year, initial analysis shows vehicle emissions are improving faster than traffic volumes are growing; therefore, the modeling of the 2022 CO concentrations is still representative of CO levels for the project area. The results summarized below account for effects of the finished Project as well as substantial completion of Project elements by 2024. The Council used current data from EPA's emission factor model<sup>116</sup> and dispersion-modeling software<sup>117</sup> to perform the CO analysis.

### Intersection Carbon Monoxide Analysis

The analysis modeled CO concentrations at the following four intersections in the Project area:

- For Alignment A1: intersection of Kellogg and Mounds boulevards
- For Alignment B: intersection of White Bear Avenue and I-94 westbound ramps
- For Alignment C: intersection of McKnight and Hudson roads
- For Alignment D3: intersection of Tamarack Road and Bielenberg Drive

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<sup>114</sup>Minnesota Department of Transportation. State of Minnesota 2019-2022 State Transportation Improvement Program (STIP). September 2018. Available at: [http://www.dot.state.mn.us/planning/program/pdf/stip/2019\\_22%20Final%20STIP.pdf](http://www.dot.state.mn.us/planning/program/pdf/stip/2019_22%20Final%20STIP.pdf). Accessed October 2018.

<sup>115</sup>Metropolitan Council. 2019-2022 Transportation Improvement Program for the Twin Cities Metropolitan Area. 2018. Available at: [http://www.metrocouncil.org/Transportation/Planning-2/Key-Transportation-Planning-Documents/Transportation-Improvement-Plan-\(TIP\).aspx](http://www.metrocouncil.org/Transportation/Planning-2/Key-Transportation-Planning-Documents/Transportation-Improvement-Plan-(TIP).aspx). Accessed October 2018.

<sup>116</sup>U.S. Environmental Protection Agency. "Motor Vehicle Emission Simulator (MOVES)". MOVES and Other Mobile Source Emissions Models. Available at: <https://www.epa.gov/moves>. Accessed October 2018.

<sup>117</sup>U.S. Environmental Protection Agency. CAL3QHC CALINE3-based air quality dispersion CO modeling software. Available at: <https://www.epa.gov/scram/air-quality-dispersion-modeling-preferred-and-recommended-models#cal3qhc>. Accessed October 2018.



The *Transportation Resources Technical Report* in **Appendix A** identified these intersections as having some of the highest traffic volumes and poorest levels of service; therefore, the analysis presumed these locations to present worst-case CO concentrations. The rationale for this approach is to evaluate whether any of the Project alignments could result in CO concentrations that exceed NAAQS' allowable limits. MPCA, Ramsey and Washington counties, MnDOT and the Council collaborated to develop this methodology.

The Council evaluated data from MPCA's CO-monitoring Site 861 (Lexington Avenue) at 1088 University Ave. in Saint Paul. Site 861 best represents Saint Paul and its eastern suburbs compared with the state's other CO-monitoring sites in Minneapolis, Duluth and the Southeast Minnesota metro area.

**Table 5.10-1** presents the CO concentrations adjusted for background traffic growth. The hot-spot intersection model combined these background concentrations to predict CO levels. The model captured worst-case conditions, so it did not factor future emissions-control improvements. This omission likely results in overestimations of ambient, background CO concentrations.

**TABLE 5.10-1: BACKGROUND CARBON MONOXIDE CONCENTRATIONS**

Site 861, Saint Paul, Minnesota	1-Hour	8-Hour
2013 Background CO Concentration (parts per million (ppm))	2.4	1.1
Background Traffic Growth Factor – 2013 to 2022	1.25	1.25
Adjusted Background CO Concentration – 2022 (ppm)	3.0	1.4

### Hot-Spot Evaluation Results

**Table 5.10-2** shows the intersection hot-spot analysis worst-case results from the EPA air quality dispersion model, listing the location of the highest expected CO concentration, the value of the highest one-hour and eight-hour average concentrations, and the wind angle that produced these concentrations. The results represent background CO concentrations plus the modeled intersection CO concentrations.

**TABLE 5.10-2: BUILD ALTERNATIVES CARBON MONOXIDE MODELING RESULTS**

Intersection	Highest CO Receptor	1-Hour Avg. (ppm)	8-Hour Avg. (ppm)	Wind Angle
Alignment A1: Intersection of Kellogg and Mounds boulevards	NW Quadrant	3.3	1.6	330°
Alignment B: Intersection of White Bear Ave and I-94 WB Ramps	NW Quadrant	3.3	1.6	30°-120°
Alignment C: Intersection of McKnight and Hudson roads	South Side	3.3	1.6	150°
Alignment D3: Intersection of Tamarack Road and Bielenberg Drive	West Side	3.6	1.8	230°





## Discussion and Conclusions

Build Alternative 1 would not produce long-term impacts to air quality. The Council's CO modeling found the following results:

- The model showed that concentrations of CO generated from Build Alternative 1 would be substantially less than the federal one-hour standard of 35 ppm; the Minnesota one-hour standard of 30 ppm; and the federal eight-hour standard of 9 ppm.
- The intersection modeled for Alignment D3 (Tamarack Road and Bielenberg Drive) would have the highest CO concentrations, with one-hour and eight-hour concentrations of 3.6 and 1.8 parts per million (ppm), respectively.

The CO hot-spot analysis indicates the Project would not cause CO concentrations to exceed state or federal standards. The *Air Quality Approach Memorandum* presents a qualitative assessment indicating that the Project also would not cause exceedances of other criteria pollutants.

## Mobile Source Air Toxics

With its passage of the 1990 Clean Air Act Amendments, Congress mandated that the EPA regulate 188 air toxics that were also known hazardous air pollutants. The EPA identified in 2007<sup>118</sup> a group of 93 compounds emitted from mobile sources and required controls to dramatically decrease these MSAT emissions through cleaner fuels and cleaner engines.

The EPA lists in its 2011 National Air Toxics Assessment<sup>119</sup> the following nine compounds that are among national-scale cancer-risk-drivers, and to which mobile sources contribute significantly: acetaldehyde, acrolein, benzene, 1,3-butadiene, diesel particulate matter (diesel PM), ethylbenzene, formaldehyde, naphthalene, and polycyclic organic matter.

## Summary of MSAT Information

The Council performed its analysis according to FHWA's guidance document on when and how to analyze MSATs within the NEPA review process for proposed highway projects.<sup>120</sup> **Figure 5.10-1** illustrates MSAT emission trends through the year 2050 based on an FHWA analysis using EPA's MOVES2014a model<sup>121</sup>. The figure shows that even if the number of vehicle miles traveled (VMT) increases by 45 percent from 2010 to 2050, as forecast, a combined reduction of 91 percent in the total annual emissions for the priority MSAT is projected for the same period. Local projections may differ from national projections in terms of the mix and turnover of vehicles, VMT growth rates and local emission-control measures.

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<sup>118</sup> "Control of Hazardous Air Pollutants from Mobile Sources"; Final rule," Vol. 72, Federal Register, No. 37, February 26, 2007, pp. 8430. Available at: <https://www.gpo.gov/fdsys/pkg/FR-2007-02-26/html/E7-2667.htm>. Accessed October 2018.

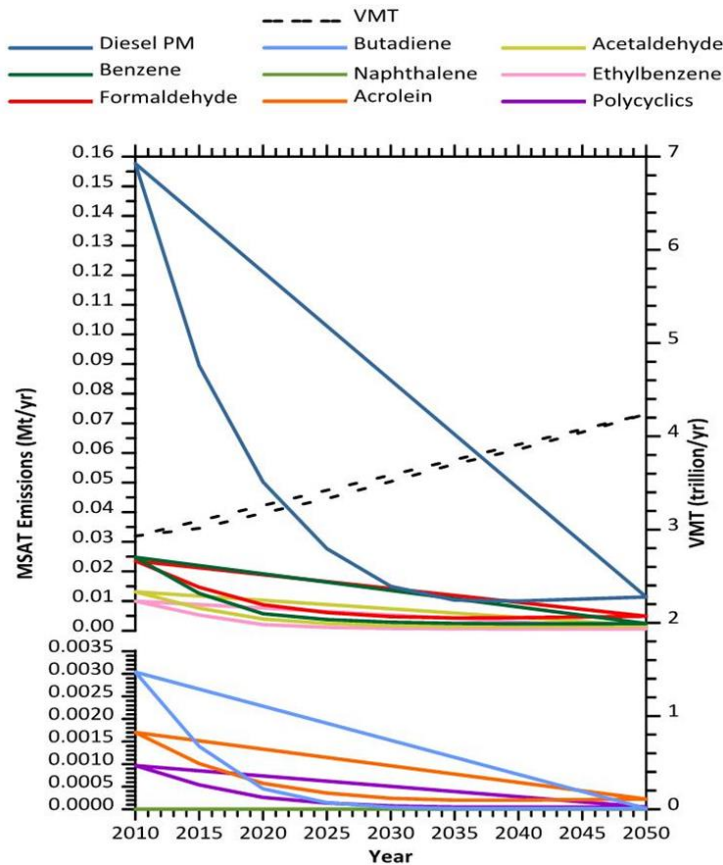
<sup>119</sup> U.S. Environmental Protection Agency. "2011 NATA: Assessment Results". National Air Toxics Assessment. Available at: <https://www.epa.gov/national-air-toxics-assessment/2011-nata-assessment-results>. Accessed October 2018.

<sup>120</sup> Federal Highway Administration. "Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents" memorandum. August 2016. Available at: [https://www.fhwa.dot.gov/Environment/air\\_quality/air\\_toxics/policy\\_and\\_guidance/msat/index.cfm](https://www.fhwa.dot.gov/Environment/air_quality/air_toxics/policy_and_guidance/msat/index.cfm). Accessed October 2018.

<sup>121</sup> Federal Highway Administration (FHWA). EPA MOVES2014a model runs conducted by FHWA. September 2016. Available at: [http://www.fhwa.dot.gov/environment/air\\_quality/air\\_toxics/policy\\_and\\_guidance/nmsatetrends.cfm](http://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/nmsatetrends.cfm). Accessed October 2018. Note: Local trends may differ depending on VMT, vehicle speeds, vehicle mix, fuels, emission-control programs, meteorology and other factors.



**FIGURE 5.10-1: PROJECTED NATIONAL MSAT EMISSION TRENDS, 2010-2050**



Air toxics analysis is a continuing area of research. While much work has been done to assess the overall health risk of air toxics, many questions remain unanswered. In particular, the tools and techniques for assessing project-specific health outcomes due to lifetime MSAT exposure remain limited. These limitations impede the ability to evaluate how potential public health risks posed by MSAT exposure should be factored into project-level decision-making within the context of NEPA.

Information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in MSAT emissions associated with a proposed set of transportation alternatives. FHWA, EPA, the Health Effects Institute and other organizations support and fund research into methods to assess potential risks to public health more definitively from MSAT emissions associated with a specific transportation project; however, such tools and techniques are not yet available or reliable. FHWA monitors developing research in this field; see the *Air Quality Approach Memorandum* for more information.

**Qualitative Mobile Source Air Toxics Analysis**

The amount of MSATs generated by the Build Alternatives would be proportional to the average daily traffic (ADT) if other variables such as the mix of vehicles are the same for both alternatives. Current air quality levels are considered acceptable, and the levels are expected to remain at acceptable levels under the Build Alternatives. The Build Alternatives are expected to serve approximately 8,000 transit trips by year 2040.



The Council does not anticipate that the Project would significantly impact vehicular traffic. Due to new transit riders' shift from cars to BRT, the Council anticipates a small decrease in annual VMT is expected on arterial roadways parallel to the Project corridor; however, additional park-and-ride lots may result in moderate localized VMT increases. The Build Alternatives projected estimated ADT do not differ from that for the No-Build Alternative; therefore, the Council does not anticipate that the Build Alternatives would produce impacts to MSAT emissions.

The Build Alternatives could include realigning travel lanes, which would effectively move some traffic closer to nearby homes, schools and businesses; therefore, the Build Alternatives could produce in localized areas higher ambient concentrations of MSATs than the No-Build Alternative. The Council cannot reliably quantify the magnitude nor duration of these potential increases compared with the No-Build Alternative because information about Project-specific MSAT-related health impacts is incomplete or unavailable.

Emissions would likely be lower in the Build Alternatives' design year than current levels due to the EPA's national emissions-control programs, which EPA anticipates could reduce annual MSAT emissions by 90 percent between 2010 and 2050. The magnitude of EPA-projected reductions is so great, even after accounting for traffic growth, that MSAT emissions in the study area are likely to be lower under a wide variety of future conditions.

Neither the Hazel Street Station Option nor the Dedicated Guideway Option at Hadley Avenue and 4th Street would produce long-term impacts to air quality.

#### BUILD ALTERNATIVE 2 (A2-BC-D3)

Build Alternative 2 would produce the same long-term impacts to air quality as Build Alternative 1.

### 5.10.3.2. Construction Phase (Short-Term) Impacts

#### BUILD ALTERNATIVE 1 (A1-BC-D3)

Build Alternative 1 would affect traffic volumes and operations along roadways in and around the Project area. Construction could temporarily close or reduce the operational capacity of some intersections in which case, the Council would work with MnDOT to detour traffic to parallel roadway facilities near the Project area. This increased traffic may produce temporarily increased emissions and higher concentrations of air pollutants near homes and businesses; however, the Council does not anticipate these emissions levels to generate localized concentrations that would exceed state or federal air quality standards.

In addition to traffic-related emissions increases, construction activities could also increase concentrations of air pollutants. Construction equipment powered by fossil fuels emits the same air pollutants as highway vehicles. Exposed soils can also produce increased particulate matter when moved by construction equipment or disturbed by wind. The Council does not anticipate that concentrations of these air pollutants would exceed state or federal air quality standards, in part due to the measures **Section 5.10.4** describes.

Neither the Hazel Street Station Option nor the Dedicated Guideway Option at Hadley Avenue and 4th Street would produce short-term impacts to geology, groundwater or soils.

#### BUILD ALTERNATIVE 2 (A2-BC-D3)

Build Alternative 2 would produce the same short-term impacts to air quality as Build Alternative 1.

### 5.10.4. Avoidance, Minimization and/or Mitigation Measures

The analysis presented in this document demonstrates there would be no anticipated exceedances of air pollutant concentrations during the operating phase of the Project; therefore, no mitigation measures are necessary. The State of Minnesota does not require permits related to air quality for projects of this type.



This analysis also demonstrates that the Council does not anticipate exceedances during Project construction; however, where applicable and prudent, the Project would implement EPA-recommended measures to reduce short-term construction impacts to air quality, and a series of BMPs would be implemented during construction to control dust. Avoidance and minimization measures apply to both Build Alternative 1 and Build Alternative 2. This may include the following prevention and minimization measures:

- Minimization of land disturbance during site preparation
- Use of watering trucks to minimize dust
- Covering of trucks while hauling soil/debris off-site or transferring materials
- Stabilization of dirt piles that are not removed immediately
- Use of dust suppressants on unpaved areas
- Minimization of unnecessary vehicle and machinery idling
- Re-vegetation of any disturbed land after construction

The Council would develop traffic mitigation measures before construction begins to establish detour routes and maintain traffic flow.

## 5.11. Energy

This section evaluates Project-related impacts to regional energy consumption.

### 5.11.1. Regulatory Context and Methodology

The Council on Environmental Quality regulations require the consideration of “energy requirements and conservation potential of various alternatives and mitigation measures” be included as part of the analysis of alternatives for a proposed project.<sup>122</sup>

For this analysis, the energy consumption factors were based on estimates of average energy consumption rates. The analysis reports results in British Thermal Units (Btus) per mile. A Btu is a unit of energy that represents the amount of heat energy needed to raise the temperature of one pint of water by 1-degree Fahrenheit. The analysis calculates the number of Btus per mile from the VMT total reported by the Twin Cities Regional Travel Demand Model for the Build Alternatives.

The energy impacts of the Build Alternatives were determined by comparing total energy consumption of each Build Alternative with that of the No-Build Alternative. **Table 5.11-1** presents the amount of energy used per mile by each mode of transportation. The annual energy use in the Twin Cities Metropolitan Area is estimated for bus transit, medium- and heavy-duty vehicles, and private vehicles by multiplying these energy-use factors by the total miles traveled.

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<sup>122</sup> “Council on Environmental Quality,” Title 40, CFR, Part 1502.16(e). July 1, 2018. Available at: <https://www.govinfo.gov/content/pkg/CFR-2018-title40-vol37/pdf/CFR-2018-title40-vol37-sec1502-16.pdf>. Accessed May 2018.



**TABLE 5.11-1: ENERGY CONSUMPTION FACTORS**

Mode	Energy Consumption Factors <sup>a</sup> (Btus per Mile)
Single-Unit and Combination Trucks <sup>b</sup>	21,382
Bus	36,760
Passenger Vehicles <sup>c</sup>	5,338

<sup>a</sup> U.S. Department of Energy Oak Ridge National Laboratory, Transportation Energy Data Book, Edition 36.2 (August 2018).

<sup>b</sup> Energy consumption factor applies to medium- and heavy-duty vehicles, which have more than two axles (Classes 3-8). The energy consumption factor excludes transit buses.

<sup>c</sup> Energy consumption factor is a weighted average of passenger cars and light trucks (with two axles and four tires or fewer).

The resource study area for energy includes Project-related changes in travel patterns and bus operations. The analysis focuses on “direct” energy use, or the energy consumed by the operations of vehicles such as autos, buses and trucks.

## 5.11.2. Affected Environment

The Project area includes a mix of urban and suburban development, and its character shifts from urban to suburban as the Build Alternative alignments move from west to east. Development along the Project corridor includes residential, business, industrial, institutional, agricultural, park and transportation uses. **Section 4.2** of the *Community and Social Resources Technical Report* in **Appendix A** describes existing land uses along the proposed alignments.

## 5.11.3. Environmental Consequences

### 5.11.3.1. Operating Phase (Long-Term) Impacts

#### BUILD ALTERNATIVE 1 (A1-BC-D3)

Build Alternative 1 would consume less energy than the No-Build Alternative. Build Alternative 1 would consume approximately 255,806 billion Btus of energy annually.

Neither the Hazel Street Station Option nor the Dedicated Guideway Option at Hadley Avenue and 4th Street would produce long-term impacts to regional energy consumption.

**Table 5.11-2** presents Build Alternative 1’s long-term operational impacts to regional energy use.



**TABLE 5.11-2: BUILD ALTERNATIVE 1 ESTIMATED 2040 ANNUAL DIRECT ENERGY USE**

Vehicle Type	No-Build Alternative	Build Alternative 1
<i>2040 Annual VMT (in Thousands)<sup>a, b</sup></i>		
Medium- and Heavy-Duty Vehicles	4,752,451	4,752,451
Bus	40,594	41,123
Passenger Vehicles	28,621,900	28,601,900
<b>Total</b>	<b>33,414,945</b>	<b>33,395,474</b>
<i>2040 Annual Energy Consumption (Billions of Btus)</i>		
Medium- and Heavy-Duty Vehicles	101,617	101,617
Bus	1,492	1,512
Passenger Vehicles	152,784	152,677
<b>Total</b>	<b>255,893</b>	<b>255,806</b>
<b>Difference</b>		<b>-87</b>

<sup>a</sup> 2016 VMT (auto and truck) is based on MnDOT's 2016 VMT figures for the seven-county Twin Cities Metropolitan Area. Available at: <https://www.dot.state.mn.us/roadway/data/data-products.html#VMT>. Accessed October 2018. Auto and truck VMT split based on the Council's 2015 travel-demand model; VMTs growth by 2040 is based on the Council's 2040 model.

<sup>b</sup> Calculation: Federal Transit Administration National Transit Database 2014 Annual Vehicle Revenue Inventory miles + estimated percent growth between 2015-2030 (based on percent growth in vehicle service hours assumed in Metro Transit's 2015-2030 Service Improvement Plan) + additional vehicle platform miles (based on changes to connecting buses and BRT service plans)

**BUILD ALTERNATIVE 2 (A2-BC-D3)**

Build Alternative 2 would consume less energy than the No-Build Alternative. Build Alternative 2 would consume slightly more energy than Build Alternative 1 because Build Alternative 2 would result in fewer mode shifts from passenger vehicles to bus. Build Alternative 2 would consume approximately 255,813 billion Btus of energy annually.

Table 5.11-3 presents Build Alternative 2's long-term operational impacts to regional energy use.

**TABLE 5.11-3: BUILD ALTERNATIVE 2 ESTIMATED 2040 ANNUAL DIRECT ENERGY USE**

Vehicle Type	No-Build Alternative	Build Alternative 2
<i>2040 Annual VMT (in Thousands)<sup>a, b</sup></i>		
Medium- and Heavy-Duty Vehicles	4,752,451	4,752,451
Bus	40,594	40,938
Passenger Vehicles	28,621,900	28,604,550
<b>Total</b>	<b>33,414,945</b>	<b>33,397,939</b>



Vehicle Type	No-Build Alternative	Build Alternative 2
<i>2040 Annual Energy Consumption (Billions of Btus)</i>		
Medium- and Heavy-Duty Vehicles	101,617	101,617
Bus	1,492	1,505
Passenger Vehicles	152,784	152,691
<b>Total</b>	<b>255,893</b>	<b>255,813</b>
<b>Difference</b>		<b>-80</b>

<sup>a</sup> 2016 VMT (auto and truck) is based on MnDOT's 2016 VMT figures for the seven-county Twin Cities Metropolitan Area. Available at: <https://www.dot.state.mn.us/roadway/data/data-products.html#VMT>. Accessed October 2018. Auto and truck VMT split based on the Council's 2015 travel demand model; VMT growth by 2040 is based on the Council's 2040 model.

<sup>b</sup> Calculation: Federal Transit Administration National Transit Database 2014 Annual Vehicle Revenue Inventory miles + estimated percent growth between 2015-2030 (based on percent growth in vehicle service hours assumed in Metro Transit's 2015-2030 Service Improvement Plan) + additional vehicle platform miles (based on changes to connecting buses and BRT service plans)

### 5.11.3.2. Construction Phase (Short-Term) Impacts

#### BUILD ALTERNATIVE 1 (A1-BC-D3)

Construction of Build Alternative 1 and the associated production of raw materials and operation of construction equipment would use energy. Energy use would be localized and temporary. Construction of Build Alternative 1 would not substantially impact regional energy consumption in the short term compared with the energy consumption of the Twin Cities Metropolitan Area.

#### Hazel Street Station Option

Constructing this option would consume the same amount of energy in the short term as construction that includes a station at Van Dyke Street because the station features would be the same at both locations; therefore, this option would not produce short-term impacts to regional energy consumption.

#### Dedicated Guideway Option at Hadley Avenue and 4th Street

The dedicated BRT lane included in this option would require slightly more energy consumption to construct than an option with mixed traffic operations because building the dedicated lane would require more extensive construction activity and would require reconstructing the bridge over I-694.

#### BUILD ALTERNATIVE 2 (A2-BC-D3)

The A2 Alignment within Build Alternative 2 is shorter than the A1 Alignment within Build Alternative 1; therefore, the construction of Build Alternative 2 would impact energy consumption slightly less in the short term than construction of Build Alternative 1.

### 5.11.4. Avoidance, Minimization and/or Mitigation Measures

Implementing the Project would decrease total regional energy consumption annually compared with the No-Build Alternative; therefore, the FTA and Council do not propose avoidance, minimization or mitigation measures for either Build Alternative 1 or Build Alternative 2.



The Project would construct energy-efficient stations and other structures, thereby potentially further minimizing long-term regional energy consumption. The Council will evaluate these opportunities as the Project advances through the Engineering Phase.

## 5.12. Farmlands

This section evaluates Project-related impacts to farmlands.

### 5.12.1. Regulatory Context and Methodology

#### 5.12.1.1. Regulatory Context

Congress passed the Farmland Protection Policy Act (FPPA)<sup>123</sup> as part of the Agriculture and Food Act of 1981 to reduce urban sprawl and protect farmland, and specifically to reduce the impact of federal projects on these resources.

The FPPA protects lands being used for agricultural production and those that have the best combined physical and chemical characteristics for agricultural production. The USDA Natural Resources Conservation Service administers the FPPA, which divides protected farmland into three categories: unique, prime, and of statewide or local importance.

The act considers prime or unique farmland to be “a unique natural resource ... [that] provides food and fiber necessary for the continued welfare of the people of the United States.” Urban or built-up land and water areas cannot be considered prime farmland, but land does not have to be in use for agricultural purposes to be considered prime farmland.

Minnesota state law<sup>124</sup> also requires the Minnesota Department of Agriculture to formally review agricultural impacts from proposed projects that would impact 10 or more acres of agricultural land.

#### 5.12.1.2. Methodology

The FPPA establishes methods for implementation, including assessing applicability and exemptions, criteria for determining whether the actions of a project are subject to the FPPA, and guidelines for applying the criteria. County-level soil surveys provide lists of NRCS-identified soil types that provide the physical and chemical components to meet the above definitions for prime or unique farmland. Projects use these resources and information that FTA provides to complete a federal “Farmland Impact Conversion Rating Form for Corridor Type Projects,” **Error! Bookmark not defined.** which calculates an estimated impact rating for a proposed project.

The FPPA and conversion rating form requirement does not apply to proposed projects if their resource study areas include only farmlands that have been converted to urban development or are located an urbanized area as mapped by the U.S. Census Bureau. NRCS defines farmland already in urban development as “*lands identified*

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<sup>123</sup>“Agriculture,” Title 7, USC, Sec. 4201 et. seq., December 1981. Available at: <https://www.govinfo.gov/content/pkg/USCODE-2010-title7/pdf/USCODE-2010-title7.pdf>. Accessed October 2018.

<sup>124</sup>“Department of Agriculture,” Chap. 17, Minnesota Statutes, Sec. 17.80-17.84, 2018. Available at: <https://www.revisor.mn.gov/statutes/cite/17>. Accessed October 2018.





as ‘urbanized area’ (UA) on the Census Bureau Map, or as urban area mapped with a ‘tint overprint’ on the USGS topographical maps, or as ‘urban-built-up’ on the USDA Important Farmland Maps.”

The Project’s potential limits of disturbance includes the resource study area for farmlands categorized as prime, unique, or of state or local importance. The NRCS soil survey mapping tool identified prime and unique farmland soil types within the Project potential limits of disturbance; however, the U.S. Census Bureau’s 2010 urbanized area maps<sup>125</sup> designate the Project’s entire farmland resource study area as urbanized. The bureau’s designation exempts the NRCS-mapped areas of prime and unique farmland soils from protection by the FPPA.

Minnesota law does not require the Minnesota Department of Agriculture to review the Project because it would acquire less than 10 acres of agricultural land.

## 5.12.2. Affected Environment

The potential limits of disturbance include unique and prime farmland; however, the study area is within an urbanized area, as designated by the U.S. Census Bureau. Therefore, this land is exempt from protection by the FPPA.

## 5.12.3. Environmental Consequences

### 5.12.3.1. Operating Phase (Long-Term) Impacts

#### BUILD ALTERNATIVE 1 (A1-BC-D3)

All NRCS-mapped prime and unique farmland within the resource study area has been converted to urban use; therefore; Build Alternative 1 would not produce long-term impacts to prime or unique farmlands.

Neither the Hazel Street Station Option nor the Dedicated Guideway Option at Hadley Avenue and 4th Street would produce long-term impacts to prime or unique farmlands.

#### BUILD ALTERNATIVE 2 (A2-BC-D3)

All NRCS-mapped prime and unique farmland within the resource study area has been converted to urban use; therefore; Build Alternative 2 would not produce long-term impacts to prime or unique farmlands.

### 5.12.3.2. Construction Phase (Short-Term) Impacts

#### BUILD ALTERNATIVE 1 (A1-BC-D3)

All NRCS-mapped prime and unique farmland within the resource study area has been converted to urban use; therefore; Build Alternative 1 would not produce short-term impacts to prime or unique farmlands.

Neither the Hazel Street Station Option nor the Dedicated Guideway Option at Hadley Avenue and 4th Street would produce short-term impacts to prime or unique farmlands.

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<sup>125</sup>U.S. Census Bureau. 2010 Census Urbanized Area Reference Maps. Available at: [https://www2.census.gov/geo/maps/dc10map/UAUC\\_RefMap/ua/ua57628\\_minneapolis--st\\_paul\\_mn--wi/DC10UA57628.pdf](https://www2.census.gov/geo/maps/dc10map/UAUC_RefMap/ua/ua57628_minneapolis--st_paul_mn--wi/DC10UA57628.pdf). Accessed October 2018.



### BUILD ALTERNATIVE 2 (A2-BC-D3)

All NRCS-mapped prime and unique farmland within the resource study area has been converted to urban use; therefore, Build Alternative 2 would not produce short-term impacts to prime or unique farmlands.

#### **5.12.4. Avoidance, Minimization and/or Mitigation Measures**

All NRCS-mapped prime and unique farmland within the resource study area has been converted to urban use; therefore, the FTA and Council do not propose avoidance, minimization or mitigation measures for either Build Alternative 1 or Build Alternative 2.



*Gold Line*

BUS RAPID TRANSIT PROJECT ENVIRONMENTAL ASSESSMENT

**Appendix A: Environmental Assessment Technical Reports**

Attachment A-5-1:

**City of Saint Paul, WCA Administration**

September 2019



CITY OF SAINT PAUL  
*Melvin Carter, Mayor*

375 Jackson Street, Suite 220  
Saint Paul, Minnesota 55101-1806

Telephone: 651-266-8989  
Facsimile: 651-266-9124  
Web: [www.stpaul.gov/dsi](http://www.stpaul.gov/dsi)

June 14, 2018

Nicole Soderholm  
Ramsey-Washington Metro Watershed District  
2665 Noel Drive  
Little Canada, MN 55117

RE: WCA Administration; Gold Line Bus Rapid Transit

Dear Nicole,

The Gold Line Bus Rapid Transit project will span multiple municipalities, two counties, and two watershed districts. The project team is currently investigating wetland resources within the project corridor.

For the purposes of Wetland Conservation Act (WCA) administration, the local government units (LGUs) involved include the City of Saint Paul, Ramsey-Washington Metro Watershed District (RWMWD), and Mn/DOT for any activities on state land. Based on the initial convening of the LGUs and Technical Evaluation Panel, preliminary indications from the project team's reconnaissance suggest most wetland activities and impacts would occur within RWMWD. As such, per Minn. Rule §8420.0200 subp 1F, the City of Saint Paul defers its WCA LGU administration duties to RWMWD.

The City of Saint Paul values its agency partnership with RWMWD and looks forward to successful collaboration on this important regional transportation project.

Sincerely,

A handwritten signature in black ink, appearing to read "Wes Saunders-Pearce".

Wes Saunders-Pearce  
Water Resource Coordinator



*Gold Line*

BUS RAPID TRANSIT PROJECT ENVIRONMENTAL ASSESSMENT

**Appendix A: Environmental Assessment Technical Reports**

Attachment A-5-2:

## **Soil Types Within the Study Area**

Natural Resources Conservation Service

September 2019



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**TABLE 1: ALIGNMENTS A1 AND A2 – SOIL TYPES WITHIN THE STUDY AREA SUMMARY**

Name <sup>1</sup>	Approximate Acres Within Study Area	Approximate Percent of Study Area	Drainage Classification <sup>2</sup>	Erosion Hazard <sup>3</sup>
Udorthents, wet substratum	47	9	Poorly drained	N/A <sup>4</sup>
Urban land	411	79	N/A	N/A
Water	65	12	N/A	N/A

**TABLE 2: ALIGNMENT B<sup>5</sup> – SOIL TYPES WITHIN THE STUDY AREA SUMMARY**

Name	Approximate Acres Within Study Area	Approximate Percent of Study Area	Drainage Classification	Erosion Hazard
Chetek sandy loam, 12-25% slopes	35	2	Somewhat excessively drained	Moderate
Chaska silt loam	12	< 1	Poorly drained	Slight
Kingsley sandy loam, 6-12% slopes	40	2	Well-drained	Slight
Kingsley sandy loam, 12-18% slopes	16	1	Well-drained	Moderate
Mahtomedi loamy sand, 0-6% slopes	6	< 1	Excessively drained	Slight
Mahtomedi loamy sand, 25-40% slopes	27	1	Excessively drained	Moderate
Kerston muck	5	< 1	Very poorly drained	Slight
Urban land-Copaston complex, 0-8% slopes	79	3	N/A	N/A
Urban land-Waukegan complex, 0-3% slopes	13	1	N/A	N/A

<sup>1</sup> Definitions for slope classes are available within the NRCS Soil Survey Manual, Chapter 3. Soils that range from 20 to 60 percent may be considered steep. Available at [http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/ref/?cid=nrcs142p2\\_054253](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/ref/?cid=nrcs142p2_054253).

<sup>2</sup> “Drainage Classes” are based on the frequency and duration in which a soil is in wet periods. Definitions for drainage classes are available within the NRCS Soil Survey Manual, Chapter 3. Available at [http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/ref/?cid=nrcs142p2\\_054253](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/ref/?cid=nrcs142p2_054253).

<sup>3</sup> “Erosion Hazard” refers to the hazard of soil loss from off-road and off-trail areas after disturbance activities that expose the soil surface. A rating of “slight” indicates that erosion is unlikely under ordinary climatic conditions; a rating of “moderate” indicates some erosion is likely and that erosion-control measures may be needed. Urban land is not considered for erosion hazard because human activities, including grading and constructed impervious, have severely changed the characteristics of the soil parent material. NRCS Web Soil Survey. Available at <http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>.

<sup>4</sup> The NRCS Web Soil Survey did not provide a rating for soil types labeled as N/A in the tables.

<sup>5</sup> The ½-mile study area from the potential area of disturbance also encompasses the Maria Avenue Option so a separate table is not provided for that option.



Name	Approximate Acres Within Study Area	Approximate Percent of Study Area	Drainage Classification	Erosion Hazard
Urban land-Chetek complex, 3-15% slopes	296	13	N/A	N/A
Urban land-Kingsley complex, 3-15% slopes	911	39	N/A	N/A
Urban land-Kingsley complex, 15-25% slopes	89	4	N/A	N/A
Mahtomedi-Kingsley complex, 12-25% slopes	11	< 1	Excessively drained	Moderate
Mahtomedi-Kingsley complex, 25-40% slopes	76	3	Excessively drained	Moderate
Udorthents, wet substratum	435	19	Poorly drained	N/A
Pits, gravel	8	< 1	N/A	N/A
Urban land	122	5	N/A	N/A
Aquolls and histosols, ponded	22	1	Very poorly drained	Slight
Dorerton-Rock outcrop complex, 25-65% slopes	50	2	Well-drained	Moderate
Water	75	3	N/A	N/A

**TABLE 3: ALIGNMENT C<sup>6</sup> – SOIL TYPES WITHIN THE STUDY AREA SUMMARY**

Name	Approximate Acres Within Study Area	Approximate Percent of Study Area	Drainage Classification	Erosion Hazard
Antigo silt loam, 0-2% slopes	9	< 1	Well-drained	Slight
Antigo silt loam, 2-6% slopes	38	2	Well-drained	Slight
Aquolls and histosols, ponded	22	1	Very poorly drained	Slight
Auburndale silt loam	12	1	Poorly drained	Slight
Barronett silt loam, sandy substratum	4	< 1	Poorly drained	Slight
Brill silt loam drained	15	1	Moderately well	Slight
Campia silt loam, 0-8% slopes	3	< 1	Well-drained	Slight
Cathro muck	27	1	Very poorly drained	Slight
Chaska silt loam	8	< 1	Poorly drained	Slight

<sup>6</sup> Alignment C includes more than one NRCS soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at various times, or at various levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.





Name	Approximate Acres Within Study Area	Approximate Percent of Study Area	Drainage Classification	Erosion Hazard
Chetek sandy loam, 12-25% slopes drained	70	4	Somewhat excessively drained	Moderate
Chetek sandy loam, 6-12% slopes	7	< 1	Somewhat excessively drained	Moderate
Comstock silt loam	7	< 1	Somewhat poorly drained	Slight
Crystal Lake silt loam, 1-3% slopes drained	15	1	Moderately well-drained	Slight
DeMontreville loamy fine sand, 12-25% slopes	22	1	Well-drained	Moderate
DeMontreville loamy fine sand, 2-6% slopes	8	< 1	Well-drained	Slight
Freeon silt loam, 1-4% slopes	3	< 1	Moderately well-drained	Slight
Freer silt loam	10	< 1	Well-drained	Slight
Gotham loamy sand, 1-6% slopes	3	< 1	Excessively drained	Slight
Gotham loamy sand, 6-12% slopes	7	< 1	Excessively drained	Slight
Kingsley sandy loam, 12-18% slopes	29	2	Well-drained	Moderate
Kingsley sandy loam, 18-30% slopes	4	< 1	Well-drained	Moderate
Kingsley sandy loam, 2-6% slopes	24	2	Well-drained	Slight
Kingsley sandy loam, 6-12% slopes	60	5	Well-drained	Slight
Mahtomedi loamy sand, 0-6% slopes	35	3	Excessively drained	Slight
Mahtomedi loamy sand, 12-25% slopes	11	1	Excessively drained	Moderate
Mahtomedi loamy sand, 25-40% slopes	45	3	Excessively drained	Moderate
Mahtomedi loamy sand, 6-12% slopes	4	< 1	Excessively drained	Slight
Mahtomedi-Kingsley complex, 3-12% slopes	63	5	Excessively drained	Slight
Markey muck	6	< 1	Very poorly drained	Slight
Pits, gravel	29	2	N/A	N/A
Poskin silt loam drained	6	< 1	Somewhat poorly drained	Slight
Prebish loam	7	< 1	Very poorly drained	Slight



Name	Approximate Acres Within Study Area	Approximate Percent of Study Area	Drainage Classification	Erosion Hazard
Rifle muck	56	4	Very poorly drained	Slight
Ronneby fine sandy loam drained	20	2	Somewhat poorly	Slight
Rosholt sandy loam, 1-6% slopes	32	2	Well-drained	Slight
Rosholt sandy loam, 6-15% slopes	35	3	Well-drained	Slight
Santiago silt loam, 2-6% slopes	44	3	Well-drained	Slight
Santiago silt loam, 6-15% slopes	24	2	Well-drained	Slight
Udifluvents drained	7	< 1	Somewhat poorly drained	N/A
Udorthents, wet substratum	254	15	Poorly drained	N/A
Urban land	44	3	N/A	N/A
Urban land-Chetek complex, 0-3% slopes	24	1	N/A	N/A
Urban land-Chetek complex, 3-15% slopes	494	30	N/A	N/A

**TABLE 4: ALIGNMENT D3 – SOIL TYPES WITHIN THE STUDY AREA SUMMARY**

Name	Approximate Acres Within Study Area	Approximate Percent of Study Area	Drainage Classification	Erosion Hazard
Antigo silt loam, 0-2% slopes	7	< 1	Well-drained	Slight
Antigo silt loam, 2-6% slopes	37	2	Well-drained	Slight
Antigo silt loam, 6-12% slopes	18	1	Well-drained	Slight
Brill silt loam	9	< 1	Moderately well-drained	Slight
Santiago silt loam, 2-6% slopes	325	16	Well-drained	Slight
Santiago silt loam, 6-15% slopes	232	11	Well-drained	Slight
Chetek sandy loam, 6-12% slopes	7	< 1	Somewhat excessively drained	Moderate
Chetek sandy loam, 12-25% slopes	34	2	Somewhat excessively drained	Moderate
Anoka loamy fine sand, 0-3% slopes	3	< 1	Well-drained	Slight
Ronneby fine sandy loam	26	1	Somewhat poorly drained	Slight
Gotham loamy sand, 1-6% slopes	9	< 1	Excessively drained	Slight



Name	Approximate Acres Within Study Area	Approximate Percent of Study Area	Drainage Classification	Erosion Hazard
Gotham loamy sand, 6-12% slopes	25	1	Excessively drained	Slight
Gotham loamy sand, 12-20% slopes	9	< 1	Excessively drained	Moderate
Auburndale silt loam	25	1	Poorly drained	Slight
Freeon silt loam, 1-4% slopes	62	3	Moderately well-drained	Slight
Freer silt loam	112	6	Well-drained	Slight
Rosholt sandy loam, 1-6% slopes	13	1	Well-drained	Slight
Rosholt sandy loam, 6-15% slopes	14	1	Well-drained	Slight
Prebish loam	6	< 1	Very poorly drained	Slight
Kingsley sandy loam, 2-6% slopes	42	2	Well-drained	Slight
Kingsley sandy loam, 6-12% slopes	140	7	Well-drained	Slight
Kingsley sandy loam, 12-18% slopes	43	2	Well-drained	Moderate
Campia silt loam, 0-8% slopes	18	1	Well-drained	Slight
Crystal Lake silt loam, 1-3% slopes	17	1	Moderately well-drained	Slight
Comstock silt loam	18	1	Somewhat poorly drained	Slight
DeMontreville loamy fine sand, 2-6% slopes	14	1	Well-drained	Slight
Mahtomedi loamy sand, 0-6% slopes	7	< 1	Excessively drained	Slight
Mahtomedi loamy sand, 6-12% slopes	2	< 1	Excessively drained	Slight
Duluth silt loam, 1-6% slopes	11	1	Well-drained	Slight
Poskin silt loam	18	1	Somewhat poorly drained	Slight
Rifle muck	148	7	Very poorly drained	Slight
Markey muck	0	0	Very poorly drained	Slight
Cathro muck	64	3	Very poorly drained	Slight
Urban land-Kingsley complex, 3-15% slopes	286	14	N/A	N/A
Mahtomedi-Kingsley complex, 3-12% slopes	46	2	Excessively drained	Slight
Mahtomedi-Kingsley complex, 12-25% slopes	7	< 1	Excessively drained	Moderate



Name	Approximate Acres Within Study Area	Approximate Percent of Study Area	Drainage Classification	Erosion Hazard
Udorthents, wet substratum	72	4	Poorly drained	N/A
Pits, gravel	28	1	N/A	N/A
Udifulvents	1	< 1	Somewhat poorly drained	N/A
Urban land	10	1	N/A	N/A
Aquolls and Histosols, ponded	5	< 1	Very poorly drained	Slight
Barronett silt loam, sandy substratum	57	3	Poorly drained	Slight
Water	6	< 1	N/A	N/A



*Gold Line*

BUS RAPID TRANSIT PROJECT ENVIRONMENTAL ASSESSMENT

**Appendix A: Environmental Assessment Technical Reports**

**Attachment A-5-3:  
Noise Barrier Relocations**

September 2019



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## ACRONYMS AND ABBREVIATIONS

BRT	Bus Rapid Transit
Council	Metropolitan Council
dB	Decibels
dBA	A-weighted decibels
FTA	Federal Transit Administration
FHWA	Federal Highway Administration
Leq	Equivalent Sound Level
MnDOT	Minnesota Department of Transportation
Project	METRO Gold Line Bus Rapid Transit Project
TNM	Traffic Noise Model



# 1. INTRODUCTION

This technical memorandum presents the results of the noise barrier evaluation that supports the METRO Gold Line Bus Rapid Transit (BRT) Project (Project) Environmental Assessment. The Metropolitan Council (Council) conducted this analysis because due to the need to relocate existing noise barriers and berms to accommodate the dedicated guideway. The Minnesota Department of Transportation (MnDOT) originally installed the existing noise barriers to abate traffic noise from Interstate 94 (I-94) at noise-sensitive receptors along I-94 westbound. MnDOT may have installed existing berms to abate traffic noise, or their presence precluded the need for additional noise barriers during Type I project studies in the area. In either case, the Project's removal of these berms would increase noise levels in the study area unless they are replaced with noise barriers.

Title 23, Section 772.5 of the Code of Federal Regulations defines Type I projects as “a proposed Federal or Federal-aid highway project for the construction of a highway on new location or the physical alteration of an existing highway which significantly changes either the horizontal or vertical alignment or increases the number of through-traffic lanes.” The analysis completed for the Project is not part of a Type I traffic noise analysis that would follow the Minnesota Department of Natural Resources' applicable guidance and requirements<sup>1</sup> because the Project meets the following criteria to be considered a transit-only project:

- The Federal Transit Administration (FTA) is the lead agency in the National Environmental Policy Act process, and FHWA's limited participation is as a cooperating agency
- The main transportation purpose of the project, as stated in the purpose and need, is transit-related and not highway-related
- No federal-aid highway funds are being used to fund the project

Although the FTA's noise analysis and procedures were used for the Project noise analysis overall, the Council used the Federal Highway Administration's Traffic Noise Model (TNM) Version 2.5 to demonstrate that relocated and replaced noise barriers would mitigate the I-94 traffic noise with the same effectiveness as the barriers in the existing locations. Noise level increases within 0.5 decibels (dB) are considered to be within tolerance of providing the same effectiveness. Because the final locations and elevations of the proposed noise barriers may change as Project design advances, the aim of this analysis was to analyze the relocated noise barriers where they are currently proposed to be located and determine if the proposed noise barriers can achieve the same effectiveness as in the existing case.

# 2. METHODOLOGY

Existing barrier plans, topographic contours and aerial imagery were used to create a 3D model in TNM of the existing roadway geometry, noise barrier configuration and the surrounding terrain and buildings. TNM 2.5 uses traffic volumes, speed, vehicle classes, and the typical characteristics of the roadway being analyzed (e.g., roadway horizontal and vertical alignment) to predict noise levels from roadway traffic at noise-sensitive receptors adjacent to the roadway.

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<sup>1</sup> Minnesota Department of Natural Resources. Noise Requirements for MnDOT and other Type I Federal-aid Projects. Effective July 10, 2017. Available at: <http://www.dot.state.mn.us/environment/noise/index.html>. Accessed December 2018.





The model was updated using the Project’s 15% Concept Plans (see **Appendix B**) to reflect the future scenario, which includes the future design including the dedicated guideway and the proposed barrier relocations. The same traffic volumes, speed and vehicle classes on I-94 were assumed in both the existing and future models.

For this analysis, the analysis examined two areas with proposed barrier relocations: the Mounds Boulevard area barrier relocation with an overlap and the Etna Street area barrier relocations both east and west of Etna Street, consisting of berm removals and barrier overlaps. These areas were chosen to examine in detail at this stage of the Project due to the need to create barrier gaps and overlaps and the removal of berms.

**Table 1** summarizes the existing noise barriers that Alignment B would relocate to accommodate the BRT dedicated guideway. Alignment B would also replace two existing berms with noise barriers between Johnson Parkway and Clarence Street, and between Etna Street and Hazelwood Street.

**TABLE 1: NOISE BARRIER RELOCATIONS ALONG ALIGNMENT B**

Location	Distance Moved <sup>a</sup> (feet)	Direction Moved
Conway Street to Wilson Avenue	0-20	North and South
Wilson Avenue to Plum Street	0-30	South
Maple Street to Forest Street	0-3	South
Forest Street to Cyprus Street	0-15	South
Cypress Street to Earl Street	10-30	South
Earl Street to Frank Street	20-40	South
Frank Street to Johnson Parkway	0-25	South
Johnson Parkway to Clarence Street	10-150	North and South
Etna Street to Hazelwood Street	0-30	North and South
Hazelwood Street to White Bear Avenue	0-5	South

<sup>a</sup> The distance moved for the location specified is given as a range that represents the smallest and greatest movement of the noise barrier within that location.

### 3. RESULTS

The results of this analysis show that the relocated noise barriers can be designed to the same effectiveness as in the existing case. The future modeled sound levels were compared to the existing modeled sound levels to assess whether the same effectiveness was achievable with the proposed noise barrier relocations. Noise level increases within 0.5 dB are considered to be within tolerance of providing the same effectiveness.

For the Mounds Boulevard barrier, future noise levels were found to be within the 0.5 dB tolerance of increase for all modeled receptors. The proposed barriers would generally maintain the existing top of barrier elevation and have an average barrier height of 20 to 22 feet. The proposed barriers would need to be up to two feet above the existing top of barrier elevation near the barrier overlap. The barrier overlap would need to maintain a distance of four times the gap distance between the barriers.



**Table 2** gives the results in the Mounds Boulevard area including the Receptor ID for each modeled location, the existing modeled equivalent sound level (Leq), the future modeled Leq, and the difference between the future and existing sound levels. All results are presented in A-weighted decibels (dBA).

**TABLE 2: MOUNDS BOULEVARD AREA BARRIER RESULTS**

Receptor ID	Leq Noise Levels (dBA)		
	Existing	Future	Difference (E-F)
Rec1	62.5	62.5	0.0
Rec3	57.4	57.4	0.0
Rec6	59.1	59.1	0.0
Rec7	65.8	65.8	0.0
Rec8	59.4	59.4	0.0
Rec10	55.9	55.9	0.0
Rec12	57.9	57.8	-0.1
Rec14	64.9	64.9	0.0
Rec16	59.7	59.5	-0.2
Rec17	64.6	64.7	0.1
Rec18	59.5	59.8	0.3
Rec20	59.0	58.3	-0.7
Rec21	61.5	60.6	-0.9
Rec22	64.7	64.3	-0.4
Rec23	59.9	56.0	-3.9
Rec24	61.7	61.4	-0.3
Rec25	60.7	60.1	-0.6
Rec26	59.3	58.4	-0.9
Rec27	53.1	52.7	-0.4
Rec28	53.1	53.0	-0.1
Rec29	53.5	53.1	-0.4
Rec30	54.5	54.1	-0.4
Rec31	55.4	55.2	-0.2
Rec32	55.3	55.0	-0.3
Rec33	54.5	53.8	-0.7
Rec34	55.8	56.0	0.2
Rec35	54.2	53.6	-0.6
Rec36	54.8	54.2	-0.6
Rec37	55.6	55.2	-0.4



TABLE 2: MOUNDS BOULEVARD AREA BARRIER RESULTS

Receptor ID	Leq Noise Levels (dBA)		
	Existing	Future	Difference (E-F)
Rec38	57.5	57.2	-0.3
Rec39	58.6	58.2	-0.4
Rec40	58.6	58.6	0.0
Rec41	54.4	53.6	-0.8
Rec42	55.4	54.2	-1.2
Rec43	56.5	55.3	-1.2
Rec44	57.1	55.7	-1.4
Rec45	57.4	55.3	-2.1
Rec46	57.8	54.1	-3.7
Rec47	59.3	55.6	-3.7
Rec48	58.7	57.4	-1.3
Rec49	60.7	58.5	-2.2
Rec50	58.2	56.6	-1.6
Rec51	57.4	57.5	0.1
Rec52	56.1	55.1	-1.0
Rec53	57.7	56.9	-0.8
Rec54	57.9	57.1	-0.8
Rec55	58.1	57.3	-0.8
Rec56	60.2	58.1	-2.1
Rec57	59.3	59.4	0.1
Rec58	60.7	61.1	0.4
Rec59	56.5	56.0	-0.5
Rec60	58.7	58.8	0.1
Rec61	60.0	59.5	-0.5
Rec62	59.4	59.2	-0.2
Rec63	60.0	59.0	-1.0
Rec64	59.2	58.9	-0.3
Rec65	59.9	59.7	-0.2
Rec66	59.6	59.6	0.0
Rec67	59.6	59.6	0.0
Rec68	59.8	60.2	0.4
Rec69	56.2	55.8	-0.4
Rec71	56.8	56.1	-0.7



TABLE 2: MOUNDS BOULEVARD AREA BARRIER RESULTS

Receptor ID	Leq Noise Levels (dBA)		
	Existing	Future	Difference (E-F)
Rec73	53.0	52.6	-0.4
Rec74	49.4	49.4	0.0
Rec75	54.9	54.4	-0.5
Rec76	57.1	57.1	0.0
Rec78	54.2	53.3	-0.9
Rec80	54.2	53.2	-1.0
Rec81	56.7	52.9	-3.8
Rec82	53.2	52.7	-0.5
Rec84	54.2	53.2	-1.0
Rec86	51.6	51.2	-0.4
Rec87	50.9	50.6	-0.3
Rec89	50.8	51.1	0.3
Rec91	51.9	51.3	-0.6
Rec92	52.4	51.8	-0.6
Rec93	53.6	52.5	-1.1
Rec94	49.9	49.4	-0.5
Rec95	51.9	50.4	-1.5
Rec97	50.0	49.8	-0.2
Rec99	52.5	51.5	-1.0
Rec101	51.9	51.3	-0.6
Rec103	51.4	51.2	-0.2
Rec105	51.6	51.2	-0.4
Rec106	51.5	51.1	-0.4
Rec107	54.7	53.1	-1.6
Rec108	53.5	52.0	-1.5
Rec110	52.7	51.5	-1.2
Rec111	51.9	51.2	-0.7
Rec112	56.4	55.4	-1.0
Rec113	56.0	54.4	-1.6
Rec114	54.8	53.8	-1.0
Rec115	51.9	51.2	-0.7
Rec116	52.4	52.0	-0.4
Rec117	51.5	50.8	-0.7



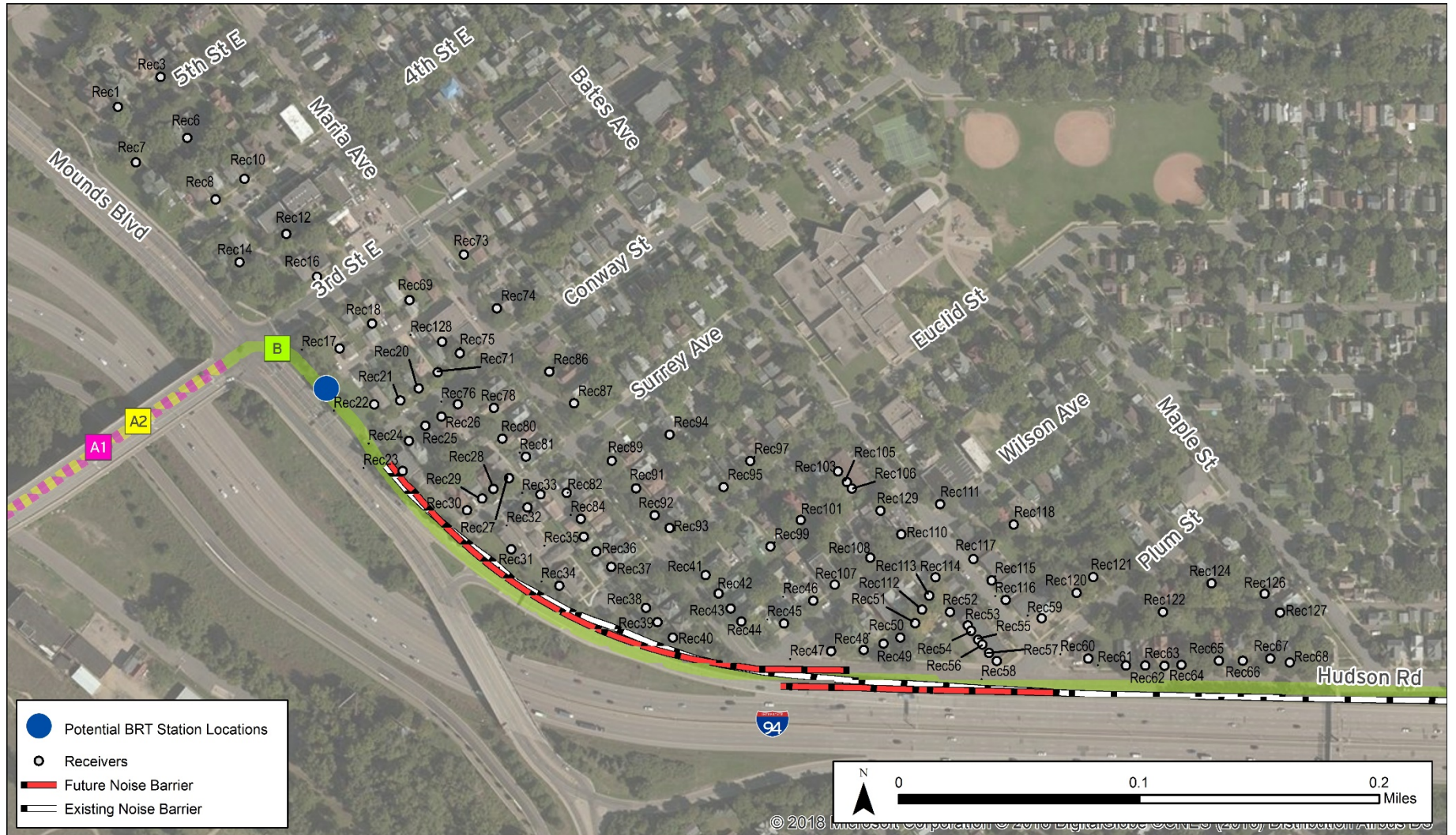
TABLE 2: MOUNDS BOULEVARD AREA BARRIER RESULTS

Receptor ID	Leq Noise Levels (dBA)		
	Existing	Future	Difference (E-F)
Rec118	51.8	51.7	-0.1
Rec120	56.1	55.9	-0.2
Rec121	55.6	55.4	-0.2
Rec122	55.4	55.9	0.5
Rec124	56.6	56.7	0.1
Rec126	57.4	57.5	0.1
Rec127	57.7	57.7	0.0
Rec128	56.3	55.2	-1.1
Rec129	52.7	52.0	-0.7

Figure 1 shows the receptors, existing barriers and Project's proposed barrier locations in the Mounds Boulevard area.



FIGURE 1: MOUNDS BOULEVARD AREA BARRIER RELOCATION





For the Etna Street area, future noise levels were found to be within the 0.5 dB tolerance of increase for all receptors. The grading that is proposed to occur will remove berms and place the barrier closer to the residences. Although the top of the proposed embankment slope will be above the existing top of berm elevation at some locations, modeling results indicate that the average existing berm height in this area needs to be maintained with the replacement barrier. A noise barrier 14-20 feet in height would be needed from Johnson Parkway to the Etna Street Station, including a section of noise barrier approximately 450 feet in length and 14 feet tall south of the dedicated guideway that would overlap the east end of the barrier near Clarence Street. At the closest point, the gap distance between these barriers is currently 60 feet. The barrier overlap would need to maintain a distance four times this minimum gap distance. Modeling results indicate the noise barrier would need to be 20 feet tall near the Wilson Apartments building, 1975 Wilson Ave. in Saint Paul, due to third-floor balconies. The existing barrier was more effective when located closer to the source (I-94) for these upper-floor receptors.

From Etna Street to Kennard Street, the proposed barriers would generally maintain the existing top of barrier or berm elevation with an average barrier height of 14 feet. The proposed barrier would need to be up to 2 feet above the existing top of berm elevation at the west end to keep future noise levels within the 0.5 dB tolerance of increase for noise-sensitive receptors off Old Hudson Road. The barrier overlap near the Hudson Road curve would need to maintain a distance four times the gap distance between the barriers.

Table 3 gives the results in the Etna Street area.

TABLE 3: ETNA STREET AREA BARRIER RESULTS

Receptor ID	Leq Noise Levels (dBA)		
	Existing	Future	Difference
R_1	57.7	57.8	0.1
R_2	55.5	55.3	-0.2
R_3	63.0	61.1	-1.9
R_4	58.8	58.2	-0.6
R_5	52.3	52.8	0.5
R_6	55.4	55.3	-0.1
R_7	55.9	55.8	-0.1
R_8	53.9	53.9	0.0
R_9	52.1	52.1	0.0
R_10	50.3	50.2	-0.1
R_11	53.0	52.5	-0.5
R_12	55.1	54.9	-0.2
R_13	57.7	56.7	-1.0
R_14	56.1	55.6	-0.5
R_15	57.0	56.5	-0.5
R_16	63.8	61.5	-2.3
R_17	57.6	58.0	0.4



TABLE 3: ETNA STREET AREA BARRIER RESULTS

Receptor ID	Leq Noise Levels (dBA)		
	Existing	Future	Difference
R_18	60.9	60.8	-0.1
R_19	60.9	60.8	-0.1
R_20	60.9	60.6	-0.3
R_21	60.9	60.6	-0.3
R_22	60.9	60.4	-0.5
R_23	60.8	60.2	-0.6
R_24	60.1	58.6	-1.5
R_25	59.7	58.6	-1.1
R_26	58.6	57.8	-0.8
R_27	55.5	55.5	0.0
R_28	57.1	56.5	-0.6
R_29	56.6	56.2	-0.4
R_30	58.3	56.8	-1.5
R_31	54.1	54.5	0.4
R_32	53.6	53.9	0.3
R_33	53.2	53.4	0.2
R_34	58.6	58.3	-0.3
R_35	58.6	58.3	-0.3
R_36	52.7	53.0	0.3
R_37	53.4	53.7	0.3
R_38	53.7	54.0	0.3
R_39	54.3	54.3	0.0
R_40	54.7	54.1	-0.6
R_41	55.3	54.2	-1.1
R_42	55.2	53.7	-1.5
R_43	53.7	53.9	0.2
R_44	54.5	54.3	-0.2
R_45	60.4	59.2	-1.2
R_46	60.4	58.9	-1.5
R_47	56.7	56.7	0.0





TABLE 3: ETNA STREET AREA BARRIER RESULTS

Receptor ID	Leq Noise Levels (dBA)		
	Existing	Future	Difference
R_48	55.1	54.7	-0.4
R_49	54.8	54.8	0.0
R_50	59.4	59.4	0.0
R_51	54.8	54.6	-0.2
R_52	54.9	54.6	-0.3
R_53	56.8	55.3	-1.5
R_54	56.2	54.5	-1.7
R_55	60.1	58.9	-1.2
R_56	58.4	57.1	-1.3
R_57	57.5	56.6	-0.9
R_58	54.1	54.1	0.0
R_59	61.7	61.7	0.0
R_60	62.6	62.6	0.0
R_61	61.0	61.0	0.0
R_62	60.7	60.7	0.0
R_63	60.8	60.8	0.0
R_64	61.4	61.4	0.0
R_65	53.8	53.8	0.0
R_66	54.3	54.3	0.0
R_67	54.5	54.4	-0.1
R_68	54.5	52.8	-1.7
R_69	54.9	53.8	-1.1
R_70	54.4	53.7	-0.7
R_71	54.9	54.9	0.0
R_72	56.1	56.1	0.0
R_73	53.7	53.0	-0.7
R_74	59.9	59.9	0.0
R_75	59.6	59.6	0.0
R_76	59.3	59.3	0.0
R_77	59.1	59.1	0.0



TABLE 3: ETNA STREET AREA BARRIER RESULTS

Receptor ID	Leq Noise Levels (dBA)		
	Existing	Future	Difference
R_78	60.2	60.2	0.0
R_79	57.8	57.8	0.0
R_80	60.1	60.1	0.0
R_81	57.5	57.5	0.0
R_82	60.9	60.9	0.0
R_83	61.7	61.7	0.0
R_84	61.8	61.8	0.0
R_85	57.7	57.7	0.0
R_86	57.0	57.0	0.0
R_87	57.1	57.1	0.0
R_88	55.7	55.7	0.0
R_89	55.1	55.1	0.0
R_90	54.5	54.5	0.0
R_91	55.0	55.0	0.0
R_92	49.4	49.4	0.0
R_93	49.4	49.4	0.0
R_94	49.7	49.4	-0.3
R_95	49.4	49.4	0.0
R_96	53.3	53.8	0.5
R_97	49.4	49.4	0.0
R_98	49.4	49.4	0.0
R_99	49.4	49.4	0.0
R_100	61.8	60.1	-1.7
R_101	62.1	59.8	-2.3
R_102	62.2	59.5	-2.7
R_103	62.2	59.0	-3.2
R_104	62.6	58.4	-4.2
R_105	49.4	49.4	0.0
R_106	49.4	49.4	0.0
R_107	49.4	49.4	0.0



TABLE 3: ETNA STREET AREA BARRIER RESULTS

Receptor ID	Leq Noise Levels (dBA)		
	Existing	Future	Difference
R_108	57.0	51.5	-5.5
R_109	56.0	52.1	-3.9
R_110	60.7	56.3	-4.4
R_111	58.4	53.1	-5.3
R_112	55.4	52.1	-3.3
R_113	53.4	50.6	-2.8
R_114	51.9	49.4	-2.5
R_115	50.1	49.4	-0.7
R_116	49.4	49.4	0.0
R_117	49.4	49.4	0.0
R_118	49.4	49.4	0.0
R_119	75.0	74.8	-0.2
R_120	75.1	75.1	0.0
R_121	75.1	75.1	0.0
R_122	75.2	75.2	0.0
R_123	75.3	75.3	0.0
R_124	51.3	51.5	0.2
R_125	51.4	51.4	0.0
R_126	50.8	50.7	-0.1
R_127	67.4	67.9	0.5
R_128	65.5	63.0	-2.5
R_129	73.9	73.9	0.0
R_130	69.9	69.8	-0.1
R_131	64.6	59.7	-4.9
R_132	61.3	55.7	-5.6
R_133	58.7	53.7	-5.0
R_134	56.3	51.8	-4.5
R_135	67.5	64.9	-2.6
R_136	49.4	49.4	0.0
R_137	49.4	49.4	0.0



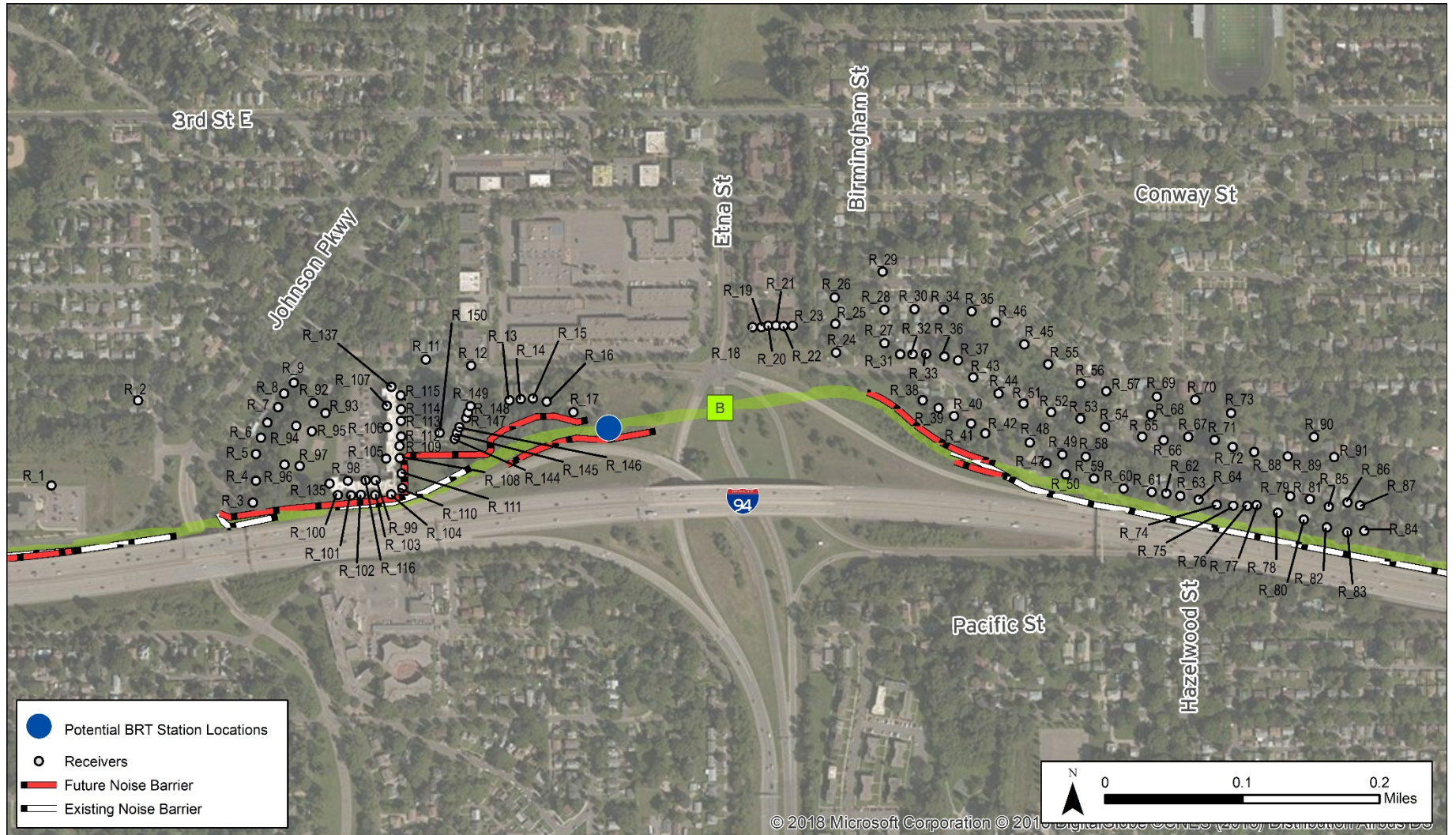
TABLE 3: ETNA STREET AREA BARRIER RESULTS

Receptor ID	Leq Noise Levels (dBA)		
	Existing	Future	Difference
R_138	55.6	55.1	-0.5
R_139	50.8	50.7	-0.1
R_140	57.4	56.8	-0.6
R_141	51.3	50.3	-1.0
R_142	60.6	59.1	-1.5
R_143	49.4	49.4	0.0
R_144	68.5	58.3	-10.2
R_145	67.8	57.1	-10.7
R_146	67.2	56.4	-10.8
R_147	67.4	57.8	-9.6
R_148	67.0	57.9	-9.1
R_149	66.7	58.1	-8.6
R_150	62.6	55.6	-7.0

Figure 2 shows the receptors, existing barriers and Project’s proposed barrier locations in the Etna Street area.



FIGURE 2: ETNA STREET AREA BARRIER RELOCATION





## 4. AVOIDANCE, MINIMIZATION AND MITIGATION

To demonstrate that relocated and replaced noise barriers would mitigate with the same effectiveness as the barriers in the existing locations, it is recommended that this comparative analysis using TNM be completed for all the relocated barriers during final design of the Project. As the Project advances through the Project Development and Engineering phases, design updates could affect guideway elevation, grading in the right-of-way, and final placement of project features. The final future locations and elevations of the proposed noise barriers will be dependent on the final elevation data for the project. It is also recommended that surveying to gather existing barrier data, including wall location and height, be used to confirm the locations and elevations of the existing noise barriers in the final comparison.

## 5. CONCLUSION

The results of this analysis indicate that the relocated noise barriers can be designed to the same effectiveness as in the existing case. With the noise barrier relocations currently proposed, future noise levels were found to be within the 0.5 dB tolerance of increase for all modeled receptors.



*Gold Line*

BUS RAPID TRANSIT PROJECT ENVIRONMENTAL ASSESSMENT

**Appendix A: Environmental Assessment Technical Reports**

**Attachment A-5-4:  
Noise Impact Contour Figures**

September 2019



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FIGURE 1: ALIGNMENT A1 NOISE CONTOUR





FIGURE 2: ALIGNMENTS A1 AND A2 NOISE CONTOUR

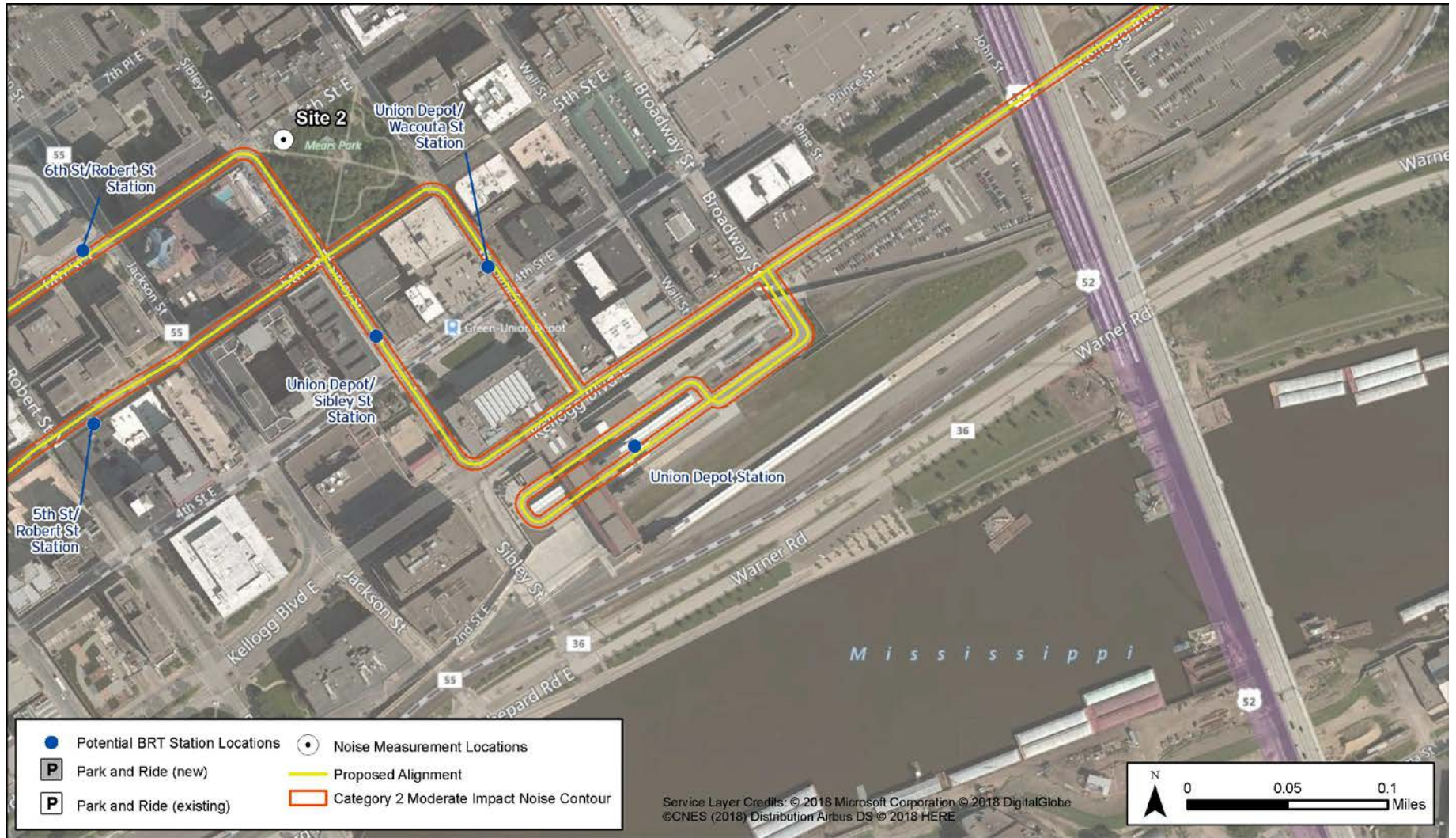




FIGURE 3: ALIGNMENTS A1, A2 AND B NOISE CONTOUR





FIGURE 4: ALIGNMENT B NOISE CONTOUR





FIGURE 5: ALIGNMENT B NOISE CONTOUR





FIGURE 6: ALIGNMENT B NOISE CONTOUR



FIGURE 7: ALIGNMENTS B AND C NOISE CONTOUR

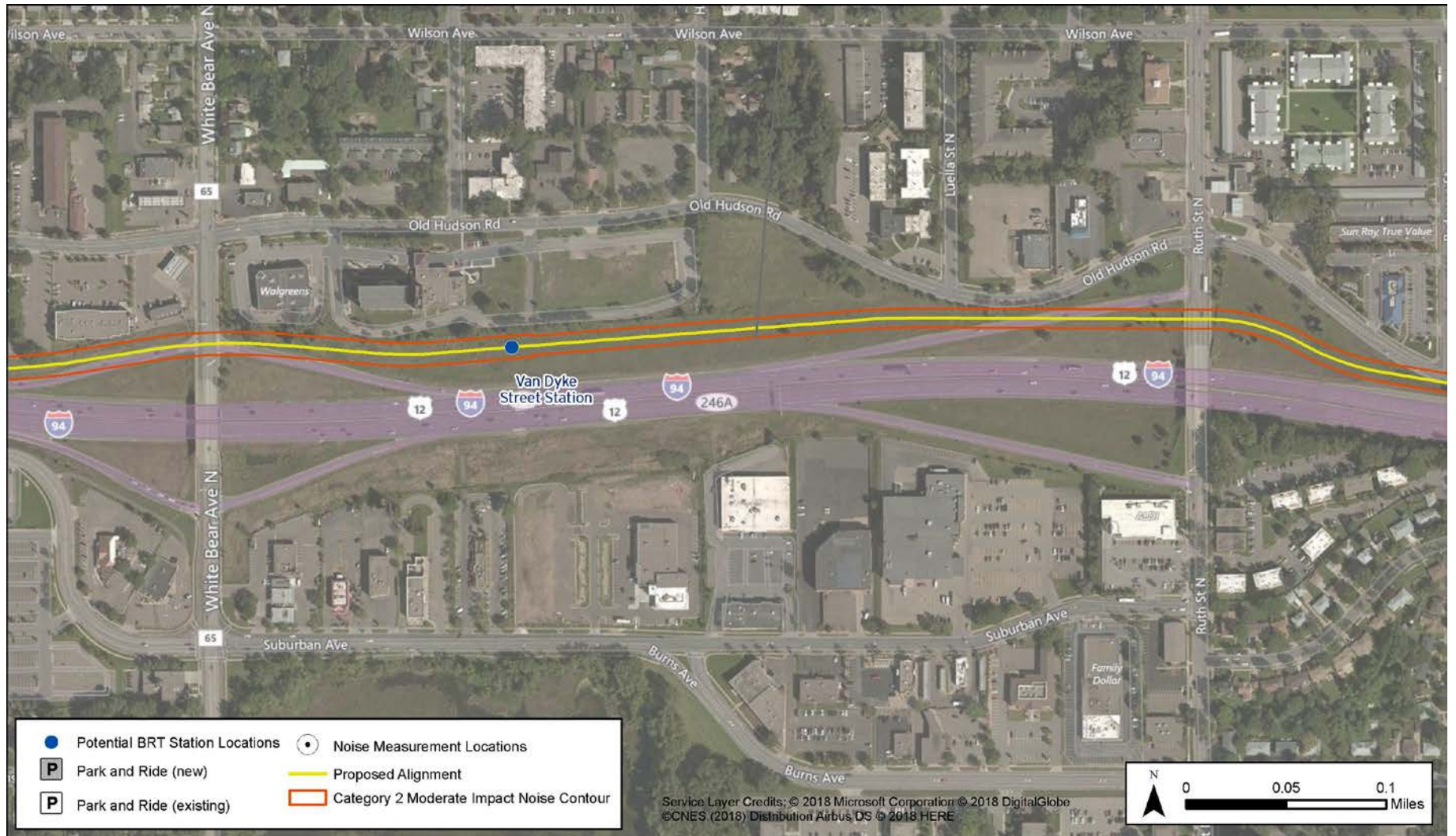
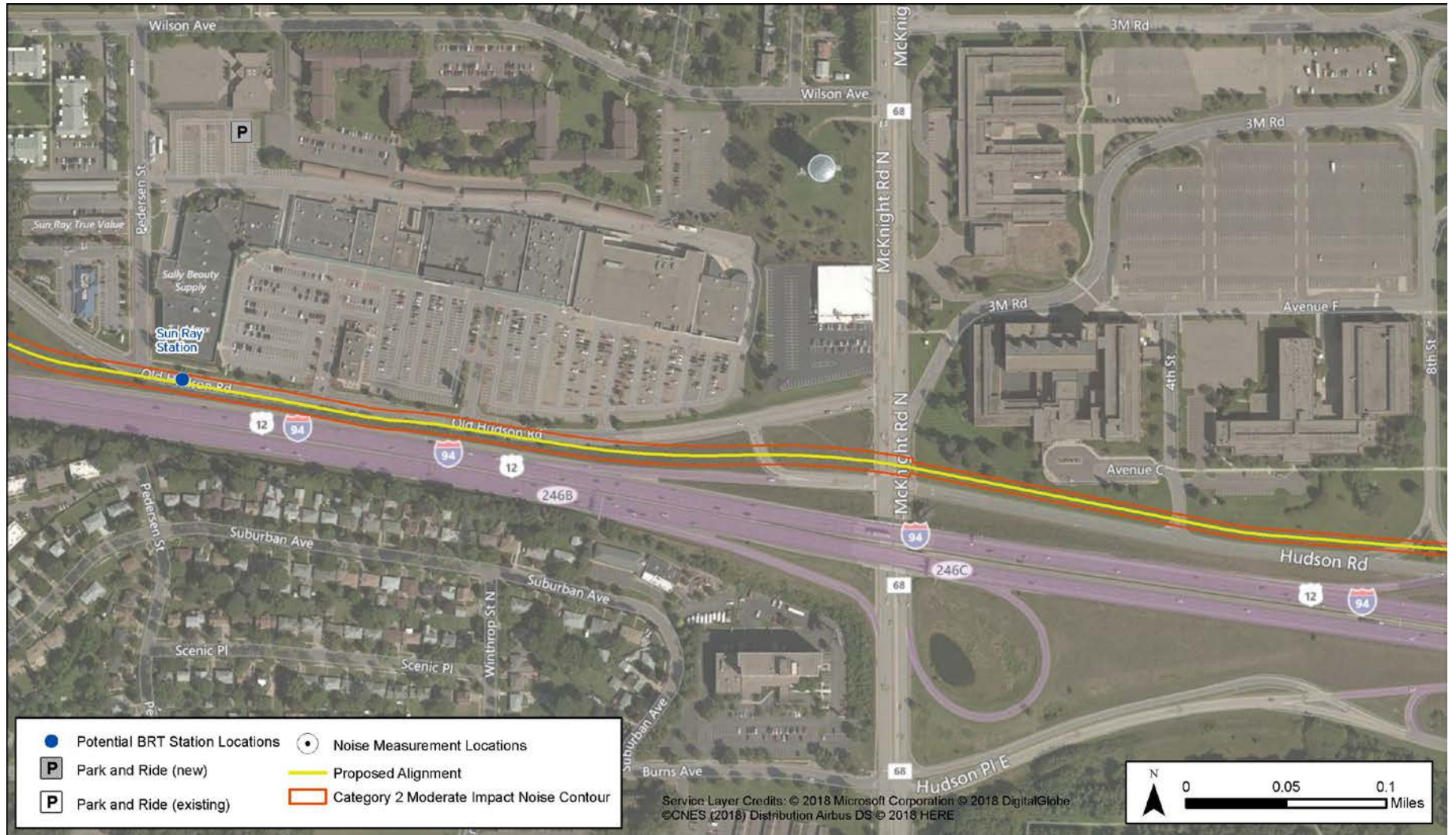




FIGURE 8: ALIGNMENT C NOISE CONTOUR







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BUS RAPID TRANSIT PROJECT ENVIRONMENTAL ASSESSMENT

**Appendix A: Environmental Assessment Technical Reports**

**Attachment A-5-5:**

**Air Quality Approach Memorandum**

September 2019



# Air Quality Approach Memorandum

October 2016



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## List of Acronyms

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BRT	Bus Rapid Transit
CO	Carbon Monoxide
EA	Environmental Assessment
EPA	U.S. Environmental Protection Agency
FTA	Federal Transit Administration
FHWA	Federal Highway Administration
HEI	Health Effects Institute
L RTPP	Long Range Transportation Policy Plan
MnDOT	Minnesota Department of Transportation
MPCA	Minnesota Pollution Control Agency
MSAT	Mobile Source Air Toxics
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NO <sub>x</sub>	Nitrogen Oxide
PM	Particulate Matter
ppm	parts per million
SIP	State Implementation Plan
TIP	Transportation Improvement Program
TPP	Metropolitan Council Transportation Policy Plan
VOC	Volatile Organic Compound

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## 1.0 Introduction

This Air Quality Approach Memorandum has been prepared in support of the Gateway Corridor project Environmental Assessment (EA).

The objective of this report is to describe the regulatory context and methodology used for the air quality analysis in the EA.

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## 2.0 Regulatory Context

The air quality impacts from the project are analyzed by addressing criteria pollutants, a group of common air pollutants regulated by the U.S. Environmental Protection Agency (EPA) on the basis of criteria (information on health and/or environmental effects of pollution). The six criteria pollutants identified by the EPA are ozone, particulate matter, carbon monoxide (CO), nitrogen dioxide, lead, and sulfur dioxide. Potential impacts resulting from these pollutants are assessed by comparing projected concentrations to National Ambient Air Quality Standards (NAAQS).

In addition to the criteria air pollutants, the EPA also regulates air toxics. There are seven air toxic compounds with significant contributions from mobile sources identified by the EPA: acrolein, benzene, 1,3-butadiene, diesel particulate matter (PM) plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter. The Federal Transit Administration (FTA) does not provide guidance for assessment of MSAT effects, but accepts the Federal Highway Administration (FHWA) guidance for the assessment of MSAT effects for transportation projects in the National Environmental Policy Act (NEPA) process.

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## 3.0 Methodology

Air quality is evaluated based on impacts to humans in the impacted environment. Humans experience air quality impacts by breathing unsafe concentrations of airborne pollutants. Exposure to air pollutants emitted from motor vehicles can occur in homes, businesses, and recreation facilities located adjacent to affected roadway segments or on pedestrian or bicycle facilities along project-area roadways.

The environmental impacts of the Build alternatives are evaluated based on the selected criteria pollutants. This selection is done according to the project's location and the attainment, non-attainment, and maintenance areas designated by the EPA. More details on methodology for each criterion and its current status are provided in the following sections. All roadway segments adjacent to and crossing the No-Build and Build alternatives were included in the evaluation of air quality impacts.

### 3.1 NAAQS Criteria Pollutants

#### 3.1.1. OZONE

Ground-level ozone is a primary constituent of smog and is a pollution problem throughout many areas of the United States. Exposures to ozone can make people more susceptible to respiratory infection, result in lung inflammation, and aggravate preexisting respiratory diseases such as asthma. Ozone is not emitted directly from vehicles but is formed as volatile organic compounds (VOC) and nitrogen oxide (NO<sub>x</sub>) reacts in the presence of sunlight. Transportation sources emit NO<sub>x</sub> and VOCs and can therefore affect ozone concentrations. However, due to the phenomenon of atmospheric formation of ozone from chemical precursors, concentrations are not expected to be elevated near a particular roadway.

The State of Minnesota is currently classified by the EPA as an ozone attainment area, which means that Minnesota has been identified as a geographic area that meets the national health-based standards for ozone levels. Because of these factors, a quantitative ozone analysis was not conducted for this project.

### 3.1.2. PARTICULATE MATTER

Particulate matter (PM) is the term for particles and liquid droplets suspended in the air. Particles come in a wide variety of sizes and have been historically assessed based on size, typically measured by the diameter of the particle in micrometers. PM<sub>2.5</sub>, or fine particulate matter, refers to particles that are 2.5 micrometers or less in diameter. PM<sub>10</sub> refers to particulate matter that is 10 micrometers or less in diameter.

Motor vehicles (i.e., cars, trucks, and buses) emit direct PM from their tailpipes, as well as from normal brake and tire wear. Vehicle dust from paved and unpaved roads may be re-entrained, or re-suspended, in the atmosphere. In addition, PM<sub>2.5</sub> can be formed in the atmosphere from gases such as sulfur dioxide, nitrogen oxides, and VOCs. PM<sub>2.5</sub> can penetrate the human respiratory system's natural defenses and damage the respiratory tract when inhaled. Numerous scientific studies have linked particle pollution exposure to a variety of problems, including:<sup>1</sup>

- Premature death in people with heart or lung disease
- Nonfatal heart attacks
- Irregular heartbeat
- Aggravated asthma
- Decreased lung function
- Increased respiratory symptoms, such as irritation of the airways, coughing or difficulty breathing

On December 14, 2012, the EPA issued a final rule revising the annual health NAAQS for fine particles (PM<sub>2.5</sub>).<sup>2</sup> The EPA changed the annual PM<sub>2.5</sub> standard by lowering the level to 12.0 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ), from the previous annual standard of 15.0  $\mu\text{g}/\text{m}^3$ . The EPA has retained the 24-hour PM<sub>2.5</sub> standard at a level of 35  $\mu\text{g}/\text{m}^3$ . The agency also retained the existing standards for coarse particle pollution (PM<sub>10</sub>). The NAAQS 24-hour standard for PM<sub>10</sub> is 150  $\mu\text{g}/\text{m}^3$ , which is not to be exceeded more than once per year on average over three years.

The Clean Air Act conformity requirements include the assessment of localized air quality impacts of federally-funded or federally-approved transportation projects that are located within PM nonattainment and maintenance areas and deemed to be projects of air quality concern. This project is located in a maintenance area for PM<sub>10</sub> that includes "A portion of the city of St. Paul bounded by the Mississippi River from Lafayette to Route 494, Route 494 east to Route 61, Route 61 north to I-94, I-94 west to Lafayette, and Lafayette south to the Mississippi River."<sup>3</sup> However, quantitative evaluation of PM<sub>10</sub> impacts is not required for this project because it is not considered a culpable source of PM<sub>10</sub> or a project of air quality concern regarding PM<sub>10</sub> emissions.

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<sup>1</sup> <http://www.epa.gov/air/particlepollution/health.html>

<sup>2</sup> <http://www.epa.gov/pm/actions.html>

<sup>3</sup> <http://www.pca.state.mn.us/index.php/air/air-quality-and-pollutants/general-air-quality/state-implementation-plan/minnesota-state-implementation-plan-sip.html>

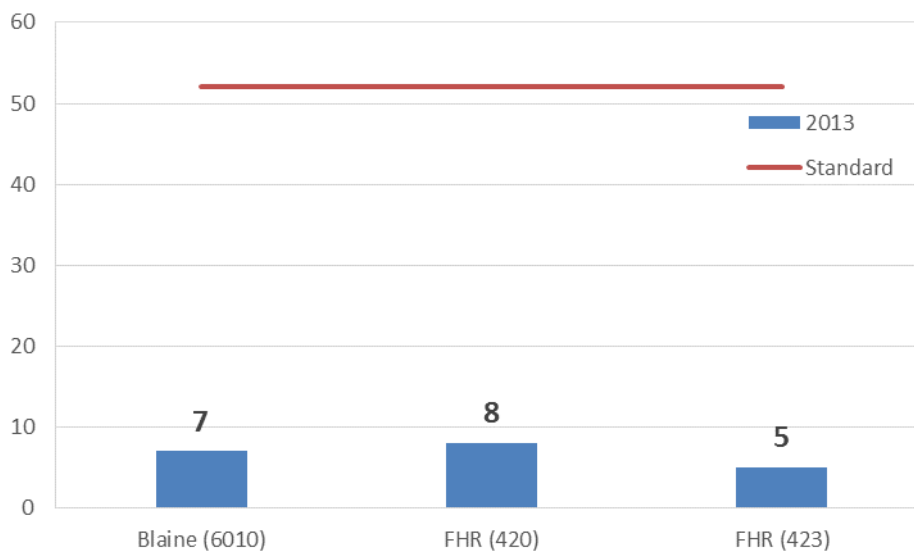
In addition, the project is located in an area that has been designated as an unclassifiable/attainment area for PM<sub>2.5</sub>. This means that the project area has been identified as a geographic area that meets the national health-based standards for PM<sub>2.5</sub> levels, and is exempt from detailed analyses.

### 3.1.3. NITROGEN OXIDES

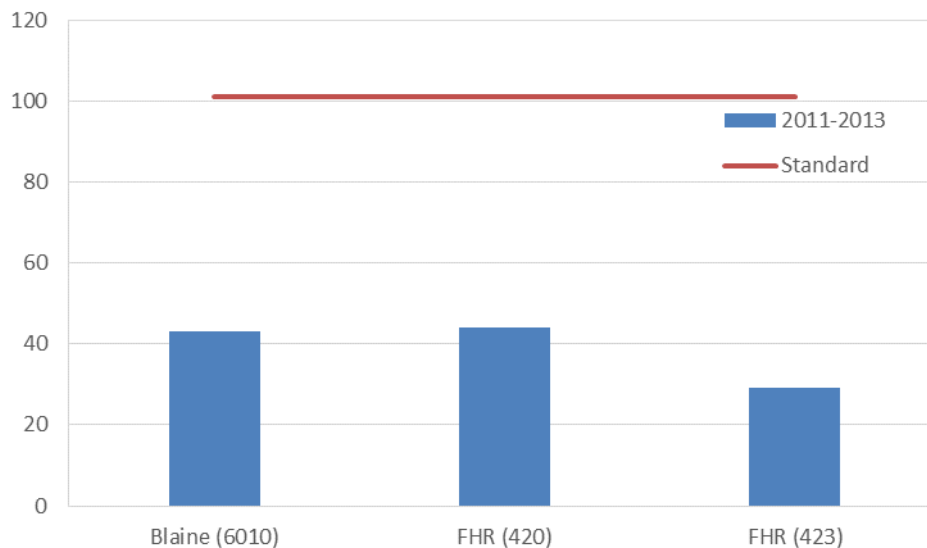
Nitrogen oxides (NO<sub>x</sub>) is the term for a group of highly reactive gases which contain nitrogen and oxygen in varying amounts. Nitrogen oxides form when fuel is burned in a combustion process, primarily including motor vehicles, electric utilities, and other industrial, commercial, and residential fuel-burning sources.

The Twin Cities Metropolitan Area currently meets federal nitrogen dioxide standards, as shown in **Figure 1** and **Figure 2** from the *2015 Annual Air Monitoring Network Plan* (Minnesota Pollution Control Agency, September 2014). This document shows that, for three monitoring sites in the Twin Cities Metropolitan Area, annual and one-hour concentrations are substantially below the NAAQS limits of 53 parts per billion (ppb) and 100 ppb, respectively. Additionally, comparison of these figures to previous years shows a steady decreasing trend, which is in conformity with EPA’s Tier 2 regulatory announcement.

**Figure 1. Annual Average NO<sub>x</sub> Concentrations in the Twin Cities Metropolitan Area Compared to the NAAQS**



**Figure 2. 1-Hour NO<sub>x</sub> Concentrations in the Twin Cities Metropolitan Area Compared to the NAAQS**



The EPA's Tier 2 regulatory standards announced in December 1999 “will significantly reduce emissions of nitrogen oxides from vehicles by about 74 percent by 2030”.<sup>4</sup>

Within the project area, it is unlikely that NO<sub>x</sub> standards would be approached or exceeded based on the relatively low ambient concentrations of NO<sub>x</sub> in Minnesota and on the long-term trend toward reduction of NO<sub>x</sub> emissions. Because of these factors, a specific analysis of NO<sub>x</sub> was not conducted for this project.

### 3.1.4. SULFUR DIOXIDE

Sulfur dioxide (SO<sub>2</sub>) and other sulfur oxide gases (SO<sub>x</sub>) are formed when fuel containing sulfur, such as coal, oil, and diesel fuel, is burned. Sulfur dioxide is a heavy, pungent, colorless gas. Elevated levels can impair breathing, lead to other respiratory symptoms, and, at very high levels, aggravate heart disease. People with asthma are most at risk when SO<sub>2</sub> levels increase. Once emitted into the atmosphere, SO<sub>2</sub> can be further oxidized to sulfuric acid, a component of acid rain.

The Minnesota Pollution Control Agency's (MPCA) *Draft 2015 Annual Air Monitoring Network Plan for Minnesota* (May 2014) shows that eight sites were monitored for SO<sub>2</sub> in the Twin Cities Metropolitan Area during the period of 2011-2013. The NAAQS limit for SO<sub>2</sub> is met if the three-year average of the annual 99<sup>th</sup> percentile daily maximum one hour SO<sub>2</sub> concentration is less than 75 ppb. The maximum of the monitoring sites was found to be 14 ppb, well below the 75 ppb threshold.

MPCA also states that about 70 percent of SO<sub>2</sub> released into the air comes from electric power generation (*Air Quality in Minnesota: 2013 Report to the Legislature*, January 2013). Therefore, a much smaller proportion is attributable to on-road mobile sources. The MPCA has concluded that long-term trends in both ambient air concentrations and total SO<sub>2</sub> emissions in Minnesota indicate steady improvement.

<sup>4</sup> EPA420-F-99-051, <http://www.epa.gov/tier2/documents/f99051.pdf>



Emissions of sulfur oxides from transportation sources are a small component of overall emissions and continue to decline due to the desulphurization of fuels. Additionally, the project area is classified by the EPA as a "sulfur dioxide attainment area," which means that the project area has been identified as a geographic area that meets the national health-based standards for sulfur dioxide levels. Because of these factors, a quantitative analysis for sulfur dioxide was not conducted for this project.

### 3.1.5. LEAD

Due to the phase out of leaded gasoline, lead is no longer a pollutant associated with vehicular emissions, and no analysis is warranted. No localized emissions of lead are associated with bus rapid transit (BRT) operations.

### 3.1.6. CARBON MONOXIDE

Carbon monoxide (CO) is a traffic-related pollutant that has been of concern in the Twin Cities Metropolitan Area. In 1999, the EPA redesignated all of Anoka, Hennepin, Ramsey, and portions of Carver, Scott, Dakota, Washington, and Wright Counties as a maintenance area for CO. This means the area was previously classified as a nonattainment area, but was found to be in attainment. Due to successful compliance as a maintenance area since 1999, the Twin Cities Metropolitan Area was designated a limited maintenance area in 2010, further reducing the evaluation required for CO. Maintenance areas are required to undertake actions to demonstrate continuing compliance with CO standards. Since the Gateway Corridor project is located in Ramsey and Washington Counties, evaluation of CO for assessment of air quality impacts is required for environmental approval in NEPA documents.

Detailed modeling of CO concentrations at the intersection level were completed to reflect year 2022, which was identified as the worst-case condition. While the opening year for the Gateway Corridor project is anticipated to be 2023, initial analysis shows vehicle emissions are improving faster than traffic volumes are growing. Therefore, 2022 was evaluated as the worst-case condition. Results presented in the EA are adequate to account for effects of the finished project as well as substantial completion of project elements by 2022.

## Air Quality Conformity

The 1990 Clean Air Act Amendments require that State Implementation Plans (SIPs) must demonstrate how states with nonattainment and maintenance areas will meet federal air quality standards.

The EPA issued final rules on transportation conformity (40 CFR 93, Subpart A), which describe the methods required to demonstrate SIP compliance for transportation projects. It requires that transportation projects must be part of a conforming Long Range Transportation Policy Plan (LRTPP) and four-year Transportation Improvement Program (TIP). The Gateway Corridor project is part of the 2040 Transitway System shown in Metropolitan Council's *2040 Transportation Policy Plan* (2040 TPP, January 2015) (identified as the METRO Gold Line) and is planned to open around 2023. The proposed project is not included in the *2016-2019 State Transportation Improvement Program* (2015) although it is mentioned in the *2016-2019 Transportation Improvement Program for the Twin Cities Metropolitan Area* (2015). The TPP was found to be in conformity by the MPCA on July 25, 2014.

On November 8, 2010, the EPA approved a request for a limited maintenance plan for the Twin Cities maintenance area. Under a limited maintenance plan, the EPA has determined that there is no requirement to estimate projected emissions over the maintenance period and that "an emission budget may be treated as essentially not constraining for the length of the maintenance period. The reason is that it is unreasonable to expect that the maintenance area will experience so much growth within this period that a violation of CO National Ambient Air

Quality Standard (NAAQS) would result." (*US EPA Limited Maintenance Plan Option for Nonclassifiable CO Nonattainment Areas, October 6, 1995*). Therefore, no regional emission modeling analysis for the LRTPP and TIP is required; however, federally funded and state funded projects are still subject to "hot spot" analysis requirements. The limited maintenance plan adopted in 2010 determines that the level of CO emissions and resulting ambient concentrations will continue to demonstrate attainment of the CO NAAQS. In accordance with this plan, no regional emissions modeling was completed as part of the evaluation of the current project; however, CO hot spot analysis was completed.

### Conformity Analysis

The effects of the proposed project on air quality were examined through analysis of the predicted impacts on CO concentrations. The following section discusses the CO analysis modeling methods; results are presented in the EA. To assess CO concentration changes, background concentrations were measured and adjusted for future background traffic growth. Potential CO impacts on air quality were analyzed with respect to intersection conditions for the proposed project. A project start year 2022 traffic was used to model future CO concentrations as the worst-case conditions. The analysis methods and procedures and the scope of this analysis were developed in collaboration with MPCA.

Air quality modeling was performed using current versions of EPA CO emission (MOVES2014) and dispersion modeling (CAL3QHC) software. All methods and procedures used in the air quality analyses are accepted by the EPA and MPCA as approved for industry-standard analytical methods. The modeling assumptions used in this analysis included the following:

- Speed Class: Arterial, posted speed limits
- Traffic Mix: Moves data for Washington Counties
- Traffic Age Distribution: MPCA Data
- Wind Speed: 1 meter/second
- Temperature: meteorology information at county level
- Wind Direction: 36 directions at 10 degree increments
- Surface Roughness: 180 centimeters
- Atmospheric Stability Class: D
- 8-Hour Persistence Factor: 0.7
- Fuel Program: Conventional Gasoline East
- Fuel Reid Vapor Pressure: 9.0 lbs/square inch
- Oxygenated Fuels: Ethanol with 2.7 percent oxygen content

The CO emissions factors were produced by the MOVES2014 emission model at varying speeds for year 2022 conditions (see [Appendix A](#)).

### Intersection (Hot Spot) Carbon Monoxide Analysis

Carbon monoxide concentrations were calculated for four intersections in the project area. Intersections were selected to represent the worst-case condition along each alignment.

These intersection locations were identified from the *Traffic Technical Report* (Kimley-Horn and Associates, 2016) as the intersections with the highest traffic volumes and poorest levels of service which would be expected to result in the worst-case CO concentrations. The rationale for this approach is to evaluate whether any of the proposed alignments might be expected to result in CO concentrations exceeding NAAQS allowable limits. This methodology was developed based on input from MPCA, Ramsey and Washington Counties, the Minnesota

Department of Transportation (MnDOT), and the Metropolitan Council. The intersections selected for evaluation include:

- Alignment A: Kellogg Boulevard and Mounds Boulevard
- Alignment B: White Bear Avenue and I-94 WB Ramps
- Alignment C: McKnight Road North and Hudson Road
- Alignment D3: Tamarack Road and Bielenberg Drive

Carbon monoxide concentrations near the intersections were estimated using forecast traffic volumes, proposed intersection geometrics, optimized signal timing, emission levels from the EPA MOVES2014 model, and dispersion modeling using the EPA model CAL3QHC. Schematics and peak-hour turning movements for each of the intersection models are provided in **Appendix B**.

### Background Carbon Monoxide Concentrations

Background CO concentrations are needed for air quality analysis purposes to represent conditions without the influence of nearby vehicles. By definition, the background CO concentration in any particular area is that concentration which exists independently of direct contributions from nearby traffic. The background concentrations are added to intersection-scale modeled results to yield predicted CO levels.

Background CO concentrations for the analysis documented in this study were obtained from MPCA for their monitoring station at Site 861 in Saint Paul. The maximum one-hour and eight-hour concentrations for worst-case (winter) condition are given in **Table 1**. The maximum one-hour concentration during this period was 2.4 and the maximum eight-hour concentration was 1.1.

Background concentrations were also adjusted for future year 2022 conditions to account for background traffic growth. The traffic growth at each of the selected intersections was computed. To represent worst-case conditions, no background reduction factor to account for future emissions-control improvements was used, which likely results in overestimations of ambient background CO concentrations.

**Table 1. Background Carbon Monoxide Concentrations**

Site #861, Saint Paul, Minnesota	1 Hour	8 Hour
2013 Background CO Concentration (ppm)	2.4	1.1
Background Traffic Growth – 2013 to 2022	1.25	1.25
Adjusted Background CO Concentration (ppm) – 2022	3.0	1.4

### 3.2 Mobile Source Air Toxics

Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments of 1990, whereby Congress mandated that the EPA regulate 188 air toxics, also known as hazardous air pollutants. The EPA has assessed this expansive list in their latest rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007), and identified a group of 93 compounds emitted from mobile sources that are listed in their Integrated Risk Information System (IRIS).<sup>5</sup>

<sup>5</sup> <http://www.epa.gov/iris/>

In addition, EPA identified seven compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from their 1999 National Air Toxics Assessment (NATA).<sup>6</sup> These are Acrolein, Benzene, 1,3-Butadiene, Diesel Particulate Matter plus diesel exhaust organic gases (Diesel PM), Formaldehyde, Naphthalene, and Polycyclic Organic Matter (POM). The 2007 EPA rule mentioned above requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines.

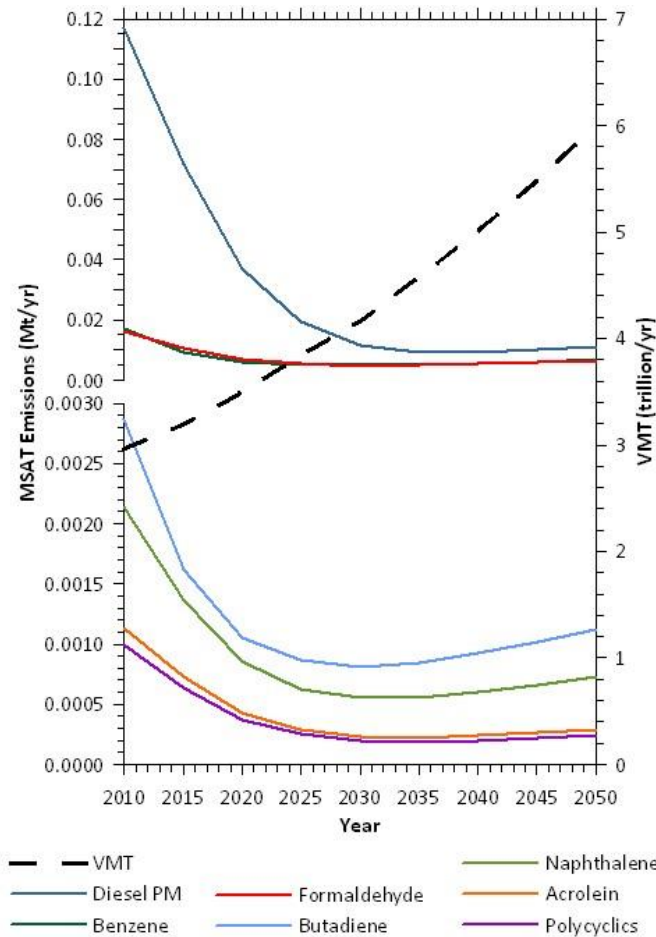
Analysis followed FHWA's *Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA* (2012).<sup>7</sup> Based on an FHWA analysis using EPA's MOVES2010b model, as shown in **Figure 3**, even if vehicle-miles travelled (VMT) increases by 102 percent, as assumed from 2010 to 2050, a combined reduction of 83 percent in the total annual emissions for the priority MSAT is projected for the same time period. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth), that MSAT emissions in the project area are likely to be lower in the future in nearly all cases. On a regional basis, EPA's vehicle and fuel regulations will over time cause substantial reductions that, in almost all cases, will cause region-wide MSAT levels to be significantly lower than today.

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<sup>6</sup> <http://www.epa.gov/ttn/atw/nata1999/>

<sup>7</sup> [http://www.fhwa.dot.gov/environment/air\\_quality/air\\_toxics/policy\\_and\\_guidance/eqintguidmem.cfm](http://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/eqintguidmem.cfm)

**Figure 3. National MSAT Emission Trends for Vehicles Operating on Roadways Using EPA’s MOVES2010b Model (2010 – 2050)<sup>8</sup>**



Air toxics analysis is a continuing area of research. While much work has been done to assess the overall health risk of air toxics, many questions remain unanswered. In particular, the tools and techniques for assessing project-specific health outcomes as a result of lifetime MSAT exposure remain limited. These limitations impede the ability to evaluate how potential public health risks posed by MSAT exposure should be factored into project-level decision-making within the context of NEPA.

Information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in MSAT emissions associated with a proposed set of transportation alternatives. The FHWA, EPA, the Health Effects Institute, and others have funded and conducted research studies to try to more clearly define potential risks from MSAT emissions associated with transportation projects. However, available technical tools do not enable us to

<sup>8</sup> EPA MOVES2010b model runs conducted during May - June 2012 by FHWA. [http://www.fhwa.dot.gov/environment/air\\_quality/air\\_toxics/policy\\_and\\_guidance/nmsatetrends.cfm](http://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/nmsatetrends.cfm). Trends for specific locations may be different, depending on locally derived information on vehicle-miles travelled, vehicle speeds, vehicle mix, fuels, emission control programs, meteorology, and other factors.

predict the project-specific health impacts of MSAT emissions. The FHWA will continue to monitor the developing research in this field.

The methodologies for forecasting health impacts include emissions modeling, dispersion modeling, exposure modeling, and then final determination of health impacts – with each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevent a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70 year) assessments, particularly because unsupported assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame, since such information is unavailable.

It is particularly difficult to reliably forecast 70-year lifetime MSAT concentrations and exposure near roadways; to determine the portion of time that people are actually exposed at a specific location; and to establish the extent attributable to a proposed action, especially given that some of the information needed is unavailable.

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by the Health Effects Institute (HEI).<sup>9</sup> As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel PM. The EPA and the HEI have not established a basis for quantitative risk assessment of diesel PM in ambient settings.<sup>10 11</sup>

There is also a lack of a national consensus on an acceptable level of risk. The current context is the process used by the EPA as provided by the Clean Air Act is to determine whether more stringent controls are required to 1) provide an ample margin of safety to protect public health, or, 2) prevent an adverse environmental effect.

Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against project benefits, such as reducing traffic congestion, accident rates, and fatalities plus improved access for emergency response, that are better suited for quantitative analysis.

A qualitative MSAT analysis is included in the EA.

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<sup>9</sup> <http://pubs.healtheffects.org/view.php?id=282>

<sup>10</sup> <http://www.epa.gov/risk/basicinformation.htm#g>

<sup>11</sup> <http://pubs.healtheffects.org/getfile.php?u=395>

## **Appendix A**

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### CO Emissions Factors

**Table A-1. MOVES2014 Year 2022 Carbon Monoxide Emissions Factors**

Speed	Emissions (g/veh mi)
Idle	6.9
2	7.8
5	4.8
10	3.3
15	2.8
20	2.5
25	2.1
30	2.1
35	2.3
40	2.5
45	2.6
50	2.6
55	2.5
60	2.5
65	2.5
70	2.6
75	3.0



## **Appendix B**

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### CAL3QHC Schematics and Traffic Inputs

Figure B-1. CAL3QHC Schematic for Alignment A (Kellogg Boulevard and Mounds Boulevard)

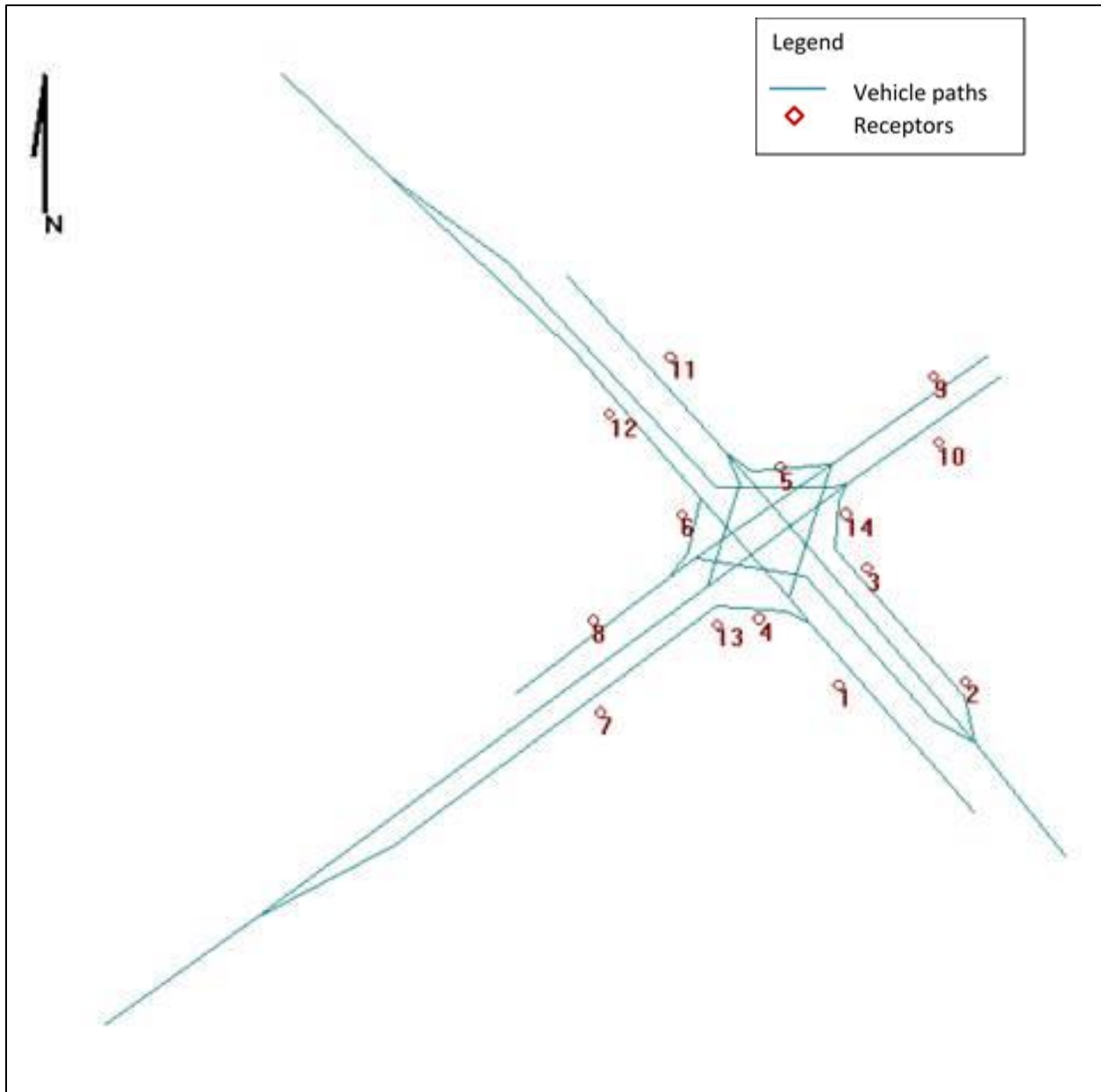


Table B-1. Year 2022 PM Peak Hour Turning Movements – Alignment A

Turning Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Count	191	468	736	24	142	143	135	369	41	167	815	39

Figure B-2. CAL3QHC Schematic for Alignment B (White Bear Avenue and I-94 Westbound Ramps)

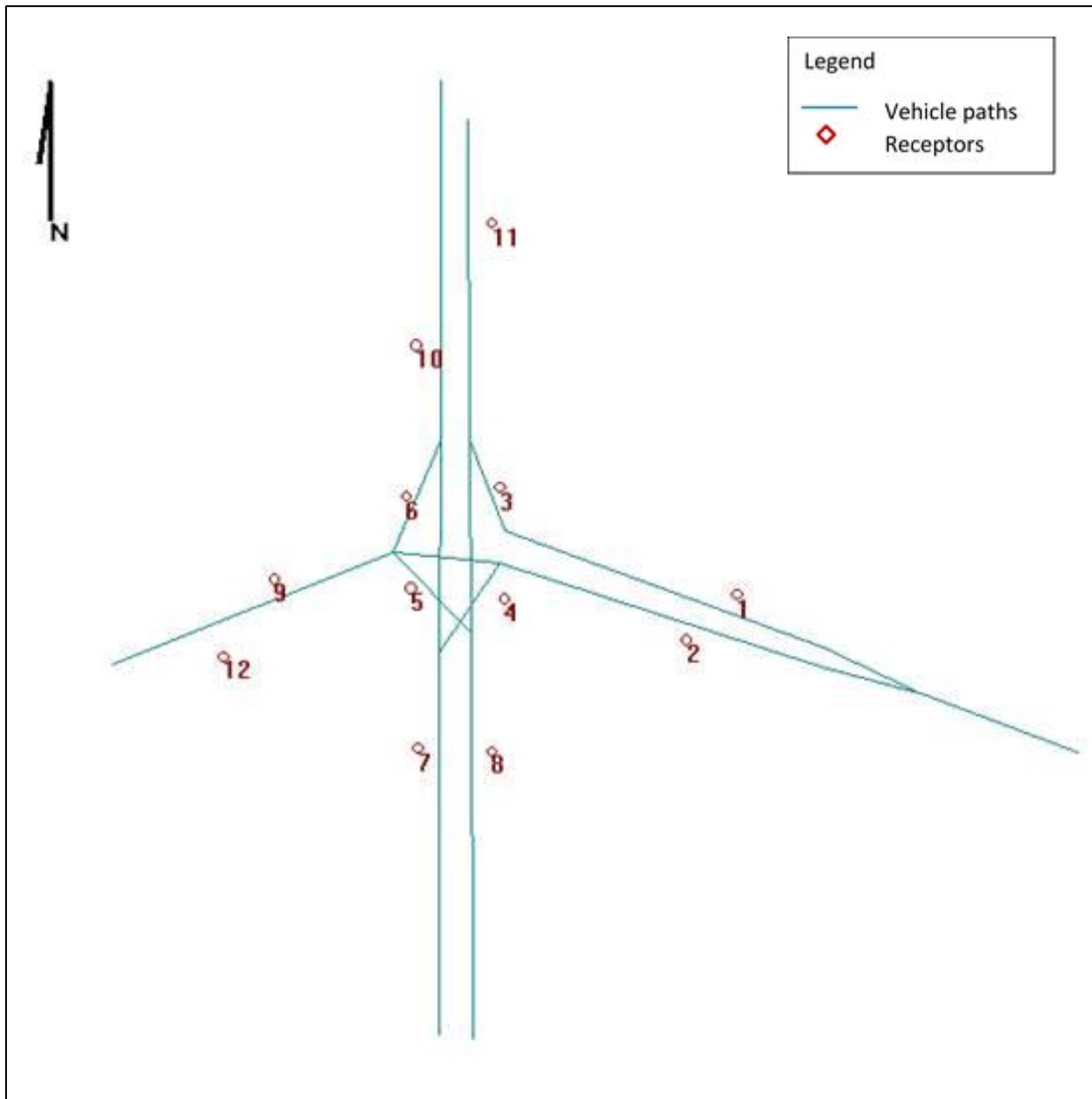


Table B-2. Year 2022 PM Peak Hour Turning Movements – Alignment B

Turning Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Count	148	2	200	299	837	470	640

Figure B-3. CAL3QHC Schematic for Alignment C (McKnight Road and Hudson Road)

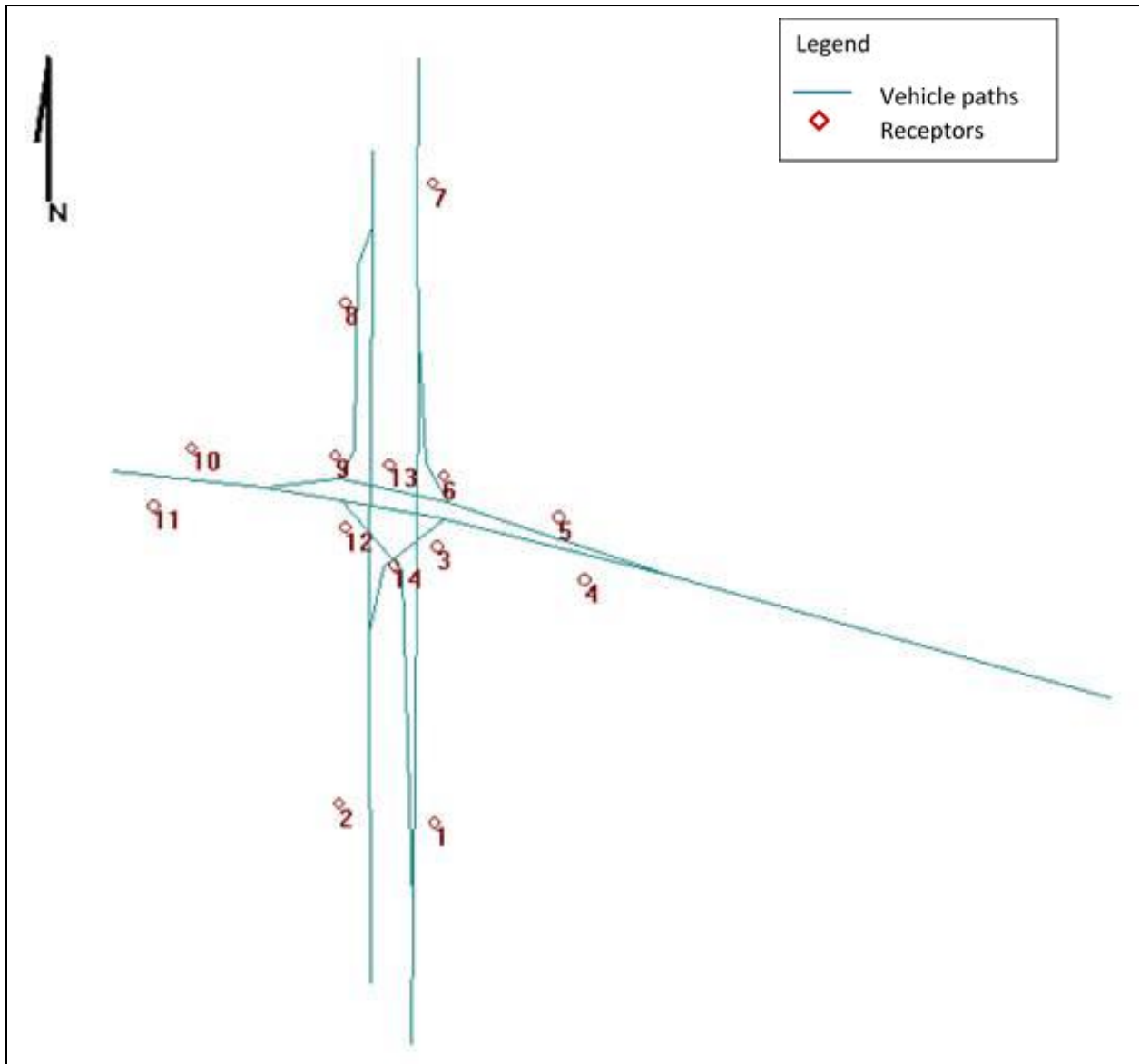


Table B-3. Year 2022 PM Peak Hour Turning Movements – Alignment C

Turning Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Count	338	338	149	188	703	905	561

Figure B-4. CAL3QHC Schematic for Alignment D3 (Tamarack Road and Bielenberg Drive)

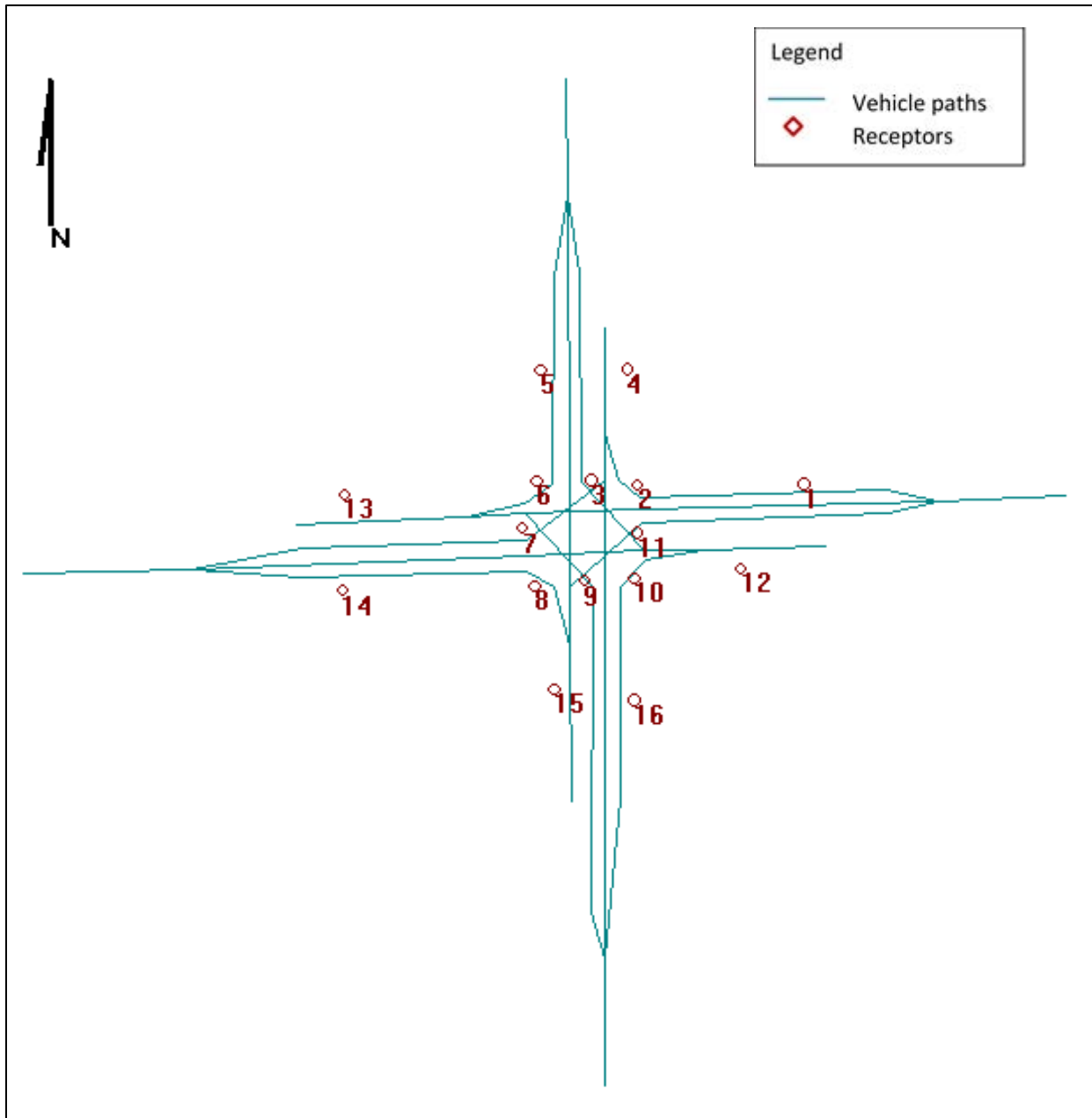


Table B-4. Year 2022 PM Peak Hour Turning Movements – Alignment D3

Turning Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Count	240	1,050	340	290	725	30	180	205	360	65	250	455



*Gold Line*

BUS RAPID TRANSIT PROJECT ENVIRONMENTAL ASSESSMENT

**Appendix A: Environmental Assessment Technical Reports**

Attachment A-5-6:

**Air Quality Conformity Analysis for  
the 2040 Transportation Policy Plan**

September 2019



## Minnesota Pollution Control Agency

520 Lafayette Road North | St. Paul, Minnesota 55155-4194 | 651-296-6300  
800-657-3864 | 651-282-5332 TTY | [www.pca.state.mn.us](http://www.pca.state.mn.us) | Equal Opportunity Employer

July 25, 2014

Ms. Arlene McCarthy  
Director  
Metropolitan Transportation Services  
Metropolitan Council  
390 North Robert Street  
St. Paul, MN 55101

**RE: Air Quality Conformity Analysis for the 2040 Transportation Policy Plan**

Dear Ms. McCarthy:

The Minnesota Pollution Control Agency (MPCA) has completed its review of the 2040 Transportation Policy Plan (Plan) submitted by the Metropolitan Council (Council). The Minnesota Interagency Air Quality Conformity Consultation Committee, with representatives from the MPCA, Council, Minnesota Department of Transportation (MnDOT), Federal Highway Administration (FHWA), and the U.S. Environmental Protection Agency (EPA), was consulted during the preparation of the Plan. Several ongoing communications also occurred along with periodic meetings, draft reports, e-mails, and phone calls.

On November 8, 2010, the EPA approved a Limited Maintenance Plan for the Twin Cities maintenance area. Under a Limited Maintenance Plan, the EPA has determined that there is no requirement to project emissions over the maintenance period and that “an emissions budget may be treated as essentially not constraining for the length of the maintenance period”. The EPA made this determination because it is unreasonable to expect that the Twin Cities maintenance area would experience so much growth in that period that a violation of the carbon monoxide National Ambient Air Quality Standards would result. No regional modeling analysis is required; however, federally-funded projects are still subject to “hot spot” analysis requirements.

I have examined the document for conformity with a checklist of requirements from the joint Federal Transportation Conformity Rule of the EPA and the U.S. Department of Transportation. Based on this information, the MPCA has determined that the projects included in the 2040 Plan meet all relevant regional emissions analysis and budget tests as required by the Conformity Rule.

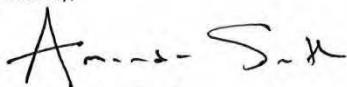
Therefore, the 2040 Plan fully meets and conforms to the relevant sections of the Federal Transportation Conformity Rule and to the applicable sections of the Minnesota State Implementation Plan for Air Quality.

Ms. Arlene McCarthy  
Page 2  
July 25, 2014

The MPCA appreciates the opportunity given to review this document as part of the EPA's Transportation Conformity Rule consultation process, and for the great work done by the Council's staff in completing this analysis in a timely fashion. The MPCA also appreciates the cooperation of the interagency consultation group with their immediate assistance in resolving all policy and technical issues with respect to the Plan's Air Quality Conformity determination.

If you have any questions, please contact me at 651-757-2486 or by e-mail at [amanda.smith@state.mn.us](mailto:amanda.smith@state.mn.us).

Sincerely,

A handwritten signature in black ink that reads "Amanda Smith". The signature is written in a cursive style with a large initial "A" and a stylized "S".

Amanda Jarrett Smith  
Air Policy Planner  
Environmental Analysis and Outcomes Division

AJS:je

cc: Jonathan Ehrlich, Metropolitan Council  
Elaine Koutsoukos, Metropolitan Council  
Patricia Bursaw, MnDOT and TAC Chair  
Karl Keel, City of Bloomington, F&P Chair  
Brian Isaacson, MnDOT  
Susan Moe, FHWA  
Michael Leslie, EPA  
J. David Thornton, MPCA  
Shannon Lotthammer, MPCA  
Frank Kohlasch, MPCA  
Mary Jean Fenske, MPCA  
Innocent Eyoh, MPCA