3 Environmental Analysis and Effects

3.0 Introduction

This chapter discusses the environmental-related analysis and effects associated with the No Build Alternative and the Southwest Light Rail Transit (LRT) Project (Project).[1] This chapter includes 17 environmental resource areas, each of which provides an overview of applicable methods and regulations, a description of the affected environment, an analysis of the environmental consequences that will result from the Project, and committed mitigation measures to address adverse environmental impacts. The analysis of impacts in each section covers long-term and short-term (construction) direct and indirect impacts, with the exception of Section 3.17, which addresses cumulative impacts related to the Project. This chapter includes the following sections:

3.1 Land Use
3.2 Economic Activity
3.3 Neighborhood and Community
3.4 Acquisitions and Displacements
3.5 Cultural Resources
3.6 Parks, Recreation Areas, and Open Spaces
3.7 Visual Quality and Aesthetics
3.8 Geology and Groundwater Resources
3.9 Surface Water Resources
3.10 Ecosystems
3.11 Air Quality and Greenhouse Gases
3.12 Noise
3.13 Vibration
3.14 Hazardous and Contaminated Materials
3.15 Electromagnetic Interference and Utilities
3.16 Energy
3.17 Cumulative Impacts

Chapter 2 provides a description of the No Build Alternative and the Project, both of which were used as the basis for the analysis within this chapter. Construction activities that will be associated with the Project are also described in Chapter 2. Chapter 4 addresses the transportation-related analysis and effects associated with the No Build Alternative and the Project. Appendix E includes the preliminary engineering plans for the Project and illustrates the extent of long-term and temporary construction-related improvements that will result from the Project. Following is a list and definition of key terms used throughout this chapter:

- ***Long-term impacts*** will continue to occur after construction is complete
- ***Short-term impacts*** will be associated with construction activities and will be temporary
- ***Direct impacts*** will occur at the same time and place as the proposed action
- ***Indirect impacts*** will occur later in time or will be further removed in distance from the proposed action
- ***Study area*** is the area where the impact analysis focused on, specific to each environmental category

[1] The Project, as evaluated in this Final EIS, includes both the Locally Preferred Alternative (LPA) and the Locally Requested Capital Investments (LRCIs) described in Sections 2.1.1 and 2.1.2. Exhibit 2.1-6 conceptually shows the components of the Project. As described in Section 2.1.1, the Eden Prairie Town Center Station and associated improvements are deferred and are not expected to be in place when the Project opens in 2020. The station and associated improvements are planned to be in place by 2040.

- ***Limits of disturbance*** is the area where the Project will result in permanent or temporary ground disturbances
- ***Avoidance*** is the act of avoiding impacts to or keeping away from something or someone
- ***Minimization*** is a measure to reduce the severity of adverse impacts
- ***Mitigation*** is a measure to alleviate adverse impacts that remain after minimization

A. Overview of the Project's Impacts

Table 3.0-1 provides a summary of the impacts for each environmental category within this chapter. Long-term and short-term impacts, project avoidance and minimization commitments, and mitigation measures are identified for each environmental category. See the corresponding sections of Chapter 3 for a more detailed description of the Project's anticipated impacts, avoidance and minimization commitments, and mitigation measures, as well as exhibits illustrating geographic features referenced in the table. Unless otherwise noted in this chapter's sections, there have been no major changes in the environmental analyses since publication of the Supplemental Draft EIS.

B. Overview of the No Build Alternative

This section provides a consolidated discussion of the No Build Alternative.[2] It includes an overview by environmental category of changes in existing conditions compared to conditions under the No Build Alternative in 2040. The No Build Alternative represents future conditions in 2040 within the corridor if the Project is not implemented and it provides the basis against which the Project is compared. The definition of the No Build Alternative includes all the proposed and funded projects in the TPP[3] except the Project. That is, the No Build Alternative only differs from the Project in that the No Build Alternative does not include the construction and operation of the Project. Section 2.1.2 provides a more detailed description of the No Build Alternative, and Chapters 5 and 6 of the TPP list and illustrate respectively the funded highway and transit projects in the 2040 TPP that are included in the No Build Alternative (identified as Current Revenue Scenario Investments).

Following are some of the projects included in the No Build (2040) transportation networks that are used for travel demand forecasting and related analyses but that are not included in the existing (2010) transportation networks:

- Highways
  - I-35W Southbound from I-94 to 46th Street
  - Highway 100 from 36th Street to Cedar Lake Road
  - I-494 Capacity Enhancements
  - Reconstruction of the I-494/Highway 169 Interchange
- Transit
  - METRO Gold Line
  - METRO Red Line Extension
  - A-Line, Snelling Avenue Arterial Bus Rapid Transit
  - C-Line, Penn Avenue Arterial Bus Rapid Transit
  - Chicago Emerson-Fremont Arterial Bus Rapid Transit

[2] This section addresses conditions under the No Build alternative for the 16 environmental categories addressed in this chapter. Sections 3.11, Air Quality and Greenhouse Gas, and 3.16, Energy, also provide a quantitative comparison of the Project and the No Build Alternative. Chapter 4 addresses six transportation categories under the No Build Alternative and the Project.

[3] If those projects are implemented, the sponsors of those projects would be responsible for complying with applicable federal and state environmental requirements, such as the National Environmental Policy Act (NEPA) and the Minnesota Environmental Policy Act (MEPA), including disclosure of the projects' environmental impacts.

Following is a summary of conditions under the No Build Alternative for the environmental categories addressed in this chapter, assessing differences under the No Build Alternative compared to the Project and describing key changes from existing conditions to conditions under the No Build Alternative in 2040.[4]

- **Land Use.** The No Build Alternative would not result in the direct conversion of land to a transportation use as a result of the Project, because light rail would not be extended into the study area. The No Build Alternative includes the existing transportation system plus funded projects in the TPP, as well as projected population and employment growth accommodated in adopted plans, but without the Project. Development projects (e.g., housing, commercial/retail, industrial) would generally occur to support the population and employment growth. While the No Build Alternative would not directly displace any residents or businesses, other transportation and redevelopment projects that would occur by 2040 could lead to displacements and changes in land uses. As noted in Table 3.1-4, the No Build Alternative is inconsistent with many of the regional land-use and transportation policies, because it would not develop a high-quality and high-capacity transit line connecting the corridor's highest-growth centers, nor is it consistent with the local plans that encourage increased density and/or transit-oriented development (TOD) land-use patterns in anticipation of the Project. The region's policies related to focused and compact growth, frequent transit service, connecting urban centers, and transportation alternatives to the single-occupant vehicle would not be fully implemented in the corridor. Therefore, the No Build Alternative would constrain transportation options in the corridor, potentially leading to more traffic congestion where higher density land uses are planned, and it could slow the rate of denser development in growth centers.
- **Economic Activity.** The No Build Alternative would not result in new short-term or long-term jobs that would be associated with construction and operation of the light rail in the corridor. The No Build Alternative would also not result in a decline of local jurisdiction property tax revenue that would be associated with the conversion of private property to a public transportation use under the Project. In the corridor, the No Build Alternative would have fewer transportation options and would tend to have longer and less reliable transit travel times. Fewer transportation options and longer and less reliable transit travel times may potentially result in increased road congestion and less transit usage due to fewer alternatives to driving and slower buses from more congestion. This may deter residents and businesses from locating in the corridor, indirectly reducing the pace of development as well as the overall level of investment in the study area. In addition, the development that would occur in the corridor under the No Build Alternative could be more dispersed and of lower density than with the Project. The No Build Alternative would likely result in a different pattern of economic development and property redevelopment than with the Project, especially within the proposed Project station areas, because there would be no light rail station to attract or accelerate additional development. New development associated with the No Build Alternative would entail "new money" that would generate employment and include within the Project corridor; these economic effects generally fall within the 2040 employment forecasts for the No Build Alternative. Indirectly, less intense development patterns in the proposed station areas could lead to a reduction in property tax revenue for affected jurisdictions.
- **Neighborhood and Community.** The No Build Alternative would not result in direct changes to neighborhoods and communities in the study area, because light rail would not be extended into them. Under the No Build Alternative, neighborhoods and communities would likely develop according to adopted plans, dependent upon economic conditions within the corridor, region, and state. However, the shape of that development in the proposed light rail station areas would be different than under the Project, with a tendency to be less intense and more dispersed. Transportation projects and private and public development projects could lead to the acquisition of property from existing owners and/or the displacement of existing occupants throughout the study area. Residents of the study area neighborhoods and those who travel in or through the study area would not receive a faster and more reliable mode of transportation or increased transit accessibility. Additional congestion that would occur in the corridor

[4] The study areas referenced in this summary are defined in the environmental categories' respective *Regulatory Context and Methodology* sections.

by 2040 could affect cohesiveness of some neighborhoods and could have adverse air quality and noise impacts on some neighborhoods and communities within the study area. Changes from existing conditions to conditions under the No Build Alternative in 2040 are assessed under recreation facilities, visual quality, and noise/vibration.

- **Acquisitions and Displacements.** The No Build Alternative would have no property impacts associated with implementation of the Project. Transportation projects and private and public development projects could lead to the acquisition of property from existing owners and/or the displacement of existing occupants throughout the study area, depending on factors such as available right-of-way or vacant property; existing residential, commercial, and institutional development; and the geographic scope of the project. Public transportation and development projects would be required to comply with applicable state and federal acquisition regulations, such as the Uniform Relocation and Real Property Acquisitions Policies Act of 1970, as amended, (42 United States Code [U.S.C.] 4601 et seq.).
- **Cultural Resources.** The No Build Alternative would not adversely affect any historic properties, because the Project would not be constructed. In particular, the adverse effects to historic properties described in Section 3.5 would be avoided. Other transportation and development projects that would be developed under the No Build Alternative would have the potential to affect historic and other cultural resources. However, those projects would be required to comply with applicable related state and federal regulations, which would likely avoid, minimize, or mitigate impacts to cultural resources.
- **Parks, Recreation Areas, and Open Spaces.** The No Build Alternative would not directly or indirectly affect any park, recreation area, or open space in the study area, because the Project would not be implemented. In particular, adverse impacts to parks, recreation areas, and open spaces identified in Section 3.6 and uses of parks and recreation area properties identified in Chapter 6 would be avoided. Under the No Build Alternative, parks in the corridor that would be located within the Project's proposed station areas would not benefit from the improved transit access (e.g., reduced travel time, improved reliability) that would be provided by the Project.
- **Visual Quality and Aesthetics.** The No Build Alternative would not directly or indirectly affect the visual quality of the study area, because the Project would not be implemented. That is, the visual impacts identified in Section 3.7 associated with light rail and related improvements and removal or replacement of existing vegetation would be avoided. Visual and aesthetic conditions under the No Build Alternative would reflect changes to the landscape in the study area that would generally be limited to improvements of existing highway and transit facilities and public and private development projects. As individual properties develop or redevelop and as transportation projects are implemented over time, changes to the visual environment in the study area would occur incrementally. Transportation and development projects that would include structures (e.g., bridges) and multistory buildings would tend to have the greatest effect on their visual setting, depending in part on whether or not the existing visual setting already includes those types of improvements. Local land use regulations (e.g., zoning limits on building height, design review requirements) will also affect how much of an effect future development will have on the visual setting within the study area.
- **Geology and Groundwater Resources.** Under the No Build Alternative, the Project would not be constructed. The existing geology and soils environment would generally remain unchanged under the No Build Alternative, except for localized changes due to transportation and development projects. Those projects would be required to comply with applicable related state and local regulations, such as those regulating groundwater pumping.
- **Surface Water Resources.** Under the No Build Alternative, Project improvements would not be extended into the corridor and the potential impacts on surface water resources identified for the Project in Section 3.9, such as the displacement of some wetlands, would be avoided. As a result, there would be no direct water resource impacts associated with No Build Alternative. However, the water quality benefits from stormwater treatment associated with the proposed project would not be realized. Other transportation and development projects in the corridor would be developed under the No Build Alternative, and they would be required comply with applicable related federal, state, and local regulations. As those projects

are developed and implemented they would tend to result in water quality benefits from stormwater treatment associated with the proposed projects.

- **Ecosystems.** Under the No Build Alternative, the Project would not be constructed and existing streams, vegetation, and wildlife habitat would not be directly or indirectly affected. The potential environmental benefits of the Project would also not be realized under the No Build Alternative, including implementation of proposed mitigation for streams, vegetation, habitat, and regulatory buffers, which could improve the existing conditions of some of these resources. Other transportation and development projects that would occur within the project area under the No Build Alternative could adversely affect ecosystems, depending on the scope and geographic location of the project relative to existing streams, vegetation, and wildlife habitat. Those projects would be required to be implemented consistent with applicable federal, state, and local regulations affecting ecosystems.
- **Air Quality and Greenhouse Gases.** Table 3.11-2 summarizes the existing air quality monitoring data for Hennepin County in 2011, 2012, and 2013. Under the No Build Alternative, regional vehicle miles traveled (VMT) in 2040 is expected to increase compared to existing conditions; however, Mobile Source Air Toxic (MSAT) emissions are expected to decrease due to the effectiveness of the U.S. Environmental Protection Agency's (EPA's) national air quality control programs. Under the No Build Alternative, annual greenhouse gases in 2040 are projected to decline to approximately 15,105,602 metric tons, from approximately 16,062,918 metric tons in 2013 and compared to approximately 15,107,680 metric tons under the Project.
- **Noise and Vibration.** With the No Build Alternative, there would be no light rail operations within the corridor, and therefore there would be no light rail-related noise or vibration within the corridor. With the No Build Alternative, noise levels in the corridor would continue to be dominated by other transportation-related noise sources, including cars, trucks, freight trains, and aircraft from the Minneapolis–St. Paul International Airport. Other noise sources would include miscellaneous industrial activities, commercial activities, and local construction projects. With projected population and employment growth within the corridor and region, it would be expected that noise levels from those sources under the No Build Alternative would tend to increase compared to existing conditions.
- **Hazardous and Contaminated Materials.** Under the No Build Alternative, there would be no Project-related removal or cleanup of potentially hazardous materials in the study area, including contaminated soil or groundwater, and the potential uncontrolled migration of existing contaminants would likely continue. However, there would tend to be removal or cleanup of potentially hazardous materials in the study area due to the implementation of other transportation and development projects, depending on their locations and the applicable related regulations at the time they are implemented. Depending on the type of development and redevelopment that occurs—and upon the type of existing development that is displaced by redevelopment—development and redevelopment projects could either reduce or increase the risk of future hazardous material contamination in the study area.
- **Electromagnetic Fields, Electromagnetic Interference (EMF/EMI), and Utilities.** Under the No Build Alternative, the Project would not be constructed and there would be neither impacts from EMF and the resulting EMI nor impacts to utilities from the Project. Other transportation projects, except for the proposed METRO Blue Line Extension, would not include new electrical-powered modes that could have the potential to affect EMF/EMI-sensitive land uses. Most transportation and development projects would affect utilities due to ground disturbances required to implement physical improvements, such as new roadways or buildings, but those projects would be implemented under applicable local regulations and in coordination with affected utility owners.
- **Energy.** The total long-term regional energy consumption for the No Build Alternative in 2040 would be approximately 232.51 trillion British thermal units (Btu) annually. The No Build Alternative would have a slightly higher forecast annual regional energy consumption (109 billion Btu more per year) than the Project. This higher consumption under the No Build Alternative is expected because no mode shifts from single-occupant vehicles to transit would occur as they would with the Project. Energy use required to construct the Project would be avoided under the No Build Alternative.

TABLE 3.0-1
Impacts and Mitigations by Environmental Category[a]

Environmental Category		Summary of Impacts and Mitigations
3.1 Land Use	Long-term Direct Impacts	• Direct conversion of approximately 144 acres of privately owned industrial, commercial, and residential land, publicly and privately owned parks and open space, publicly owned rights-of-way (i.e., HCRRA), and privately owned railroad rights-of-way (i.e., Canadian Pacific Railway and BNSF Railway) to public transportation-related use (refer to Table 3.1-5 for more information) • No adverse impacts due to no changes in overall land use characteristics within the vicinity of the Project
	Long-term Indirect Impacts	• Potential increased intensity and/or advanced timing of development surrounding proposed light rail station areas • No adverse impacts
	Short-term Impacts	• Temporary changes to property access during construction or temporary conversion of land to a transportation use for construction staging and other construction activities • Temporary easements on 134 acres effecting 178 parcels of land that include industrial, commercial, railroad, residential, and public land uses
	Commitments	None
	Mitigation Measures	Short-term: • Develop and implement a Construction Mitigation Plan and a Construction Communication Plan that will address short-term impacts to land use related to temporary construction easements and other construction activities; strategies may include: - Issue construction updates and post them on the Project website - Provide advance notice of roadway closures, driveway closures and utility shutoffs - Conduct public meetings - Establish a 24-hour construction hotline - Prepare materials with information about construction - Address property access issues - Assign staff to serve as liaisons between the public and contractors during construction • Develop and implement a construction staging plan, which will be reviewed with the appropriate jurisdictions and railroads. Components of the staging plan include traffic management plans and a construction timeline.
3.2 Economic Activity	Long-term Direct Impacts	Employment: • Beneficial effects: - $34.5 million (2015 dollars) in local annual wages and salaries, resulting in 172 long-term jobs in the local economy • No adverse impacts to regional employment due to the projected increase in transit workers Property Tax Revenue: • Permanent removal of acquired private parcels from the property tax base of affected cities and corresponding reduction in property tax revenue from those parcels Existing Business and Development/Redevelopment: • Changes in local traffic patterns and the number of available off-street and on-street parking spots, resulting in a loss of overall parking for some businesses and a related loss in revenue • Removal of land acquired by the Project from the inventory of available land for potential development/redevelopment Freight Rail Owners and Operators: • No adverse impacts to freight rail owners and operators based on modifications by the Project

Environmental Category		Summary of Impacts and Mitigations
	Long-term Indirect Impacts	Employment: • Beneficial effects: - Potential creation of new jobs as employees gain easier access to businesses, residential housing units, and other facilities, providing a net benefit to the local economy • No adverse impacts due to new jobs created in the region as employees gain easier access to businesses Property Tax Revenue: • Beneficial effects: - Potential increase in property tax revenue for local jurisdictions related to increases in development/redevelopment • No adverse impacts to property tax revenue due to the transit oriented development potential surrounding the stations Existing Business and Development/Redevelopment: • Beneficial effects: - Likely increased property values in areas surrounding proposed light rail stations - Likely increase in development/redevelopment in the areas surrounding light rail stations • Potential impacts that could reduce value of an area ("nuisance effects") • No adverse effects to existing business and development/redevelopment due to improved accessibility which expand workforce and retail access
	Short-term Impacts	Employment: • Beneficial effects: - Construction spending associated with the Project will result in an estimated $1.3 billion in overall economic activity (year-of-expenditure dollars) over the construction period • Potential lost revenues for businesses due to temporary reduction of parking stalls, traffic congestion, reduced access, and increased noise, dust, and perceived changes in visual quality Property Tax Revenue: • No adverse impacts because the temporary occupancies and easements are not expected to result in displacement of businesses or residents Existing Businesses: • Potential increases in noise levels, dust, traffic congestion, visual changes, and increased difficulty accessing property for existing businesses Freight Rail Owners and Operators: • Slower freight rail operations during construction may occur and short periods of freight stoppage required to make some modifications to the freight rail track
	Commitments	Long-Term: • Pursue with the City of St. Louis Park the joint development opportunity at the proposed Beltline Station that could increase property tax revenues • Coordinate changes to freight rail tracks, sidings, or other facilities with the freight railroad owner and operator • Onsite flaggers to manage freight rail traffic during construction
	Mitigation Measures	Long-Term: Existing Businesses and Development/Redevelopment Effects • When acquiring property from a property owner, pay damages if the value of the property is decreased in accordance with the Uniform Act Short-term: Existing Businesses and Development/Redevelopment Effects • Develop and implement a Construction Mitigation Plan, Construction Communication Plan and construction staging plan (see 3.1)

Environmental Category		Summary of Impacts and Mitigations
		Freight Rail Owners and Operators: • Develop and implement freight rail operation coordination plans to mitigate short-term impacts to freight rail operations related to construction activities • Work with affected freight rail owners and operators to provide provisions in the construction contract to identify how the contractor will interact with the railroads • Work with affected freight rail owners and operators to sequence construction to minimize effects on freight movements and to identify optimal periods for closing the rail service and reducing speeds • Determine dates and times for all stoppages through coordination with the railroad owners and operators
3.3 Neighborhood and Community	Long-term Direct Impacts	Access to Community Facilities: • Some roadway modifications within the general vicinity of community facilities, but access to these facilities will be maintained and the Project will provide improve transit access to these facilities • No adverse impacts Community Character: • Some changes in noise/vibration and visual character adjacent to the Project and some property acquisition, but these changes will be confined to limited areas • No adverse impacts Community Cohesion: • Some changes in the local roadway, pedestrian, and bicycle networks will occur, but existing roadway and sidewalk/trail connectivity and access will be maintained or improved • No adverse impacts
	Long-Term Indirect Impacts	• Potential property conversion surrounding proposed station areas, including private and public development and/or redevelopment that could affect supply of and demand for off-street and on-street parking around station areas • No adverse impacts on community facilities, community character, or community cohesion
	Short-Term Impacts	Access to Community Facilities: • Temporary changes to roadways, including intersections modifications, and trail and sidewalk detours for routes which provide access to community facilities Community Character: • Construction impacts, such as increased levels of noise, vibration, and dust, may temporarily affect neighborhood character at times of heavy construction • Presence of large construction equipment may be perceived as visually disruptive Community Cohesion • Potential increases in noise levels, dust, and traffic congestion, including increased automobile and truck traffic through residential neighborhoods
	Commitments	None
	Mitigation Measures	Short-term: • Develop and implement the Construction Mitigation Plan, Construction Communication Plan and construction staging plan (see 3.1)
3.4 Acquisitions and Displacements	Long-term Direct Impacts	• Partial acquisition of 159 parcels (totaling 133.5 acres) and full acquisition of 36 parcels (totaling 64 acres) • Relocation of up to 72 businesses that currently operate on or use 20 of the parcels to be acquired
	Long-term Indirect Impacts	• Potential for increased development and redevelopment in areas surrounding station areas that could indirectly lead to acquisitions and displacements
	Short-term Impacts	• Temporary easements on 134 acres effecting 178 parcels of land that include industrial, commercial, railroad, residential, and public land uses

Environmental Category		Summary of Impacts and Mitigations
	Commitments	None
	Mitigation Measures	Long-term and Short-term: • Compensate businesses or persons displaced from a property in accordance with provisions of the Uniform Act and MN Stat. 117. Provide relocation benefits under the provisions of the Uniform Act and Mn Stat. 117.
3.5 Cultural Resources	Adverse Effects	• Adverse effect on the Kenilworth Lagoon and the Grand Rounds Historic District, of which the Kenilworth Lagoon is a contributing element • Adverse effect on the Chicago, Milwaukee, St. Paul & Pacific Railroad Depot (Avoided with measures incorporated into the Project's design and Section 106 MOA) • Adverse effect at two archaeological sites, 21HE0436 and 21HE0437, both of which will be destroyed during the construction of the Project (the term "destroyed" is used in applying 36 CFR 800.5 and the Secretary of the Interior's Standards [36 CFR 68])
	Commitments	• Explored alternative locations for Project elements where adverse effects occur to archaeological resources • Implement Section 106 Memorandum of Agreement measures to avoid/minimize adverse effects
	Mitigation Measures	• Implement a Section 106 MOA that will include the following mitigation measures: - Architecture/History Properties o Install a parapet wall and rail damper on LRT bridge over waterway to mitigate the moderate noise impact at the Kenilworth Lagoon (see Section 3.12) o Rehabilitate/Reconstruct Works Progress Administration Rustic Style Retaining Walls to minimize and mitigate the direct physical and indirect visual adverse effects on the Grand Rounds Historic District, including the Kenilworth Lagoon o Design Project elements within and adjacent to the Grand Rounds Historic District in accordance with the *SOI's Standards (36 CRF 68)*, to be reviewed by the MnHPO and consulting parties, to further minimize the direct physical and indirect visual adverse effects o Develop a Construction Protection Plan detailing measures to be implemented during Project construction to avoid direct physical and indirect adverse effects o Prepare guidance for future preservation activities within the portion of the Grand Rounds Historic District: Canal System, including adjacent parkland, extending from the north end of Lake Calhoun to the east end of Cedar Lake, and including the entirety of the Lake of the Isles Park and Kenilworth Lagoon elements to mitigate the direct physical and indirect visual adverse effects to the Grand Rounds Historic District o Revised the Project design to relocate the crossover location near the Chicago, Milwaukee, St. Paul & Pacific Railroad Depot 3,420 feet west along the alignment to allow the noise wall to shift at least 240 feet west, and avoid adverse visual effect o Revised the Project design to relocate the signal bungalow near the Chicago, Milwaukee, St. Paul & Pacific Railroad Depot to the alternate crossover location to further avoid adverse visual effects (complete) - Archaeological Resources o Conduct a Phase III Archaeological Data Recovery of Sites 21HE0436 and 21HE0437 o Incorporate into the design of the Royalston Station interpretation of the sites, based on the results of the Phase II investigations and allowing for the incorporation of any additional information from the Phase III data recovery o Develop an interpretative plan for the interpretation in conformance with the Standards and Practices for Interpretive Planning from the National Association for Interpretation and Creating Outdoor Trail Signage technical leaflets
3.6 Parks and Recreation	Long-term Direct Impacts	The following parks, recreation areas, and open space properties will incur long-term direct impacts as a result of the Project: • Unnamed Open Space A: Acquisition of entire 2.95-acre open space parcel to accommodate installation of LRT tracks and station platform; trail realignment • Unnamed Open Space B: Acquisition of 2.5 acres to accommodate installation of LRT tracks; trail realignment • Kenilworth Channel/Lagoon: LRT improvements and modifications to the freight rail and trail alignments will occur on approximately 0.3 acre • Cedar Lake Park: New segment of sidewalk to be constructed within the park near East Cedar Beach; realignment of a portion of North Cedar Lake Regional Trail in park

Environmental Category		Summary of Impacts and Mitigations
		• Bryn Mawr Meadows Park: Acquisition of 0.4-acre permanent maintenance easement to accommodate replacement trail bridge; modification of trail alignments in the park
	Long-term Indirect Impacts	The following parks, recreation areas, and open spaces will incur long-term indirect impacts as a result of the Project: • Purgatory Creek Park: Changes to visual setting due to installation of elevated LRT line adjacent to park • Nine Mile Creek Conservation Area: Changes to visual setting due to installation of LRT line adjacent to the property • Overpass Skate Park: Changes to visual setting and noise conditions due to installation of LRT line adjacent to park • Edgebrook Park: Changes to visual setting and noise conditions due to installation of LRT line adjacent to park • Minnehaha Creek Open Space: Changes to visual setting and noise conditions due to installation of LRT line adjacent to park • Jorvig Park: Changes to visual setting and noise conditions due to installation of LRT line adjacent to park • Lilac Park: Changes to visual setting and noise conditions due to installation of LRT line adjacent to park • Park Siding Park: Changes to visual setting and noise conditions due to installation of LRT line adjacent to park • Kenilworth Channel/Lagoon: Changes to visual setting and noise conditions due to installation of LRT line across the channel • Bryn Mawr Meadows Park: Modification to the park's visual setting due to the replacement trail bridge; improved transit and trail access
	Short-term Impacts	The following parks, recreation areas, and open spaces will incur short-term impacts as a result of the Project: • Purgatory Creek Park: Acquisition of temporary construction easement; temporary changes to access, noise, and visual setting conditions during construction • Nine Mile Creek Conservation Area: Temporary changes to visual setting and noise conditions during construction; potential for construction activities within the parcel • Overpass Skate Park: Temporary changes to visual setting and noise conditions during construction • Minnehaha Creek Open Space: Temporary changes to visual setting and noise conditions during construction • Edgebrook Park: Temporary changes to visual setting and noise conditions during construction • Jorvig Park: Temporary changes to visual setting and noise conditions during construction • Lilac Park: Temporary changes to visual setting and noise conditions during construction • Park Siding Park: Temporary changes to visual setting and noise conditions during construction • Kenilworth Channel/Lagoon: Temporary closure of channel/user detour during construction; temporary changes to access, visual setting and noise conditions during construction • Cedar Lake Park: Acquisition of temporary construction easement to accommodate trail reconstruction within the park • Bryn Mawr Meadows Park: Acquisition of temporary construction easement and temporary Project activities within the park related to construction of replacement bridge and realignment of trails
	Commitments	Long-term: • Kenilworth Channel/Lagoon: Conclude consultation on the design of the proposed bridges prior to construction • Bryn Mawr Meadows Park: - Continue consultation with MPRB to determine realignment of trails within the park prior to construction - Conclude consultation with the MPRB on the design of the proposed new bridge prior to construction Short-term: • Kenilworth Channel/Lagoon: Develop BMPs to be implemented during removal of the existing bridges and construction of the new bridges • Bryn Mawr Meadows Park: Maintain connectivity with temporary trails during construction
	Mitigation Measures	Long-term: • When permanently acquiring property at Bryn Mawr Meadows Park and two open spaces in Minnetonka, provide property owners with compensation in accordance with the Uniform Act Short-term:

Environmental Category		Summary of Impacts and Mitigations
		• When acquiring property for temporary construction purposes (i.e., temporary easement) at Purgatory Creek Park, Cedar Lake Park, and Bryn Mawr Meadows Park, provide property owners with compensation in accordance with the Uniform Act. Continue efforts to avoid, minimize, and mitigate impacts to Purgatory Creek Park, Nine Mile Creek Conservation Area, two unnamed open spaces in Minnetonka, Overpass Skate Park, Minnehaha Creek Open Space, Edgebrook Park, Jorvig Park, Park Siding Park, Kenilworth Channel/Lagoon, and Bryn Mawr Meadows Park; and develop a Construction Communication Plan that includes coordination with park owners, advance notice of construction activities, and highlight road, sidewalk, and trail closures, and detour routes • Restore areas and features of parks and recreation areas altered or disturbed due to construction activities to original conditions or better in coordination with the jurisdictional owner
3.7 Visual Quality and Aesthetics	Long-term Direct Impacts	• Six views with a substantial level of visual quality impact, six views with a moderate level of visual quality impact[b]
	Long-term Indirect Impacts	• Potential for the built environment to appear more intensively developed and more urbanized in character due to the potential opportunities for new development, including higher residential densities and, in some cases, new or expanded commercial activities
	Short-term Impacts	• Temporary impacts in portions of all visual analysis units[b] associated with: construction staging areas; concrete and form installation; lights and glare from construction areas; and dust and debris
	Commitments	• Designed stations to have a minimal impact on the surrounding environs. Each of the stations has been designed to be compatible or attractive additions to the surrounding community. • Screen or landscape power stations located in areas of moderate or high visual sensitivity, to be compatible with the surrounding neighborhood character
	Mitigation Measures	Long-term: • Follow design guidelines for key structures throughout the proposed light rail alignment found in the Council's *Visual Quality Guidelines for Key Structures* • Follow exceptions to design guidelines where context sensitive designs have and will be prepared including the proposed light rail structures over Highway 212, I-394, and Highway 100, as well as individual retaining wall and bridge designs at 5th Avenue South and 7th Avenue South, in Hopkins • Design and implement landscaping into design at appropriate locations to address identified visual impacts, within available landscape budget and balancing other priorities for landscaping (e.g., surface water quality, habitat preservation, species of concern), which could include the following: - Retain as much existing vegetation as appropriate to provide shielding for sensitive viewpoints, including techniques such as chaining and mowing without removal of the root systems, and/or tying back large shrubs and trees to provide adequate areas for construction activities - Restore and replant cleared areas in a timely manner, where appropriate, considering such factors as species type, seasonal growing conditions, and other construction-related activities - Place new and replacement trees based on such factors such as helping to provide the maximum screening of views to and from sensitive viewpoints (e.g., adjacent residential areas) or providing street ornamentation, where appropriate - Develop landscape plans for areas adjacent to elevated structures, retaining walls, noise walls, and TPSS sites[c] to achieve such effects as providing partial screening from sensitive viewpoints - Incorporate visual mitigation measures for Section 106-protected resources and Section 4(f)-protected properties as specified in Section 106 Memorandum of Agreement and Final Section 4(f) Evaluation, respectively Short-term: • Follow the Council's design guidelines, to address construction impacts where appropriate and practical; these include: - Locate staging areas in places where their visibility will be minimal and, to the extent required, provide temporary visual screening to limit views into them from nearby residential areas, trails, streets, or other places from which they will be seen by visually sensitive viewers - Use construction methods that minimize the need to remove vegetation to accommodate construction activities

Environmental Category		Summary of Impacts and Mitigations
		- Minimize and shielding lighting needed for staging areas or for nighttime construction activities • Restore areas disturbed during construction
3.8 Geology and Groundwater	Long-term Direct Impacts	Geology: • Potential for uneven ground settlement and bearing failure of the building foundations for the light rail alignment, stations, structures, and surface parking lots/parking structures • Cuts and fills to accommodate appropriate light rail track grade, including two light rail tunnels • No adverse impacts Groundwater: • Water collected at the tunnel portals will be routed through a pretreatment system that captures debris and sediments and through an underground infiltration chamber • Water from internal tunnel will be treated, if required, and pumped to the adjacent sanitary sewer systems owned by either the City of Minneapolis or Metropolitan Council Environmental Services
	Long-term Indirect Impacts	Geology: • No adverse impacts due to the existing disturbed soils underlying these areas Groundwater: • Impacts may occur as development activities in the Project's vicinity increase, but those development activities will be held to applicable regulatory standards and requirements
	Short-term Impacts	Geology: • At- or above-grade construction activities will expose sub-soil when topsoil is removed, which will be susceptible to surface-water and wind erosion Groundwater: • Temporary groundwater pumping during construction • Potential for groundwater contamination • Potential that buildings, roadways, and utilities may settle • Potential that pumped groundwater will be discharged to sewer and not recharge shallow aquifer
	Commitments	Long-term/Geology: • Address areas of compressible soils with appropriate design and construction techniques to avoid the potential for settlement and bearing failure of building foundations • No soils will be placed in floodplains or wetlands unless permitted Short-term/Geology: • Develop a stormwater pollution prevention plan as a part of the permitting process • Use wildlife-friendly BMPs to avoid the potential effects of soil erosion when topsoil is removed Long-term/Groundwater: • Tunnels designed to minimize inflow of groundwater through various design features and BMPs Short-Term/Groundwater: • Adhere to permit requirements related to groundwater pumping and discharge from pumping • Employ proper BMPs associated with groundwater removal during construction, to minimize the risk of building settlement • Within Minneapolis, send groundwater discharged to the sanitary sewer system to the treatment plant on the Mississippi River
	Mitigation Measures	Long-term/Groundwater: • Prepare a groundwater management plan, to be approved by MnDNR and applicable local jurisdictions before construction, which will address collection, storage, and disposal of surface water runoff and pumped groundwater following construction of the Project, and consider concerns about placement of stormwater handling facilities in or near wellhead protection areas

Environmental Category		Summary of Impacts and Mitigations
		• Include in the groundwater management plan, particularly within the Kenilworth Corridor, monitoring, which will be used to assess excessive groundwater infiltration and to prioritize any potential repairs to the waterproofing systems Short-term/Groundwater: • Develop and implement a monitoring plan that provides means for detecting the settlement of buildings, roads, or parking areas, so that additional remediation methods could be employed, if necessary • Prepare a groundwater management plan, to be approved by MnDNR and applicable local jurisdictions before construction, which will include required groundwater monitoring and management practices during construction • Seal and abandon all water or monitor wells or boreholes installed as part of soil and groundwater investigation; contractor will notify the Minnesota Department of Health if previously unidentified well are encountered during construction and also retain a licensed well contractor to abandon the well, if necessary
3.9 Surface Water Resources	Long-term Direct Impacts	Wetlands[d]: • Impacts[e] on 20 wetlands regulated under the Minnesota Wetlands Conservation Act (4.70 acres) and/or Clean Water Act (1.83 acres) • Impact to 20 linear feet of Kenilworth Channel Public Waters and Surface Water Quality: • Impacts will result from conversion of undeveloped land and operations and maintenance of the Project • 39.9 acres of new impervious surface • Five new crossings over water bodies • Fill into ditch at Hopkins Operations and Maintenance Facility Floodplains: • Long-term fill within 15 locally regulated floodplains (7,296 cubic yards)
	Long-term Indirect Impacts	Wetlands[d]: • Impacts to wetlands may occur if new development occurs within the proposed station areas Public Waters and Surface Water Quality: • Impacts will occur as commercial, transportation, and industrial activities in the Project's vicinity increase new point and non-point sources of water pollutants Floodplains: • Impacts to floodplains may occur if new development occurs within the proposed station areas
	Short-Term Impacts	Wetlands[d]: • Impacts[f] to 18 wetlands regulated under the Minnesota Wetland Conservation Act (3.83 acres) and/or the Clean Water Act (7.53 acres) • Impact to 60 linear feet of North Fork of Nine Mile Creek • Impact to 100 linear feet of Kenilworth Channel Public Waters and Surface Water Quality: • Increased rates and volumes of sediment-laden runoff during excavation, accidental spills and leaks from construction vehicles and equipment, and removal of riparian vegetation • Sediment and erosion impacts to public waters and surface water quality will occur near stream crossings, where slopes are greater and construction activities occur closer to the public water, and where controls are more difficult to implement and maintain Floodplains: • Temporary fill within floodplains • Loss or disturbance of soils and vegetation at some locations, which will increase the likelihood of temporary erosion and sedimentation in floodplains

Environmental Category		Summary of Impacts and Mitigations
	Commitments	Long-term/Wetlands: • Strive to avoid impacts on wetlands through design solutions Short-term/Wetlands: • Avoided and minimized short-term impacts to wetlands through design adjustments • Avoid in-stream construction when possible; install temporary portable dams or cofferdams as required • Implement appropriate wildlife-friendly (e.g. natural materials, no welded webbing) construction BMPs Long-term/Public Waters and Surface Water Quality: • Implement various design features that meet stormwater regulatory requirements including minimizing or eliminating pollutant sources and implementing structural and non-structural BMPs to treat and control runoff Short-term Public Waters and Surface Water Quality: • Develop a stormwater pollution prevention plan that complies with the Construction General Permit • Long-term and Short-term/Floodplains: • Develop appropriate plans and obtain applicable permits for floodplains, as well as implement BMPs
	Mitigation Measures	Long-term/Wetlands: • Purchase the required amount of wetland mitigation bank credits based on the long-term impacts and associated replacement ratios identified in the WCA and CWA Section 404 permit applications Short-term/Wetlands: • Restore wetlands temporarily affected during construction to existing grade, hydrology, and reseed with appropriate native wetland species seed mix, as required by the WCA and CWA; purchase wetland mitigation bank credits for CWA regulated short-term impacts lasting longer than 180 days Long-term/Public Waters and Surface Water Quality: • Design stormwater management facilities, which will be approved by local jurisdictions and through final permitting, to provide stormwater treatment in compliance with NPDES requirements • Short-term/Public Waters and Surface Water Quality: • Design stormwater management facilities to provide stormwater treatment in compliance with NPDES requirements Long-term/Floodplains: • Implement appropriate compensatory storage within or adjacent to the affected waterbody and where it is not feasible to meet this requirement, request a variance from applicable regulatory agency • Short-term/Floodplains: • Remove short-term floodplain fill placed during construction and restore elevations to pre-existing conditions resulting in a no net-loss of flood storage volume
3.10 Ecosystems	Long-Term Direct Impacts	Threatened and Endangered Species: • "No effect" on the Higgins eye (pearly mussel) and Snuffbox mussel, or their associated critical habitats • The Project may affect but is not likely to adversely affect the northern long-eared bat • No element occurrences of the Blanding's turtle within 0.9 mile of the Project's alignment; however, MnDNR determined this species may be adversely affected by the Project Habitat: • Removal, conversion, degradation, or splitting of existing habitat • Loss and/or degradation of vegetated areas associated with five land cover types, which could result in a decrease in potential wildlife foraging areas, breeding habitats, and nesting areas • Loss of approximately 60 acres of habitat Migratory Birds:

Environmental Category		Summary of Impacts and Mitigations
		• No adverse impacts as it is likely that regulated migratory bird species have adapted to survive in urban areas and tolerate high levels of human activity given the limited forest or woodland areas present
	Long-Term Indirect Impacts	Threatened and Endangered Species: • Impacts to threatened and endangered species may occur if new development occurs within the proposed station areas Habitat: • Increased disturbance of habitat because of activities associated with the daily operation of the light rail (e.g., noise, lighting, dust), as well as an increase in human activity in or adjacent to habitat areas • Impacts to habitat may occur if new development occurs within the proposed station areas Migratory Birds: • No adverse impacts as it is likely that regulated migratory bird species have adapted to survive in urban areas and tolerate high levels of human activity given the limited forest or woodland areas present
	Short-term Impacts	Threatened and Endangered Species: • No adverse impacts on federal or state listed threatened or endangered species, or critical habitat because impacts are avoided through commitments Habitat: • Temporary loss of vegetated areas associated with five natural land cover types, which could result in short-term loss of habitat • Temporary loss of approximately 23 acres of habitat Migratory Birds: • No adverse impacts because the Project's light rail alignment will be located in a predominantly urban area, and the species of migratory birds that regularly travel throughout or nest within this region are likely familiar with and/or have adapted to dealing with construction activities similar to those associated with construction of the Project
	Commitments	Long-term/Threatened and Endangered Species: • Implement MnDNR recommendations to avoid direct impacts to the Blanding's turtle (for measures see Section 3.10.3.1) Short-term/Threatened and Endangered Species: • Seasonal restriction on removal of trees during the summer northern long-eared bat pup season (June 1 to July 31) at the South Fork Nine Mile Creek • No activities within ¼ mile of a known hibernacula • Implement MnDNR recommendations to avoid impacts to Blanding's turtle as part of the Project's design Long-term/Habitat: • Implemented measures identified during design adjustment process to avoid and minimize long-term fragmentation, degradation and/or loss of habitat Short-term/Habitat: • Include invasive species and noxious weeds management plan in the Project's construction specifications • Implement measures such as fencing to isolate areas of disturbance, minimize amount of trees and vegetation removed as part of and implement measures to protect aquatic habitat Migratory Birds: • Avoid removing nest habitat during primary migratory bird nesting season (May 1 to Aug. 31), where appropriate • Conduct field survey prior to removal of nest habitat during primary bird nesting season (May 1 to Aug. 31) and follow developed protocol should an active nest be encountered • Comply with the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d, 54 Statutes [Stat.] 250), which prohibits taking, possession, or commerce of these species

Environmental Category		Summary of Impacts and Mitigations
	Mitigation Measures	Long-term/Habitat: • Incorporate native landscaping into the Project's design, where applicable and appropriate Short-term/Habitat: • Reseed and restore habitat that is temporarily disturbed during construction, where appropriate, upon construction completion
3.11 Air Quality and Greenhouse Gases	Long-term Direct Impacts	• Beneficial effects: - Lower levels of mobile source air toxics emissions in the region, with projected reduction in vehicle travel when passengers switch from driving to light rail • No adverse impacts
	Long-term Indirect Impacts	• Beneficial effects: - Improved traffic conditions on the region's travel network will reduce vehicle emissions and contribute to air quality improvements - Net Greenhouse Gas emissions reduction in the region and beneficial GHG and climate change effects • No adverse impacts
	Short-term Impacts	• Temporary increase in air emissions from project construction • Temporary increase in greenhouse gases from the construction equipment and vehicles • Short-term increases in dust in and around the project area from construction activities
	Commitments	Short-term/Greenhouse Gases: • Implement BMPs, such as energy efficient construction equipment vehicles and limiting equipment and vehicle idling time during construction to reduce greenhouse gas emissions from construction activities Short-term/Air: • Comply with federal and state regulations, including the EPA's emission standards for on-road vehicles and off-road construction equipment, the state air rules in Chapter 7023: Mobile and Indirect Sources, and the applicable MnDOT's Standard Specifications for construction • Implement BMPs to minimize temporary construction emission impacts, including, but not limited to: - Minimization of land disturbance during site preparation - Watering of the construction site - Stabilization of dirt piles if they are not removed immediately - Use dust suppressants on unpaved areas - Covering trucks while hauling soil/debris off-site or transferring materials - Minimization of unnecessary vehicle and machinery idling - Use of energy efficient equipment and vehicles • Implement EPA-recommended measures where applicable (See Section 3.11.3.5 for a detailed list of measures)
	Mitigation Measures	None
3.12 Noise	Long-term Direct Impacts	• Without mitigation: 237 moderate noise impacts (52 buildings) and 558 severe noise impacts (69 buildings) for residential land uses; one moderate noise impact for institutional land uses • With mitigation: 59 moderate noise impacts (22 buildings) for residential land uses[g]
	Long-term Indirect Impacts	• Increased development near new light rail stations will likely result in more people having exposure to the noise produced by light rail vehicles and park-and-ride lots • Increase in transit ridership will likely reduce roadway traffic noise
	Short-term Impacts	• Elevated noise levels from construction equipment • For residential land use, at-grade track construction noise impacts can extend 120 feet from the construction site

Environmental Category		Summary of Impacts and Mitigations
		• If nighttime construction is conducted, noise impacts from at-grade construction can extend 380 feet from the construction site
	Commitments	Short-term: • Require construction equipment used by contractors be properly muffled and in proper working order • Develop a nighttime construction mitigation plan if nighttime construction is deemed necessary • Conduct construction activities during daytime hours, except when required and allowable within local noise ordinance procedures
	Mitigation Measures	Long-term: • Mitigate for severe and moderate impacts, where the existing noise levels exceed 65 dBA Ldn or where there is an increase in noise due to the Project of three dB or greater, where reasonable and feasible, in accordance with the noise mitigation guidelines contained in the Regional Transitway Guidelines (March 2016) • Employ BMPs to minimize noise project-wide, including use of wheel skirts (panels over the wheels) to reduce wheel/rail noise and continuously welded rail to eliminate gaps in the tracks that generate additional noise; conduct wheel truing to keep wheels smooth and round and rail grinding to remove corrugations; and apply lubrication if/where needed • Conduct wheel truing (to keep wheels smooth and round) and rail grinding (to remove corrugations) on a regular basis, and employ lubrication where appropriate and as needed • Locate noise generating elements (e.g., crossovers) away from sensitive locations, where possible • Implement the following mitigation measures for residential and institutional locations: - Provide sound insulation improvements at building nearest LRT track: Residence Inn, Eden Prairie - Construct 8' high noise barrier extending 1,800'; Claremont Apartments, Minnetonka - Implement design elements for quiet zones, where the routine sounding of horns would be eliminated because of safety improvements at at-grade crossings, including modifications to streets, raised median barriers, four quadrant gates, and other improvements designed and implemented by the Project and consistent with quiet zone readiness at the following locations: o Hopkins Plaza Apartments, Hopkins o 7th Avenue, Hopkins o Sonoma Apartment, Hopkins o 6th Avenue, Hopkins o Town Terrace Apartments, Hopkins o Westside Apartments, Hopkins o Creekwood Estates, Hopkins o Railroad Avenue, St. Louis Park o Village in the Park Condos, St. Louis Park o TowerLight, St. Louis Park o 35th Street Apartments, St. Louis Park o Construct 3' high parapet barrier extending 500' on elevated structure over Excelsior Boulevard, Hopkins o Construct 8' to 11' noise barrier extending 760', Railroad Avenue, Hopkins o Construct 2' high parapet wall and rail dampers 300', Kenilworth Channel, Minneapolis o Complete on-site testing to determine if residences meet interior noise level criteria: one residence at Burnham Road North located NW of the channel; three residences at Thomas Ave South • Implement wayside bell at Thomas Avenue South, Sheridan Avenue South, and South Upton Avenue, Minneapolis Short-term: • Contractors will prepare a detailed Noise Control Plan for the Project's construction duration. A noise control engineer or acoustician will work with the contractor to prepare a Noise Control Plan in conjunction with the contractor's specific equipment and methods of construction. Key elements of this plan will include: - Contractor's specific equipment types - Schedule and methods of construction - Maximum noise limits for each piece of equipment with certification testing

Environmental Category		Summary of Impacts and Mitigations
		- Prohibitions on certain types of equipment and processes during the nighttime hours without local agency coordination and approved variances - Identification of specific sensitive sites where near construction sites - Methods for determining construction noise levels - Implementation of noise control measures where appropriate - Include a 24-hour construction hotline
3.13 Vibration	Long-term Direct Impacts	Vibration: • No vibration impacts for residential or institutional land uses Ground-borne noise: • Without mitigation: 54 units (five buildings) ground-borne noise impacts for residential land uses in the tunnel section south of the Kenilworth Channel, and one ground-borne noise impact at an institutional land use, an audiology clinic • With mitigation: no vibration impacts to residential or institutional land uses
	Long-term Indirect Impacts	• Increased development near new light rail stations will likely result in more people having exposure to vibrations produced by LRT and freight rail
	Short-term Impacts	• Vibration will result from operation of heavy equipment (pile driving, vibratory hammers, hoe rams, vibratory compaction, and loaded trucks) needed to construct bridges, retaining walls, roads, and park-and-ride facilities
	Commitments	Long-term: • Construct a tunnel slab within the Kenilworth Corridor to significantly reduce the number and magnitude of ground-borne noise impacts
	Mitigation Measures	Long-term/Ground-borne noise: • Implement highly resilient rail fasteners in the tunnel section (2,200 feet) to eliminate ground-borne noise impacts (the fasteners should be designed to provide at least 5 dB of reduction in vibration levels at 80 Hz and higher) • Replace the existing vibration isolation elements between the floor of the building and the sound booth at Hearing Care Specialists (audiologist) (the isolation elements should provide at least 10dB of reduction in vibration levels at 80Hz and higher) Short-term/Vibration: • Apply the following measures where feasible to minimize impacts from construction vibration: - Limit Construction Hours: Limit high-vibration activities at night - Construction Specifications: Include limits on vibration in the construction specifications, especially at locations with high-vibration activities - Alternative Construction Methods: Minimize the use of impact and vibratory equipment, where feasible and appropriate - Truck Routes: Use truck haul routes that minimize exposure to sensitive receptors and minimize damage to surface roadways, where appropriate - Pre-Construction Survey: Perform pre-construction surveys to document the existing conditions of structures in the vicinity of sites where high-vibration construction activities will be performed - Vibration Monitoring: If a construction activity has the potential to exceed the damage criteria at a building, the contractor will be required to conduct vibration monitoring and, if the vibration exceeds the limit, the activity must be modified or terminated
3.14 Hazardous and Contaminated Materials	Long-term Direct Impacts	• Beneficial Effect: - Removal of existing hazardous and contaminated soils within the construction area for the Project • No adverse impacts as operation of the light rail vehicles will not generate hazardous materials or regulated wastes and due to the effectiveness of identified avoidance measures (i.e., BMPs for OMF)
	Long-term Indirect Impacts	• Beneficial Effect: - Potential for known hazardous and contaminated material sites to be cleaned up as development/redevelopment occurs

Environmental Category		Summary of Impacts and Mitigations
		• Long-term management of methane-related indirect impacts on the proposed Hopkins OMF site from the Hopkins Sanitary Landfill may be necessary to limit potential worker exposure to methane
	Short-term Impacts	• Earthwork or other disturbance at or in proximity to contaminated areas could mobilize or result in the release of hazardous and contaminated materials • Potential spills of hazardous materials during construction • Discovery of previously undocumented contaminated soil or groundwater contamination encountered during construction • Potential for structures on acquired land to contain contaminated or hazardous materials • Potential exposure of hazardous material to people present within and adjacent to the project construction area
	Commitments	Long-term: • Responsible management and containment of hazardous materials that will be used and stored onsite at the proposed Hopkins OMF • Implement industry BMPs for the collection and disposal of oils, grease, and other waste materials generated during vehicle maintenance and repair activities at the Hopkins OMF • Obtain a Generator License through Hennepin County for the Hopkins OMF and comply with applicable requirements for annual reporting/licensing, storage, shipping, record keeping, emergency planning, and disposal requirements • Develop a SPCC plan to minimize potential long-term effects related to accidental spillage of petroleum products stored at the Hopkins OMF • Tunnels designed to minimize inflow of groundwater through various design features and BMPs preventing hazardous materials or contaminated stormwater from entering groundwater Short-term: • Develop RAPs for remediation in cases where the presence of contamination has been verified through the Phase II ESAs • Follow OSHA guidelines during construction • Prevent public exposure through physical contact with a contaminated material by site access barriers • Use engineering controls and BMPs to avoid spills of hazardous materials during construction; this includes preparation and adherence to a SWPPP and best management practices, to limit and contain releases and spills to minimize the likelihood of soil and groundwater contamination during construction
	Mitigation Measures	Short-term: • Conduct mitigation within the MPCA Brownfield Program regulatory framework and approved RAPs • Implement RAPs, approved by MPCA, to address the risks identified in the Phase I and Phase II environmental site assessments • Prior to the start of construction prepare, and with MPCA approval, prepare a CCP to address the discovery of unknown contamination • Survey structures on acquired land for the presence of hazardous/regulated materials prior to their demolition or modification • Handle and manage potentially hazardous materials in compliance with applicable regulatory standards and dispose of in accordance with an Hazardous Materials Abatement Plans for in-place hazardous/regulated materials, and the RAP/CCP for hazardous/regulated materials in the site soils
3.15 Electromagnetic Fields/ Electromagnetic Interference, and Utilities	Long-term Direct Impacts	• No adverse impacts from electromagnetic fields due to the low levels of exposure to people riding the LRT or in adjacent buildings • No adverse impacts from electromagnetic interference because there are no sensitive receptors in the study area • No adverse impacts on utilities because conflicting utilities will be relocated and services maintained
	Long-term Indirect Impacts	• No adverse impacts from electromagnetic fields or electromagnetic interference and no adverse impacts on utilities
	Short-term Impacts	EMI/EMF: • No adverse impacts Utilities:

Environmental Category		Summary of Impacts and Mitigations
		• Excavation and grading activities, placement of structural foundations and work that requires large-scale equipment could interfere with utilities • Relocating water mains could temporarily affect access to and use of fire hydrants
	Commitments	Long-term/Utilities: • Relocate all conflicting utilities to avoid utility impacts to and to maintain utility service, in accordance with the Southwest LRT Utility Relocation and Management Plan • Include measures to minimize stray current and reduce amount of corrosion due to stray current • Prior to construction, determine necessary improvements to transmission systems along the corridor through consultation with Xcel Energy Short-term/Utilities: • Provide temporary utility connections to customers prior to permanent relocation activities • Contact area utility companies and utility agencies to request providing line relocation measures and approval of the proposed alteration of utility lines prior to construction • Notify affected businesses and residences of planned disruption of service due to construction activities • Contact appropriate utility companies and agencies to identify utility lines discovered during construction that were not identified in the contract documents • Coordinate with local and state agencies, as required, to relocate specific utilities outside the project corridor: - Adhere to Minnesota Statute 216B, Public Utilities, which provides terms for which utility companies may operate in public right-of-way - Conform to *MnDOT Utility Accommodation Policy*, which requires public and private utilities to obtain a permit to place utility facilities on trunk highway right-of-way • Review any utility installations on, over, or under railroad property, with railroad(s) and obtain approval(s)
	Mitigation Measures	None
3.16 Energy	Long-term Direct Impacts	• Beneficial effects: - The Project will have an annual regional energy consumption 109 billion Btu lower than the No Build Alternative - Changes due to mode shifts from single-occupant vehicles to transit, reducing energy consumption • No adverse impacts
	Long-term Indirect Impacts	• Beneficial effects: - Changes due to mode shifts from single-occupant vehicles to transit, reducing passenger vehicle miles traveled • Increase in energy consumption from new development and redevelopment • No adverse impacts because new development is typically more energy efficient than existing or less dense development
	Short-term Impacts	• No adverse impacts because energy used for production of raw materials and components for construction will be localized and temporary
	Commitments	• Design the Project to incorporate opportunities to reduce energy consumption into the Project, including: - Follow the State of Minnesota Sustainable Building Guidelines (MSBG-B3) - Use highly efficient LED lighting throughout the Project (street lighting to building lighting) - Maximize use of daylight at OMF, supplemented with lighting control management software - Coordinate with Xcel Energy for efficient OMF heating, cooling, and lighting control systems - Use energy recovery units in the OMF - Use a high-efficiency chiller at OMF - Use condensing boilers at OMF

Environmental Category		Summary of Impacts and Mitigations
		- Use closed-cell cooling tower (free winter cooling)
	Mitigation Measures	None
3.17 Cumulative Impacts	Cumulative Effects Assessment	Direct and indirect adverse impacts will be localized and the Project is not anticipated to generate substantial cumulative impacts for the environmental categories evaluated

[a] This table summarizes the anticipated impacts and mitigation measures for the Project as identified in the Final EIS. All data in the table are approximate. See the corresponding sections of Chapter 3 for a more detailed description of the anticipated impacts, and mitigation measures. "Mitigation measures" are specific actions that will be incorporated into the project to address anticipated adverse impacts (see also 40 CFR 1508.20). "Commitments" are general actions that will be incorporated into the project that may not be tied to anticipated adverse impacts, such as the use of best management practices (BMPs) or public outreach strategies. If there are no mitigation measures identified for a specific type of impact area, it means that the avoidance measures identified for that environmental category will avoid any adverse environmental impacts for that category, and therefore, no mitigation measures are warranted.

[b] 19 viewpoints were selected for assessment within six visual analysis units. The six visual analysis units and the exhibits on which they are mapped include Eden Prairie (Exhibit J-1), North Eden Prairie/Minnetonka/South Hopkins (Exhibit J 6), Hopkins (Exhibit J-9), St. Louis Park (Exhibit J-12), Kenilworth Corridor (Exhibit J 17), and Minneapolis Downtown Fringe (Exhibit J-24).

[c] A traction power substation (TPSS) is an electrical substation that converts electric power from the form provided by the electrical power industry for public utility service to an appropriate voltage, current type, and frequency to supply railways, trams (streetcars), or trolleybuses with traction current.

[d] The term "wetland" is used to describe any regulated aquatic resource, including streams. See Section 3.9 for additional information.

[e] Long-term direct impacts on wetlands regulated under the Minnesota Wetlands Conservation Act are generally defined as impacts not fully restored within six months, and long-term direct impacts to wetlands regulated under the Clean Water Act are generally defined as impacts that are not fully restored.

[f] Short-term impacts on wetlands under the Minnesota Wetlands Conservation Act are generally defined as impacts that will be fully restored within six months, and short-term impacts to wetlands regulated under the Clean Water Act are generally defined as impacts that will be fully restored.

[g] If the noise mitigation guidelines, as contained in the Regional Transitway Guidelines (March 2016) (see Appendix D), are found to not meet reasonable criterion or if property owner(s) does not approve sound insulation, the Project will result in additional residual noise impacts. Noise mitigation measures include the implementation of quiet zones in some areas where the light rail alignment will be adjacent to freight rail. Quiet zones are locations, at least one-half mile in length, where the routine sounding of horns has been eliminated because of safety improvements at at-grade crossings, including modifications to the streets, raised median barriers, four quadrant gates, and other improvements designed and implemented by the Project and consistent with quiet zone readiness. Horns are sounded in emergency situations at these locations. Municipalities must apply to FRA for approval of quiet zones. If the municipality fails to apply for a quiet zone or FRA fails to approve the quiet zone, the Project may result in additional residual noise impacts. See Section 3.12 and Table 3.12-7 for additional information.

Note: APE = area of potential effects; BMP = best management practice; CWA = Clean Water Act, CCP = Construction Contingency Plan; CFR = Code of Federal Regulations; EIS = Environmental Impact Statement; dB = decibels; dBA = A-weighted decibels; EPA = U.S. Environmental Protection Agency; HCRRA = Hennepin County Regional Railroad Authority; MOA = Memorandum of Agreement; MnDOT = Minnesota Department of Transpiration; MnDNR = Minnesota Department of Natural Resources; MnHPO = Minnesota Historic Preservation Office; MPCA = Minnesota Pollution Control Agency; MPRB = Minneapolis Park and Recreation Board; OMF = Operation and Maintenance Facility; OSHA = Occupational Health and Safety Administration; RAP = Response Action Plan; SOI's Standards = Secretary of the Interior's Standards for the Treatment of Historic Properties; SPCC = Spill Prevention, Control, and Countermeasure; SWPPP = Stormwater Pollution Prevention Plan; T&E = threatened and endangered; USACE = U.S. Army Corps of Engineers; USFWS = U.S. Fish and Wildlife Service; U.S.C. = United States Code; Uniform Act = Uniform Relocation Assistance and Real Property Acquisition Policies Act, WCA = Minnesota Wetlands Conservation Act of 1991.

Source: Council, 2015.

3.1 Land Use

This section describes long-term direct and indirect and short-term (construction) direct and indirect effects of the Project on land use (see Section 3.17 for cumulative impacts). This section includes an overview of the regulatory context and methodology used for the analysis; a description of existing land use conditions; an assessment of the alternative's compatibility with applicable adopted land use plans and anticipated environmental consequences related to land use; and a description of mitigation measures to implement with the Project.

3.1.1 Regulatory Context and Methodology

This section describes regulatory context and methodology for the land use evaluation, and includes a summary of relevant laws and executive orders, an overview of the methodology, and a description of the land use study area for the analyses completed as part of the land use evaluation.

State, regional and local land use policies and plans form the basis for discussing land use conflicts in the land use study area. Local municipalities have land use controls available to them in the form of comprehensive plans guiding land use and city zoning codes guiding development. There are no other specific laws or executive orders that regulate the consideration of land use impacts as part of preparing environmental review documents.

The methodology used to describe the affected environment and evaluate potential environmental impacts to land use generally followed the following steps:

1) Review of the *existing land use* and *planned land use* (MetroGIS Datafinder, *Generalized Land Use*, 2010, and *Planned Land Use*, 2014, respectively)[5]
2) Review of the adopted land use plans and policies of each city where the proposed light rail improvements will be located
3) Assessment of the compatibility of the No Build Alternative and the Project with adopted land use plans and policies
4) Assessment of the potential long-term direct and indirect impacts to land use as a result of the No Build Alternative and the Project

The assessments in this section include a qualitative review of the degree to which the No Build Alternative and Project are compatible with, or supportive of, adopted comprehensive land use plans based on a review of published local and regional planning documents. In addition, the assessment includes: 1) a quantitative estimation of the direct, long-term conversion of existing land uses resulting from property acquisitions for the Project; 2) an assessment of whether land use conversions resulting from property acquisition will affect the overall land use character of area; and 3) a qualitative assessment of the indirect effect of the Project on land uses surrounding station areas, based in part on a review of the Southwest Corridor station area planning efforts (*Southwest Corridor Investment Framework* [Hennepin County, 2013]).

[5] This section uses the following definitions of *existing land use* and *planned land use*. *Existing land use* is defined as the way a parcel of land or right-of-way is currently being used by the existing property owner, independent of its zoning or comprehensive plan designation. *Existing land use* represents the use of land under current conditions. The description of existing land uses is based on the *generalized land use categories* developed by the Council and documented in the MetroGIS Datafinder, *Generalized Land Use*, 2010. The Council routinely develops *generalized land use category* data for the Twin Cities region to support its statutory responsibilities and assist in long range planning for the seven-county, Twin Cities Metropolitan Area. This dataset is developed in consultation with each of the communities in the Metropolitan Area. *Planned land use* is defined as the land use category for a parcel of land or right-of-way as designated in the applicable adopted comprehensive land use plan for that parcel or right-of-way. *Planned land uses* are based on data collected by the Council and represent the approved land use plans and subsequent amendments for each community. The Council routinely compiles individual land use plans and plan amendments from communities within the seven-county Twin Cities metropolitan area (MetroGIS Datafinder, *Planned Land Use*, 2014).

The land use study area is one-half-mile on either side of the centerline proposed light-rail alignment, a one-half-mile radius around the center point of the proposed Hopkins Operations and Maintenance Facility (OMF), and a one-half mile radius around each proposed station location.

3.1.2 Affected Environment

This section describes the existing land use and planned land use conditions within the land use study area. This section also includes a description of the planning and policy framework in the jurisdictions affected by the Project, and a review of the Project's compatibility with local plans and policies. The description of existing land uses represents land as it is currently used and the description of planned land use is based on the designation within adopted land use plans (see Section 3.1.1, including footnote 1, for additional information on definitions and data sources used throughout this section). The description of the planning and policy framework is based on a review of relevant plans and policies for the affected jurisdictions.

3.1.2.1 Existing and Planned Land Uses

This section describes the existing and planned land uses within the land use study area. This section includes: (1) a corridor-wide summary of existing and planned land uses; and (2) a more detailed description of existing and planned land uses around each of the proposed light rail stations.

Table 3.1-1 and Exhibits 3.1-1 and 3.1-2 present the existing land use for the land use study area.[6] In total, the land use study area covers approximately 9,702 acres of land (about 15 square miles) in the Cities of Eden Prairie, Minnetonka, Hopkins, St. Louis Park, and Minneapolis. The predominant land uses in the Project area are single-family residential (20 percent), industrial (15 percent), and parks and open space (12 percent).[7]

Because the Project has been incorporated into many local land use plans, some new development or redevelopment is expected to occur within the land use study area as a result of the Project, particularly within one-half mile of the proposed stations. In comparing existing land uses to approved land use plans, land uses around several stations are anticipated to shift to higher-density, mixed-use development, as allowed under approved zoning regulations (refer to Section 3.1.3.3 for additional detail on indirect land use impacts related to station area development). Exhibits 3.1-3 and 3.1-4 and Table 3.1-2 show the planned land uses for the land use study area, based on the approved land use plans for the region (MetroGIS Datafinder, *Generalized Land Use*, 2010, and *Planned Land Use*, 2014).

The Project includes 16 proposed light rail stations, which are illustrated on Exhibits 3.1-1 through 3.1-4 and described in Section 2.1.1.1. The following provides a description of the existing use, zoning, and comprehensive plan designations of land within the Project's proposed light rail station areas in the Cities of Eden Prairie, Minnetonka, Hopkins, St. Louis Park, and Minneapolis.

As with the assessment of land use within the Project's land use study area, existing land uses near the light rail station areas are based on a land use dataset developed by the Council (MetroGIS Datafinder, *Generalized Land Use*, 2010) (see Exhibits 3.1-1 and 3.1-2). Zoning is based on a city's adopted land use plan. While zoning provides the legal basis for shaping future development according to adopted plans, it does not necessarily reflect the land use that is currently in place, because some uses are permitted through conditional use permits or other local permitting. Planned land uses are described herein as they are documented in adopted comprehensive plans and station area plans (see Exhibits 3.1-3 and 3.1-4).

[6] The land use categories presented in the table are the *generalized land use categories* from the MetroGIS Datafinder, *Generalized Land Use*, 2010.

[7] See Section 3.5 and Chapter 6 for property acquisitions affecting Section 106 and Section 4(f) properties. As noted in Section 3.6, no portions of any Section 6(f) properties would be acquired under the Project.

TABLE 3.1-1
Existing Land Uses within One-half Mile of the Project

Existing Land Use Category[a]	Acreage	% of Total Land
Residential - Single Family (detached and attached)	1,959	20%
Residential - Multifamily	664	7%
Retail and Other Commercial	910	9%
Office	456	5%
Industrial	1,429	15%
Mixed Use	500	5%
Agricultural	0.3	0%
Institutional	461	5%
Parks and Open Space[b]	1,189	12%
Open Water[c]	573	6%
Freight Railroad (private)[d]	108	1%
Undeveloped[e]	1,453	15%
Total	9,702	100%

[a] Existing land use is defined as land as it is currently being used, independent of its designation within an applicable adopted comprehensive land use plan. The land use categories used in this table are the *generalized land use categories* from the MetroGIS Datafinder, *Generalized Land Use*, 2010.

[b] Publicly owned land within existing freight rail corridors (i.e. Bass Lake Spur, Kenilworth Corridor, and BNSF Wayzata Subdivision) is included in the totals for Parks and Open Space.

[c] Open Water is a land use category used in MetroGIS Datafinder that refers to open water features for lakes and rivers.

[d] The freight railroad land use category represents privately owned land occupied or intended to be occupied by railroad track lines or similar uses.

[e] Undeveloped land includes approximately 766 acres of land designated within the Major Highway category of the *generalized land use categories* from the MetroGIS Datafinder, *Generalized Land Use*, 2010. Approximately 687 acres of the land within the - Undeveloped category is land that has the potential to be developed in the future, depending on specific zoning requirements and site conditions.

Source: Metropolitan Council, MetroGIS Datafinder, *Generalized Land Use*, 2010

TABLE 3.1-2
Planned Land Uses within One-half Mile of the Project

Land Use Plan Category[a]	Acreage	% of Total Land
Low-Density Residential	1,123	12%
Medium-Density Residential	556	6%
High-Density Residential	299	3%
Commercial	714	7%
Office/Business Park	794	8%
Town Center	110	1%
Urban Neighborhood	881	9%
Industrial	1,294	13%
Mixed Use	959	10%
Public / Institutional	326	3%
Park, Recreational, and Open Space	1,060	11%
Open Water	567	6%
Vehicular Right-of-Way	831	9%
Railway	137	1%
Trail	51	0%
TOTAL	9,702	100%

[a] Land use plan categories are based on the land use designations within applicable adopted local land use comprehensive plans, as defined within the MetroGIS Datafinder, *Planned Land Use* (Metro, 2010).

Source: Metropolitan Council, MetroGIS Datafinder, *Planned Land Use*, 2010.

EXHIBIT 3.1-1
Existing Land Use – Eden Prairie, Minnetonka, and Hopkins

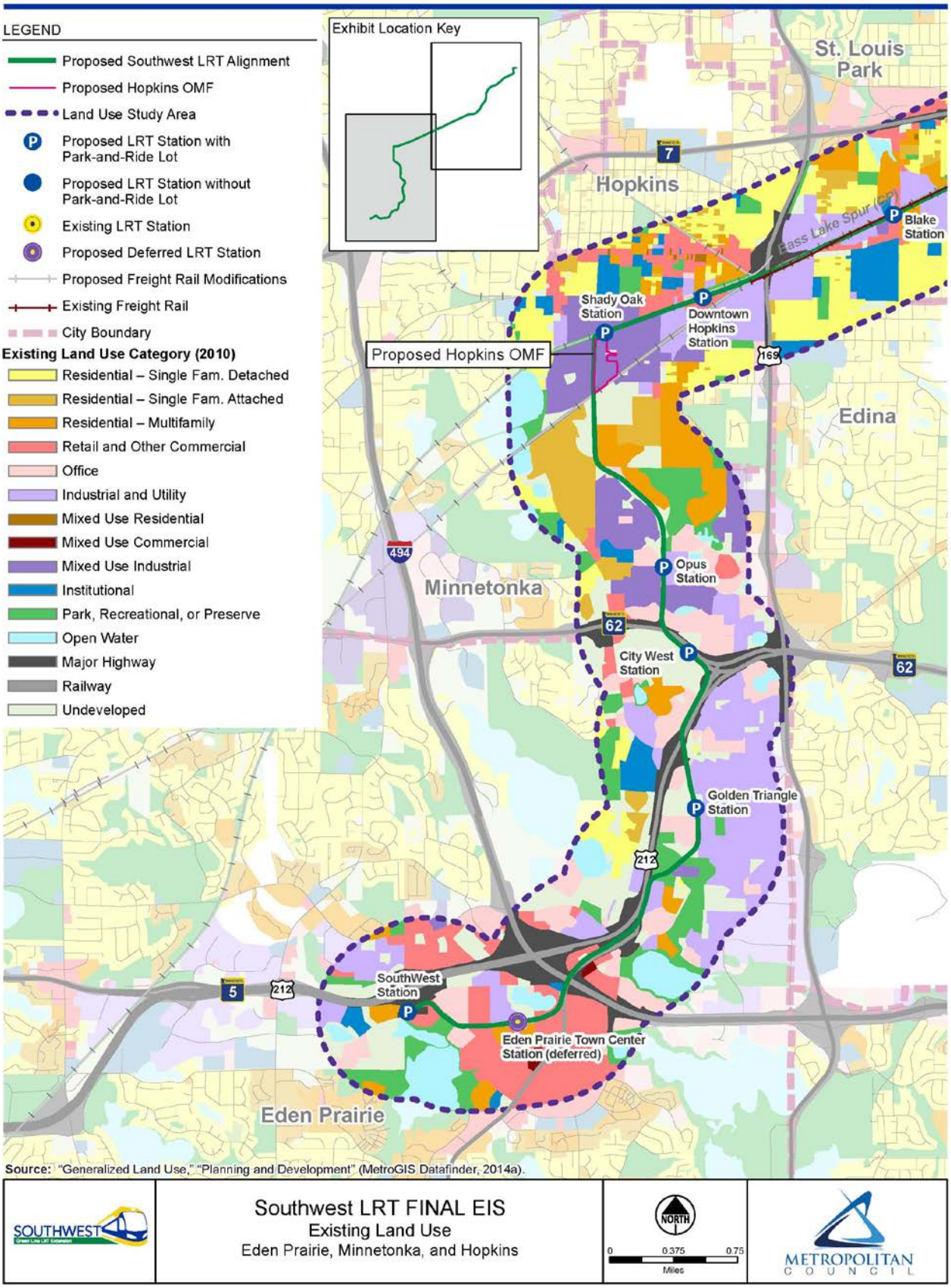


EXHIBIT 3.1-2
Existing Land Use – St. Louis Park and Minneapolis

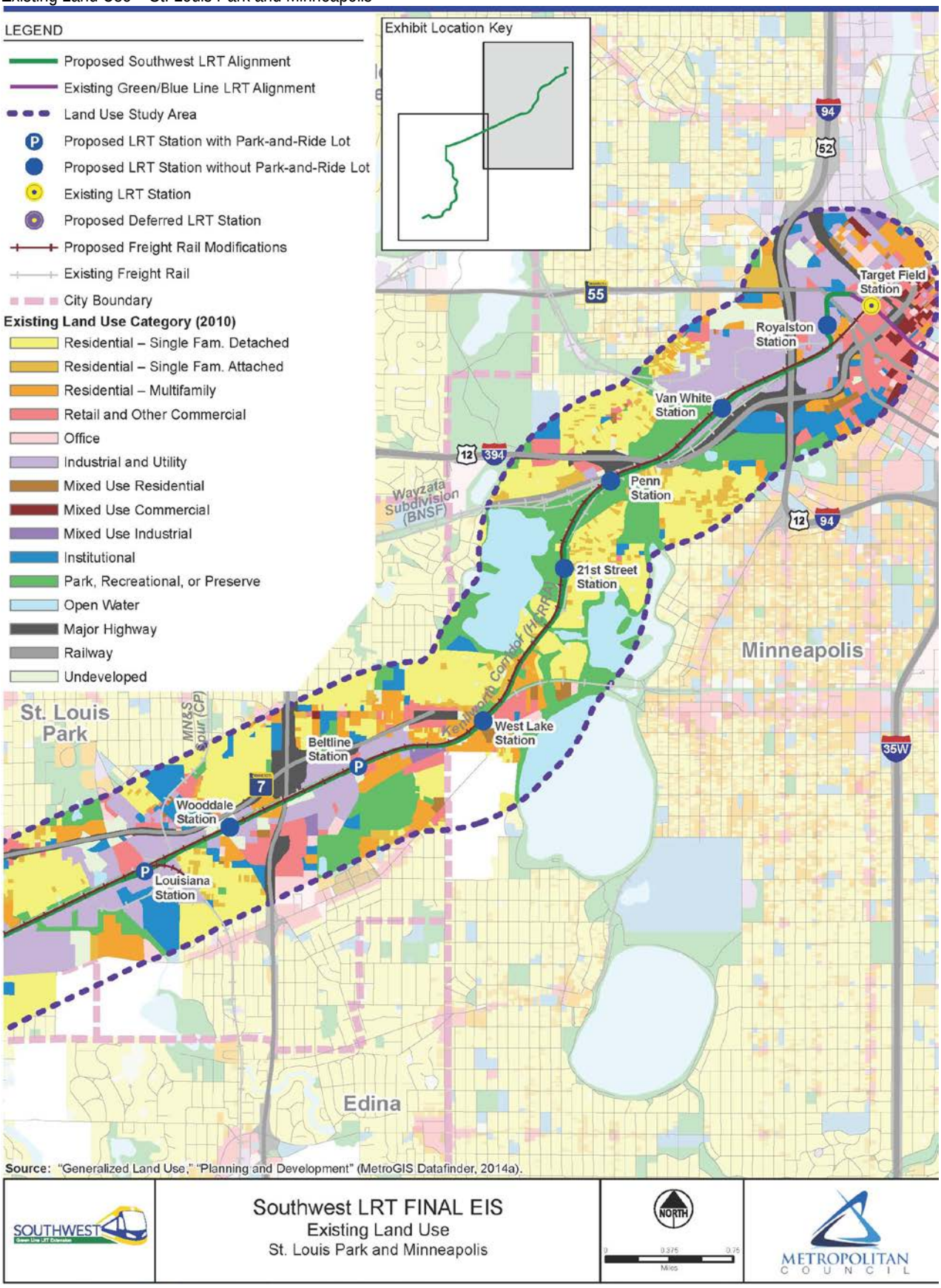


EXHIBIT 3.1-3
Planned Land Use – Eden Prairie, Minnetonka, and Hopkins

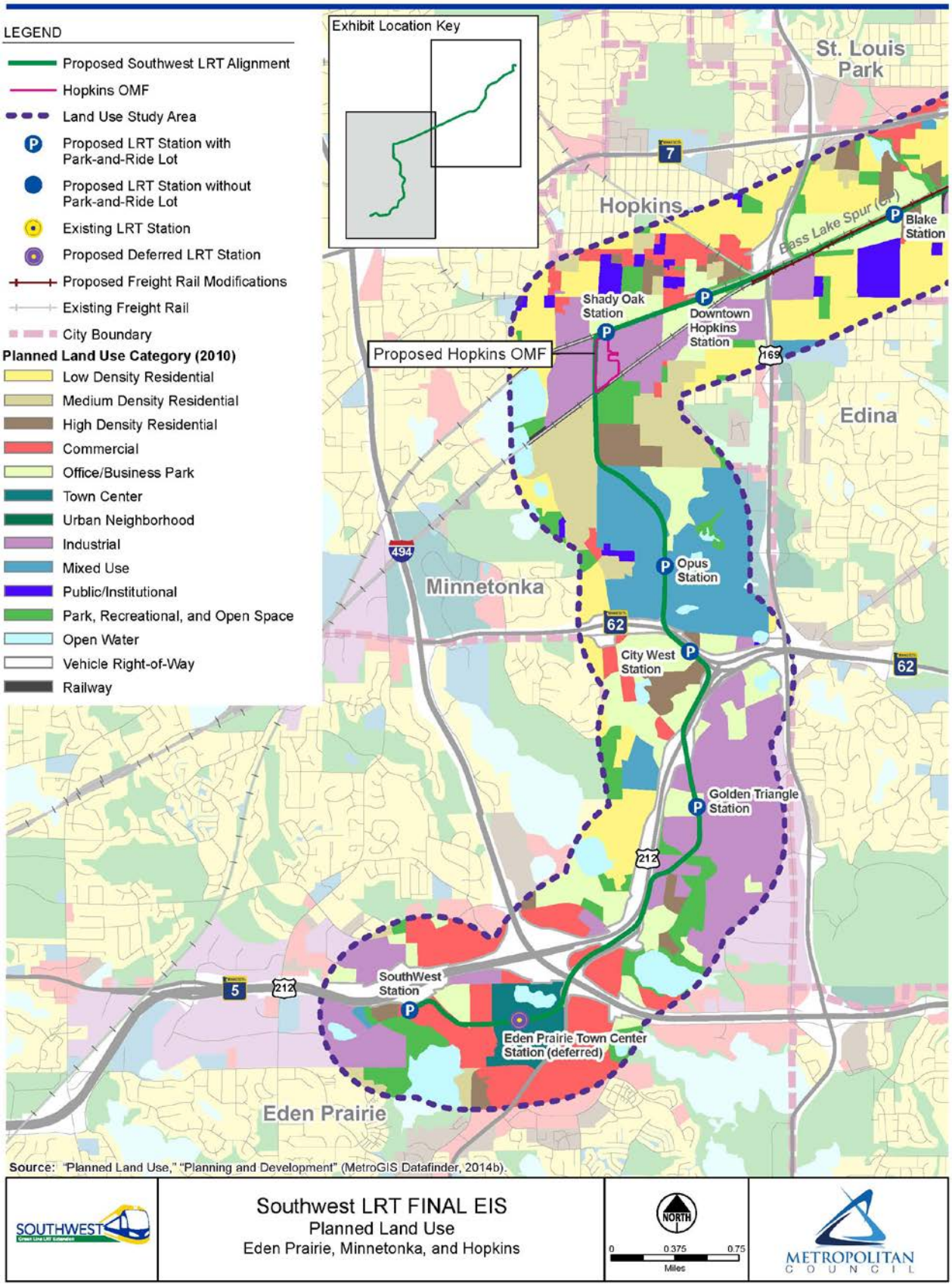
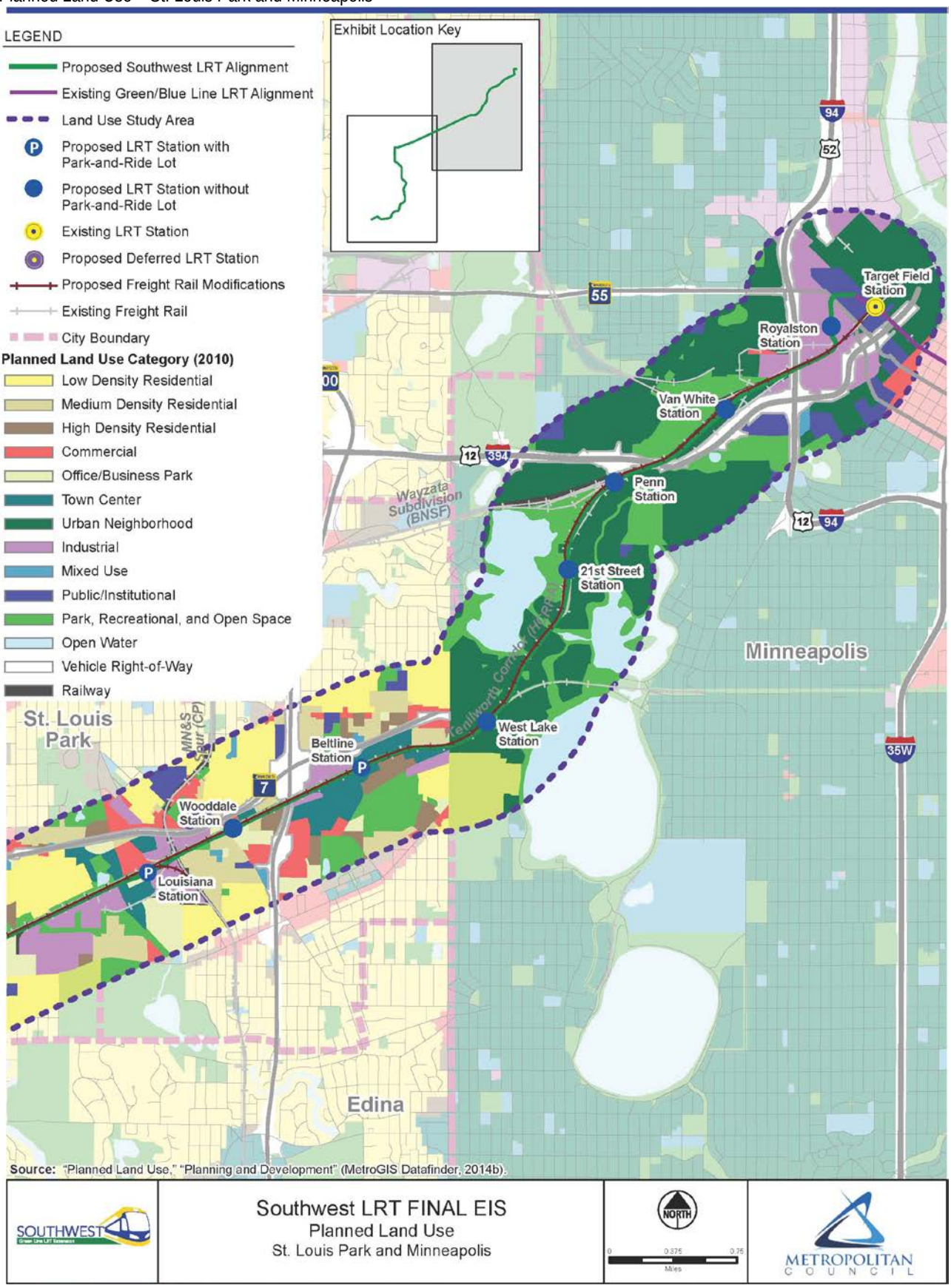


EXHIBIT 3.1-4
Planned Land Use – St. Louis Park and Minneapolis



Existing land uses around the 16 proposed light rail stations include areas with a mix of commercial, office, multifamily residential, institutional and light industrial (SouthWest, Town Center, Downtown Hopkins, Wooddale, and West Lake Stations), areas that are major employment centers (Golden Triangle, City West, and Opus Stations), areas that are primarily industrial with some nearby residential (Shady Oak, Louisiana, Beltline, and Royalston Stations), and areas that are primarily residential and open space (21st Street and Penn Stations). These land uses are consistent with existing zoning and compatible with the proposed Project. Existing land uses throughout the land use study area will benefit from the improved transit access provided by the proposed Project.

All of the local communities in the land use study area have adopted comprehensive plans and have participated in land use planning for station areas. Planned uses for all station areas, except the 21st Street Station, which is fully built existing residential, include areas for intensified mixed-use development that are supportive of and compatible with the proposed Project. These planned uses are consistent with comprehensive plans or station area plans and support opportunities for redevelopment and transit-oriented development in the land use study area. Station area plans emphasize a pedestrian-friendly, mixed-use environment with a multimodal transit network. Planned land uses throughout the land use study area would benefit from the improved access provided by the proposed Project.

The *Southwest Corridor Investment Framework* (Hennepin County, 2013) provides a description of the existing and planned land uses in the vicinity of the proposed light rail stations (see Appendix D for instructions on how to review a copy of that report).

3.1.2.2 Adopted Plans and Policies

This section provides a summary of relevant planning documents from state, regional, and local agencies with jurisdiction over the land use study area. Included are adopted comprehensive land use plans, transportation system plans, small area plans, and specific planning studies from the Minnesota Department of Transportation (MnDOT), the Metropolitan Council, Hennepin County, and the five cities through which the Project will pass. Table 3.1-3 summarizes the contents of these adopted plans and studies. Section 3.1.2.3, "Compatibility with Adopted Plans and Policies," evaluates the degree to which the No Build Alternative and Project are compatible with or supportive of these plans and studies. Assessing the compatibility of the alternatives with state, regional, and local land use plans is important because one of the purposes of the Project is to support those plans and the growth and development goals and objectives that are encompassed in those plans.

TABLE 3.1-3
Adopted Plans and Policies

Plans and Policies	Date Adopted	Summary
Metropolitan Council		
Thrive MSP 2040	2015	Specifies policies in this long-range plan and vision that drive other plans, including the *Transportation Policy Plan*, the *Regional Parks Policy Plan*, and the *Housing Policy Plan*. Includes official population and employment projections for the region.
2040 Transportation Policy Plan	2015	Identifies a long term vision for the region, which includes supporting growth through a connected and sustainable transportation system. Specifies goals for regional transportation systems; outlines policies and priority investments to achieve these goals. Includes a Transit Investment Direction Plan, which identifies the Southwest LRT project (METRO Green Line Extension) as a programmed improvement under the "Current Revenue Scenario."
2040 Regional Parks Policy Plan	2015	Identifies goals and outcomes for the regional park system in support of the Thrive MSP 2040 plan, and the strategies designed to meet those goals. Includes a systems plan which lists planned park improvements and planned expansions of the regional trail network.
Minnesota Department of Transportation		
Statewide Multimodal Transportation Plan	September 2012	Describes the transportation policy framework for all transportation modes in Minnesota over the next 20 years and how land use and transportation systems should be better integrated.

Plans and Policies	Date Adopted	Summary
Minnesota GO State Rail Plan 2015	2015	Provides plans and strategies to improve the condition and capacity of Minnesota's primary railroad arterials, intermodal service access, and passenger rail service. Includes a general description of Bass Lake Spur improvements planned as part of the Project. Discusses continued freight rail operations for TC&W in the Kenilworth Corridor, as part of the LPA for the Project as approved through the municipal consent process.
Hennepin County		
2030 Hennepin County Transportation Systems Plan	October 2011	Provides policy guidance on future county transportation investments and strategies to support different transportation projects, including light rail.
2030 Hennepin County Comprehensive Plan	June 2011	Provides planning elements (wastewater and sewage systems, regional park systems, surface water management, and transportation) with specific goals to support light rail by moving environmental processes forward on major transit corridors.
City of Eden Prairie		
City of Eden Prairie Comprehensive Guide Plan	2009	Supports LRT in the transit corridor by planning for transit supportive uses and densities within one-half mile of the stations proposed in the Town Center and the Golden Triangle Area.
Town Center Plan	2009	Supports, enables, and encourages the planning principles for the Town Center outlined in the Major Center Area Study, especially those that promote TOD and integrate LRT stops with existing infrastructure and existing and future development.
City of Minnetonka		
City of Minnetonka Comprehensive Guide Plan	2008	Finds that a fixed route transit system that penetrates the Golden Triangle would serve as a catalyst for redevelopment and that a balanced TOD land use pattern would extend the life of capital investments in infrastructure and potentially create a catalyst for future redevelopment.
City of Hopkins		
Hopkins Comprehensive Plan	2009	Provides a vision for the city's future that includes enhancing downtown Hopkins, redeveloping transportation corridors, protecting open spaces, and making informed decisions regarding transportation infrastructure. Includes a land use plan for the City.
Blake Road Corridor Small Area Plan	2009	Serves as a policy document for the Blake Road Corridor within which an LRT station for the Southwest Transitway is proposed.
Hopkins Station Area Plan	2007	Develops Station Area Plans for the Shady Oak, Hopkins, and Blake LRT Stations, and provides the first elements of a "road map" to guide future integrated transportation and land use planning initiatives within the City of Hopkins.
City of St. Louis Park		
City of St. Louis Park Comprehensive Plan	2009	Focuses on land use planning efforts around the three stations proposed in St. Louis Park. References a study of the MN&S alignment and impacts to traffic circulation and neighborhoods. Includes goals to minimize impacts of railroad operations in St. Louis Park and address the potential rerouting of freight rail in St. Louis Park.
Connect the Park! Plan		Provides 10-year plan to add additional sidewalks, trails, bike lanes, and bikeways throughout the community to provide local and regional connectivity, improve safety and accessibility, and enhance overall community livability. Identifies objective to develop an interconnected network of pedestrian and bicycle routes linked to transit systems.
City of Minneapolis		
Loring Park Neighborhood Master Plan	2013	Includes brief recommendations for bicycle and pedestrian connections to the Southwest LRT stations.
Minneapolis Climate Action Plan	2013	Supports the build-out of transit lines, including the Southwest LRT Project, as a strategy to reduce greenhouse gas emissions.

Plans and Policies	Date Adopted	Summary
Access Minneapolis	2011	Comprises six main components that include the Downtown Action Plan, the Citywide Action Plan, Design Guidelines for Streets and Sidewalks, Street Car Planning, the Pedestrian Master Plan, and the Bicycle Master Plan. Identifies specific actions that the City and its partner agencies (Metro Transit, Metropolitan Council, Hennepin County, MnDOT) need to take within the next 10 years to implement the transportation policies.
North Loop Small Area Plan: Update to the Downtown East/North Loop Master Plan	2010	Updates the *Downtown East/North Loop Master Plan* (City of Minneapolis Planning Department, 2003), which develops a vision and a framework for how new growth should occur in the underdeveloped districts of Downtown Minneapolis, particularly in areas surrounding proposed rail transit stations. This includes land use plans and design considerations for the proposed Royalston Station area.
Minneapolis Plan for Sustainable Growth (update of Minneapolis Comprehensive Plan)	2009	Updates *The Minneapolis Plan of 2000* (City of Minneapolis Community Planning and Economic Development Department, Planning Division, 2000) as the new comprehensive plan for the city. Includes an outline for the creation of Transit Station Areas (TSAs), which is a land use policy feature intended to promote growth specifically around transit stations along fixed-route transitways, such as Southwest LRT.
Lyn-Lake Small Area Plan	2009	Contains recommendations designed to strengthen the business core, and provides design considerations in the case that rail service is implemented within the Midtown Greenway.
Uptown Small Area Plan	2008	Promotes higher residential and employment densities, urban design specifications, and enhanced connections among the Midtown Corridor, the surrounding lakes area, and the urban core. Includes East Isles, Lowry Hill East, East Calhoun, and Calhoun Area Residents Action Group (CARAG).
Minneapolis Parks and Recreation Board Comprehensive Plan	2007	Provides a general vision and strategies for implementation for parks within the City of Minneapolis. Identifies continued park/open space use for the land adjacent to the Kenilworth Corridor near Cedar Lake. Includes criteria for parcels that are considered for "disposition" (disposal), such as space around Cedar Lake. Park/open space use must meet certain criteria, such as not diminishing a parcel's recreation function.
Bassett Creek Valley Master Plan	2007	Envisions a system of existing and proposed parks and open space integrated with a revitalized mixed-use urban village immediately west of downtown Minneapolis through which the Project alignment runs. Includes future land use plans within the vicinity of the proposed Royalston Station.
Midtown Greenway Land Use and Development Plan	2007	Provides policy guidance and recommendations for future land use development along the Midtown Corridor (referred to as the Midtown Greenway), evaluates the long-term viability of adjacent land uses, and provides guidance for planned land uses.
Bryn Mawr Neighborhood Land Use Plan	2005	Includes a land use plan for the area around the proposed Penn Ave Station. Identifies the potential for additional neighborhood residential and commercial development.
Midtown Minneapolis Land Use and Development Plan	2005	Sets out guidelines for future development and infrastructure improvements along Lake St in Minneapolis.

Source: Metropolitan Council, 2015. Refer to Appendix D for instructions on how to access the plans and policies referenced in this table.

3.1.2.3 Compatibility with Adopted Plans and Policies

As described in Section 3.1.2.2, "Adopted Plans and Polices," a range of relevant state, regional, and local planning documents were reviewed to establish the planning context for the land use study area. The Project was then evaluated to determine the degree to which it would be compatible with or supportive of the planning documents identified, based on a qualitative assessment. Table 3.1-4 summarizes the results of this analysis:

Items marked as **Compatible/Project Referenced** signify that the Southwest LRT Project would be compatible with the identified plan or study because the plan has goals or policies that support transit, multimodal transportation, and/or transit-oriented development and because the Project is specifically mentioned in the plan document. For example, the plan might support the Southwest LRT Project in general, include support for the Project, or provide land use plans and policies specific to proposed Southwest LRT station areas.

- Items marked as **Compatible** indicate plans that have been determined to be compatible with the Project, but the plans do not specifically cite the Southwest LRT Project. In these plans or studies, the Project was determined to be compatible because of support for transit and/or transit-oriented development. For example, a plan might be generally supportive of LRT or TOD, but might not specifically reference the proposed Southwest LRT Project.
- Items marked as **Incompatible** indicate that the Project is incompatible with the plan or study because the plan has specific elements that are unique to either the No Build Alternative or the Project or the plan is not supportive of transit, multimodal transportation, or transit-oriented development. For example, a plan might expressly call for a specific station or alignment that is not a part of the No Build Alternative or the Project under consideration. In that case, that alternative would not be compatible with that particular plan. An item that is marked as Compatible/Project Referenced would be Incompatible for the No Build Alternative.

TABLE 3.1-4
No Build Alternative and the Project Compatibility with Adopted Plans and Policies

Jurisdiction/ Adopted Plans and Policies	Compatibility with Plans/Policies		Compatibility Assessment Rationale (No Build Alternative and the Project)
	No Build Alternative	Project	
Metropolitan Council			
Thrive MSP 2040	Incompatible	Compatible/ Referenced	Includes Southwest LRT as a transitway recommendation
2040 Transportation Policy Plan	Incompatible	Compatible/ Referenced	Includes Southwest LRT (METRO Green Line Extension) in its "Current Revenue" funding scenario
2040 Regional Parks Policy Plan	Compatible	Compatible	Does not specifically mention Southwest LRT or either alignment but is supportive of multimodal access
Minnesota Department of Transportation			
Statewide Multimodal Transportation Plan	Compatible	Compatible	Does not specifically mention Southwest LRT or either alignment, but is supportive of transit and multimodal transportation
Minnesota GO State Rail Plan, 2015	Incompatible	Compatible/ Referenced	Includes improvements to the Bass Lake Spur and Kenilworth Corridor as Part of the METRO Green Line Extension. Acknowledges the approval of the shallow tunnel in the Kenilworth Corridor as part of the municipal consent process for the Project.
Hennepin County			
2030 Hennepin County Transportation Systems Plan	Incompatible	Compatible/ Referenced	Includes Southwest LRT as a transitway recommendation
2030 Hennepin County Comprehensive Plan	Incompatible	Compatible/ Referenced	Includes Southwest LRT as a transitway recommendation
City of Eden Prairie			
City of Eden Prairie Comprehensive Guide Plan	Incompatible	Compatible/ Referenced	Includes land use and infrastructure plans for the proposed Eden Prairie Town Center and Golden Triangle Stations
Town Center Plan	Incompatible	Compatible/ Referenced	Includes land use and infrastructure plans for the proposed Eden Prairie Town Center Station
City of Minnetonka			
City of Minnetonka Comprehensive Plan	Incompatible	Compatible/ Referenced	Expresses support for the proposed Golden Triangle Station
City of Hopkins			
City of Hopkins Comprehensive Plan	Incompatible	Compatible/ Referenced	Includes land use plan for the proposed Shady Oak, Downtown Hopkins, and Blake stations
Blake Road Corridor Small Area Plan	Incompatible	Compatible/ Referenced	Includes land use plan for the proposed Shady Oak, Downtown Hopkins, and Blake stations

Jurisdiction/ Adopted Plans and Policies	Compatibility with Plans/Policies		Compatibility Assessment Rationale (No Build Alternative and the Project)
	No Build Alternative	Project	
Hopkins Station Area Plan	Incompatible	Compatible/ Referenced	Includes land use plan for the proposed Shady Oak, Downtown Hopkins, and Blake stations
City of St. Louis Park			
City of St. Louis Park Comprehensive Plan	Compatible	Compatible	Is supportive of transit but specifically addresses concerns about the relocation of freight rail; those concerns have been addressed through the proposed Project; includes land use plans compatible with proposed Project
Elmwood Area Land Use, Transit and Transportation Study	Incompatible	Compatible/ Referenced	Includes future land use and infrastructure plans for the proposed Beltline and Louisiana stations
Connect the Park! Plan	Incompatible	Compatible/ Referenced	Includes future trails and sidewalks connecting to proposed Southwest LRT stations
City of Minneapolis			
Loring Park Neighborhood Master Plan	Compatible	Compatible	Does not specifically mention Southwest LRT or specify an alignment for the transitway; however, plan is supportive of transit and transit-oriented development
Minneapolis Climate Action Plan	Compatible	Compatible	Does not specifically mention Southwest LRT or specify an alignment for the transitway; however, multimodal transportation is compatible with goals of the climate action plan
Access Minneapolis	Compatible	Compatible	Does not specifically mention Southwest LRT or specify an alignment for the transitway; however, transit improvements and multimodal transportation are key elements of the goals of the plan
North Loop Small Area Plan: Update to the Downtown East/North Loop Master Plan	Incompatible	Compatible/ Referenced	Includes recommendations relative to the proposed Royalston Station
Minneapolis Plan for Sustainable Growth (update of Minneapolis Comprehensive Plan)	Compatible	Compatible	Does not specifically mention Southwest LRT or specify an alignment for the transitway; however, the goals of the plan are supportive of transit, multimodal transportation, and transit-oriented development
Lyn-Lake Small Area Plan	Compatible	Compatible	Does not specifically mention Southwest LRT or specify an alignment for the transitway; however, the goals of the plan are supportive of transit, multimodal transportation and transit oriented development
Uptown Small Area Plan	Compatible	Compatible	Does not specifically mention Southwest LRT or specify an alignment for the transitway; however, the goals of the plan are supportive of transit, multimodal transportation, and transit-oriented development
Minneapolis Parks and Recreation Board Comprehensive Plan	Compatible	Compatible	Does not specifically mention Southwest LRT or specify an alignment for the transitway; however, the plan is supportive of multimodal access
Bassett Creek Valley Master Plan	Incompatible	Compatible/ Referenced	Includes land use and infrastructure plans for the proposed Royalston Station
Midtown Greenway Land Use and Development Plan	Compatible	Compatible	Does not specifically mention Southwest LRT or specify an alignment for the transitway; however, the goals of the plan are supportive of transit, multimodal transportation, and transit-oriented development
Bryn Mawr Neighborhood Land Use Plan	Incompatible	Compatible/ Referenced	Includes land use and infrastructure plans for the proposed Penn Station
Midtown Minneapolis Land Use and Development Plan	Compatible	Compatible	Does not specifically mention Southwest LRT or specify an alignment for the transitway; however, the goals of the plan are supportive of transit, multimodal transportation, and transit-oriented development

Source: Metropolitan Council, 2015. Refer to Appendix D for instructions on how to access each of the plans and policies included in the table.

The Project is compatible with adopted plans and policies. This finding reflects the advanced planning completed over the past several years at the regional and local levels in anticipation of the proposed Southwest LRT Project. As noted in Table 3.1-4, many of the applicable adopted land use plans and policies have been developed or amended to specifically include or reflect the Southwest LRT Project rather than the No Build Alternative. Others have goals and policies that are supportive of transit improvements, multimodal transportation, and/or transit-oriented development. At the regional level, Metropolitan Council and Hennepin County plans support the proposed Southwest LRT Project. At the local level, all of the affected municipalities have plans and policies that support transit improvements and many have plans that specifically support the proposed Project, including several station area plans that identify future transit-supportive land uses surrounding station areas. In summary, the Project is compatible with all identified plans and policies.

3.1.3 Environmental Consequences

This section identifies the long-term and short-term direct and indirect impacts on land use from the Project. As part of this evaluation, this section includes an evaluation of compatibility with adopted local and regional planning documents.

3.1.3.1 Long-term Direct Impacts on Land Use

Under the Project, long-term direct changes in land use will occur in locations where acquired property will be converted to a public transportation-related use. As described in Section 2.1.1.1, under the Project the new transportation use will include the following: the light rail alignment (e.g., tracks, ballast, overhead contact system wires, and poles); light rail stations and park-and-ride lots; light rail traction power substations and signal bungalows; associated roadway, pedestrian, and bicycle improvements; and associated freight rail infrastructure modifications.

Direct changes in land use under the Project will primarily be limited to station areas and to access, circulation improvements to those stations, and to sections of the proposed light rail alignment where there is currently no publicly owned right-of-way. The Project's effect on land use will be somewhat limited because the proposed light rail alignment will primarily be located within existing public rights-of-way, such as the currently owned property by the Hennepin County Regional Railroad Authority [HCRRA] and reserved for light rail and other transportation use. Table 3.1-5 summarizes the anticipated direct land use changes that will result from the Project, by land use type. Approximately 143 acres of land will be acquired for the Project and converted to public transportation purposes. The affected land will include the acquisition of privately owned industrial, commercial, and residential land, as well as publicly and privately owned parks and open space, publicly owned rights-of-way (i.e., HCRRA), and privately owned railroad rights-of-way (i.e., CP and BNSF).

Of the land to be acquired, approximately 86 acres are currently part of an existing railroad corridor (i.e., Bass Lake Spur, Kenilworth Corridor, and Wayzata Subdivision). Refer to Section 4.4.3.1 for more information on the characteristics of these corridors. Approximately 32 acres are privately owned property within the Bass Lake Spur and Wayzata Subdivisions and approximately 54 acres are public property, currently owned by HCRRA within the Bass Lake Spur and Kenilworth Corridor. Final ownership of these rights-of-way will be determined as Engineering progresses, but it is likely that portions of the railroad corridors will be transferred to public ownership, with continued operating rights for TC&W, which currently operates in these corridors.

While the acquisition of property for the Project would change the land use of specific parcels, the acquisitions are not likely to change the overall character of land within the land use study area. For the purposes of this section, a change in the use of a single parcel of land is not the same as a change in the land use of the surrounding neighborhood. That is, a commercial district that loses one or more commercial buildings is still a commercial district; similarly, a residential neighborhood that gains higher-density residential uses, or compatible mixed-use or commercial development, would still be a residential neighborhood. While the Project will result in changes to the existing use of particular parcels of land, those modifications will not change the overall land use characteristics of the land use study area. Generally, the acquisitions represent a small fraction (approximately 2 percent) of the total land in the land use study area,

and no major changes to area land use patterns are expected as a result of the acquisitions. In addition, some of the properties the Project will partially acquire will leave sufficient land for redevelopment, which would reduce long-term impacts to land use, compared to full acquisition of the properties.

TABLE 3.1-5
Direct Changes in Land Use for the Project[a]

General Land Use Category	Area Converted to Public Transportation Use (acres)[a]	Percent of Total Project Land Converted
Parks and Open Space[b]	7.2	5%
Industrial	60.7	42%
Commercial/Mixed Use[c]	31.4	22%
Residential	6.0	4%
Public/Institutional	5.7	4%
Private railroad right-of-way[d]	31.9	22%
TOTAL	**142.9**	**100%**

[a] The nature of the land purchase and agreements between HCRRA, the Council and CP has not been determined. Final ownership of these rights-of-way will be determined as Engineering progresses, but it is likely that railroad corridors (i.e., Bass Lake Spur and Kenilworth Corridor,) will be transferred to public ownership, with continued operating rights for TC&W), which currently operates in these corridors.

[b] Includes all parks and open space, including 4(f) properties. See Section 3.6 for more information on parks, recreation areas, and open space, including a Section 4(f) evaluation.

[c] As described in Section 2.1.1, the Eden Prairie Town Center Station and associated roadway improvements are deferred and are not expected to be in place when the Project opens in 2020. The station and associated roadway improvements are planned to be in place by 2040. If the station and associated improvements are not in place by 2040, there would be a reduction in the amount of land acquired by the Project in the vicinity of the station by 2040, and thus the amount of commercial land converted to public transportation use would be 30.2 acres rather than 31.4 acres.

[d] Approximately 54 acres of publicly owned (i.e., HCCRA) railroad right-of-way within the Kenilworth Corridor and Bass Lake Spur will be used for public transportation purposes under the Project. Because this right-of-way is publicly owned and reserved for light rail use, it is not considered a direct change in land use and is not included in the table above.

Note: Area converted to public use is based on estimated property acquisitions.

Sources: MnDOT (2015) and Hennepin County Property Tax Information Search (December 2014).

3.1.3.2 Long-term Indirect Impacts on Land Use

While development and redevelopment in the land use study area is regulated by the affected local jurisdictions and is driven by regional and local economic conditions, light rail lines can advance the timing and increase the intensity of development, within the limits allowed by local comprehensive plans, particularly in areas surrounding proposed station. To fully leverage this development potential and to support local land use goals, Hennepin County, in partnership with the Cities of Eden Prairie, Minnetonka, Hopkins, St. Louis Park, Edina and Minneapolis, undertook a station area planning effort. The resulting *Southwest Corridor Investment Framework* (Hennepin County, 2013)[8] identifies short- and long- term infrastructure needs and land use plans for the Project station areas.

These station area plans are intended to help coordinate the Project design with the plans and decisions of local jurisdictions and adjacent property owners. These plans are part of an ongoing process that will continue through the Engineering phase and into construction and operation. The station area planning process has featured public workshops and meetings designed to help identify local area goals and the potential for redevelopment near proposed stations. As the Project continues toward construction, similar outreach and community involvement effort is anticipated. The Council recognizes that local governments control the decisions about land use, including zoning and specific development approvals.

Because the proposed Hopkins OMF would be used to perform light maintenance on light rail vehicles and is not a light rail station, the OMF is not anticipated to attract transit-oriented development nor would it influence growth patterns and neighborhood characteristics on adjacent land. However, portions of the proposed OMF site are within the area of potential land use influence of the proposed Shady Oak Station. As

[8] http://www.swlrtcommunityworks.org/beyond-rails/planning-information/investment-framework

such, the Hopkins OMF would proportionately reduce the overall size of the area that could be influenced by the proposed station for more intense development and redevelopment. Because the proposed Hopkins OMF and the uses that would occur within it are compatible with existing adjacent land uses, it would not limit future development of adjacent parcels, which would remain as industrial uses.

The potential for increased development or redevelopment around proposed light rail stations is based on the *Southwest Corridor Investment Framework* (Hennepin County, 2013). Because future potential developments would require the actions of others and are influenced by market forces, they are considered potential indirect impacts to land use and not necessarily probable. See Exhibits 3.1-1 and 3.1-2 for an illustration of the proposed light rail station locations. Additional development or redevelopment is anticipated in all Project light rail station areas, except the 21st Street Station, which is currently fully developed with existing residential uses. All other proposed light rail stations are expected to experience additional mixed-use development that would be supportive of and compatible with light rail. The *Southwest Corridor Investment Framework* anticipates future changes in land use policies and zoning that would support opportunities for redevelopment and transit-oriented development, emphasizing a pedestrian-friendly, mixed-use environment with a multimodal transit network. Proposed developments, while subject to market forces, are already planned to be constructed close to proposed light rail stations. Joint development scenarios are discussed further in Chapter 10.

The anticipated development and density surrounding the Project station areas would promote employment by creating new permanent jobs and supporting access to employment opportunities. Commercial, office, and industrial uses throughout the land use study area would benefit from this improved transit access, as employers in the land use study area would be able to draw from a larger pool of potential employees. Businesses also may be influenced by transit service when selecting new sites, resulting in increased intensity of these land uses.

The expected increase in development density around light rail stations resulting from the construction of the Project is consistent with regional and local plans. These plans acknowledge the value of transit in supporting efficient land use development and the value of transit-oriented development around light rail stations.

3.1.3.3 Short-term Impacts on Land Use

Short-term land use impacts resulting from the Project could include temporary changes to property access during construction or temporary conversion of land to a transportation use for construction staging and other construction activities throughout all or part of the construction period. Refer to Sections 3.4, 3.7, 3.12, and 4.2 for a discussion on short-term impacts related to acquisitions and displacements, visual quality, noise, and roadways and traffic, respectively.

Temporary occupancies of parcels will include the use of construction easements or intergovernmental agreements and will not change existing land uses in the long term. Based on the Project's preliminary engineering plans (see Appendix E), temporary easements will be acquired on approximately 134 acres effecting approximately 178 parcels of land including those with industrial, commercial, railroad, residential, and public land uses. These construction easements will be temporary and the expiration of the easements will be specified within the executed easements. Prior to the expiration of the easement, the areas within the easements will be returned to preconstruction conditions or with changes, as specified in the executed easements.

3.1.4 Mitigation Measures

This section describes the measures the Council will implement to mitigate the Project's long-term and short-term land use impacts. For each mitigation measure or set of associated mitigation measures, this section generally notes the anticipated impact or associated impacts that the mitigation measures will address (see Sections 3.1.3.1, 3.1.3.2, and 3.1.3.3 for additional information on the identified land use impacts and avoidance measures).

3.1.4.1 Long-term Mitigation Measures

Mitigation is not warranted for long-term land use impacts because there will be no long-term adverse impacts. The potential land use changes resulting from implementation of the Project, including intensification of land uses near proposed light rail stations, will be consistent with existing plans and policies. While the Project will result in changes to the existing use of particular parcels of land, those modifications will not change the overall land use characteristics of the land use study area and will not result in any adverse impacts to land use.

3.1.4.2 Short-term Mitigation Measures

Impact. Short-term land use impacts resulting from the Project could include temporary changes to property access during construction or temporary conversion of land to a transportation use for construction staging and other construction activities (i.e., noise and dust impacts) throughout all or part of the construction period.

Mitigation. Specific mitigation measures for short-term impacts to land use related to temporary construction easements and other construction activities will be identified in the Construction Mitigation Plan and Construction Communication Plan which will be implemented by the Council prior to and during construction. The purpose of the Construction Communication Plan is to prepare project-area residents, businesses, and commuters for construction; listen to their concerns; and develop plans to minimize harmful or disruptive effects. Specific mitigation measures included in the Construction Communication Plan will be site specific and may include:

- Issue construction updates and post them on the Project website
- Provide advance notice of roadway closures, driveway closures, and utility shutoffs
- Conduct public meetings
- Establish a 24-hour construction hotline
- Prepare materials with applicable construction information
- Address property access issues
- Assign staff to serve as liaisons between the public and contractors during construction

In addition, the Council will develop and implement a construction staging plan (staging plan), which will be reviewed with the appropriate jurisdictions and railroads, and the contractor will be required to secure the necessary permits and follow the staging plan, unless otherwise approved. Components of a staging plan include traffic management plans and a detailed construction timeline.

3.2 Economic Activity

This section describes the potential long-term direct and indirect and short-term (construction) direct and indirect effects of the Project on economic activity (see Section 3.17 for cumulative impacts). This section includes an overview of the regulatory context and methodology used for the analysis; an assessment of the existing environment; a description of the anticipated impacts related to economic activity; and a description of mitigation measures to implement with the Project.

3.2.1 Regulatory Context and Methodology

Two geographical study areas were used for the economic activity analysis:

1) The ***economic activity study area*** generally extends one-half-mile on either side of the centerline of the proposed light rail alignment and includes a one-half-mile radius around the center point of the proposed Hopkins OMF and light-rail stations. The *economic activity study area* is used for the description of the affected environment.

2) The ***economic trends study areas*** include the Twin Cities Metropolitan Area[9] and the Minneapolis-St. Paul-Bloomington, MN-WI Metropolitan Statistical Area (MSA).[10] The Twin Cities Metropolitan Area is used for the analysis of employment and population trends while the MSA is used for the analysis of long-term (operation) and short-term (construction) effects of the Project on the local economy in the form of employment, earnings and economic output.

Long-term environmental consequences were analyzed in the context of operational changes to the transit system and freight rail operations, as well as changes to property ownership under the Project. Short-term impacts were analyzed in the context of temporary activities related to the construction of the Project. Impacts evaluated include the following:

- **Employment Effects (i.e., employment, earnings, and economic output) of Operating and Capital and Expenditures.** Regional Input-Output Modeling System (RIMS) multipliers[11] developed by the Bureau of Economic Analysis (USBEA) were utilized to estimate the operation and construction-related impacts for the metropolitan region. The metropolitan region is the smallest geographic area for which the multipliers are available. The multipliers were applied to the portion of the operation and construction and maintenance spending that would otherwise not have been present in the local economy to estimate the economic effects of the Project, which is termed *new money*. *New money* refers to either state or federal dollars that would otherwise not be present in the local economy except for the construction of the Project. Other funding sources that would likely enter the local or regional economy through other means are not included in the analysis. For instance, if state funding was not used on this particular project, the dollars would likely enter the local, regional or state economy via another state-sponsored project, providing benefits related with construction expenditures. Thus, money that would otherwise be spent locally should be excluded from the analysis. The RIMS II multipliers are only applied to *new* construction dollars from the Federal Transit Administration (FTA) and designated state funds that are brought to the regional economy by the Project.

  In addition, only project expenditures that are likely to occur within the Minneapolis-St. Paul-Bloomington MSA are included in the regional impact analysis. For this analysis, it is anticipated that construction costs and professional services expenditures would largely occur within the region. It is also expected that expenditures associated with the manufacturing of transit vehicles will occur outside the region and therefore they are excluded. Right-of-way costs were also excluded as they represent the value of the land and not the labor associated with the transaction. Legal services, real estate costs, and relocation services are included in the professional services cost category. Thus, it is anticipated that no local labor will be used to produce the transit vehicles nor involved in the right-of-way costs, the RIMS II multipliers were not applied to capital expenditures related to vehicle and right-of-way spending and no local impact is expected to be realized as a result of these expenditures.

  In addition, the short and long-term impacts of the Project were analyzed using the Council's REMI PI regional economic model.[12] The REMI PI model utilizes computable general equilibrium and new economic geography techniques to project forward time-series of economic and demographic outcomes.

[9] The Twin Cities Metropolitan Area covers Minneapolis and St. Paul and their suburbs. The seven counties included in the Twin Cities Metropolitan Area include Hennepin (the Project lies completely within Hennepin County), Ramsey, Anoka, Washington, Carver, Scott, and Dakota.

[10] Minneapolis-St. Paul-Bloomington, MN-WI Metropolitan Statistical Area includes the following counties in Minnesota and Wisconsin: Anoka, Carver, Chisago, Dakota, Hennepin, Isanti, Le Sueur, Mille Lacs, Ramsey, Scott, Sherburne, Sibley, Washington, Wright, Pierce (WI), and St. Croix (WI). https://www.bea.gov/regional/docs/msalist.cfm#M.

[11] RIMS multipliers provide a way to estimate the total impact that an initial change in economic activity has on an economy. RIMS multipliers are used to study how one industry's production affects the production of other industries in an economy. They are used to estimate how much additional production is created for every initial increase in production and how many additional jobs are created for every new job that is created. See the USBEA web site for additional information (http://www.bea.gov/regional/rims/index.cfm).

[12] Regional Economic Models Inc., Policy Insights (REMI PI) is an economic analysis modeling software package.

The REMI PI projections are informed by data on the region's industry mix, costs and productivity, and analysis of regional competitiveness within the national economy. Employment, migration and population outcomes directly flow from projected economic performance. The REMI PI model was run to supplement the economic impacts analysis. Results of the REMI PI analysis are discussed qualitatively as a relative comparison to the analysis conducted using the RIMS II multipliers, which was the primary economic impacts modeled considered for the Project.

- **Property Tax Revenues.** Anticipated private property acquisitions by the Council (see Section 3.4) were used to estimate the assessed value of property to be acquired for the Project. The most current annual city property tax assessment for a particular parcel was used to estimate the amount of city property tax revenue that the Project may initially eliminate. These effects are termed *direct property tax effects*. Direct property tax effects are a general measure of the fiscal effect to jurisdictions in terms of projected changes to property tax revenue due to the Project. All direct property tax effects for a particular city were then summed and compared to the total property tax revenues for that city (as reported in its most current adopted budget) to gauge the scale of the anticipated impact.
- **Economic Impacts on Freight Rail Owners and Operators.** The potential for long-term economic impacts associated with changes to the freight rail transportation system related to modifications to existing tracks and connections are discussed qualitatively. Also discussed are the short-term activities that will be related to the construction of the proposed light rail line and related facilities. These short-term construction activities have the potential to effect freight rail operations in select locations due to such things as temporary intermittent freight train stoppage periods to provide for light rail-related construction activities.
- **Development Impacts and Impacts to Businesses.** The proposed light rail stations under the Project have the potential to support development or redevelopment that will likely change the existing land use patterns within approximately one-half mile of station areas under current plans and policies. The stations may also have adverse impacts that can include increased congestion and reduced parking supply for business patrons. The discussion of development impacts is qualitative in nature.

3.2.2 Affected Environment

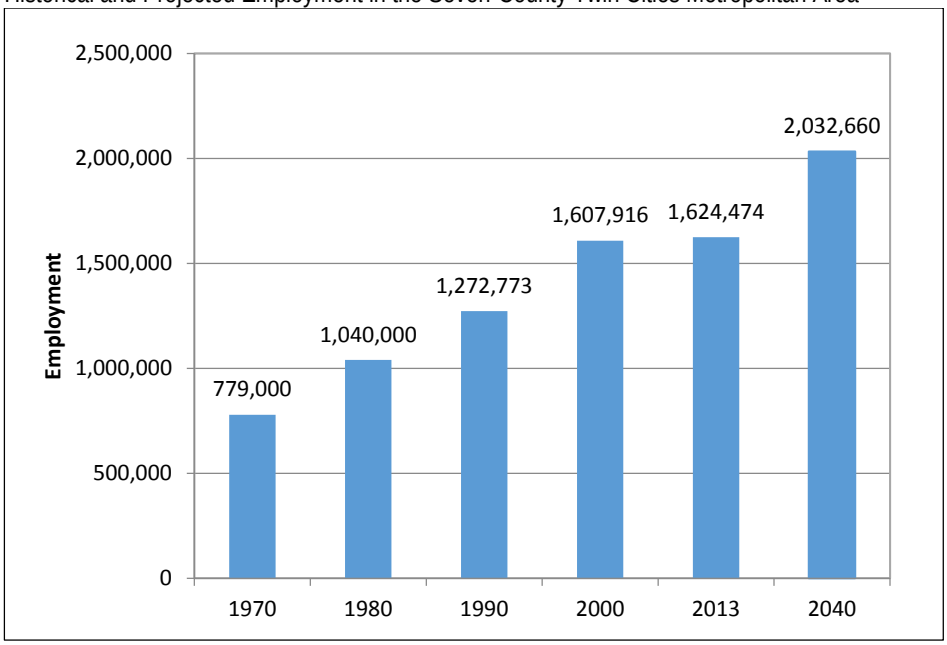
This section describes the existing economic activities and conditions within the study area for the economic activities analysis. This section includes a summary of the general employment trends within the region, an overview of existing property tax revenues for each of the affected cities (i.e., Eden Prairie, Minnetonka, Hopkins, St. Louis Park, and Minneapolis), and a summary of the existing development in the areas surrounding the proposed light rail stations.

3.2.2.1 Employment Trends

This section evaluates employment trends in the seven-county Twin Cities Metropolitan Area. This region is characterized by current and projected job growth in industries that require efficient transportation of goods, services, and employees to and from their places of business. Between 1970 and 2013, total employment in the region increased from approximately 780,000 jobs to over 1.6 million jobs, respectively. Exhibit 3.2-1 presents historical and projected employment in the region, from 1970 to 2040. The Twin Cities Metropolitan Area is the dominant economic center for Minnesota and western Wisconsin and is the home to a number of large corporate employers: Target, Best Buy, 3M, CHS, US Bancorp, Medtronic, and General Mills (Greater MSP, 2015). Major employers located along the proposed alignment include United Health Group, Supervalu, and Cargill. Although the area experienced steady job growth from 1970 to 2000, the national recession slowed job growth between 2000 and 2013. Employment in the seven-county region and the MSA grew at average annual rates of 0.1 percent and 0.3 percent, respectively (Bureau of Labor Statistics, 2015).

As the economy recovers from the recession, future job growth is anticipated in the region. By 2040, businesses in the seven-county area are projected to employ over 2.0 million individuals; an addition of over 400,000 jobs. Communities in the urban center and suburban areas are expected to draw the region's employment growth. The five cities located on the alignment are projected to add over 115,000 jobs.

EXHIBIT 3.2-1
Historical and Projected Employment in the Seven-County Twin Cities Metropolitan Area



Source: Metropolitan Council, 2015a.

Minneapolis is expected to add nearly 69,000 jobs. Eden Prairie and Minnetonka are forecast to add approximately 18,000 and 19,000 jobs, respectively. Hopkins and St. Louis Park are anticipated to employ an additional 11,000 people combined by 2040 (Metropolitan Council, 2015a).

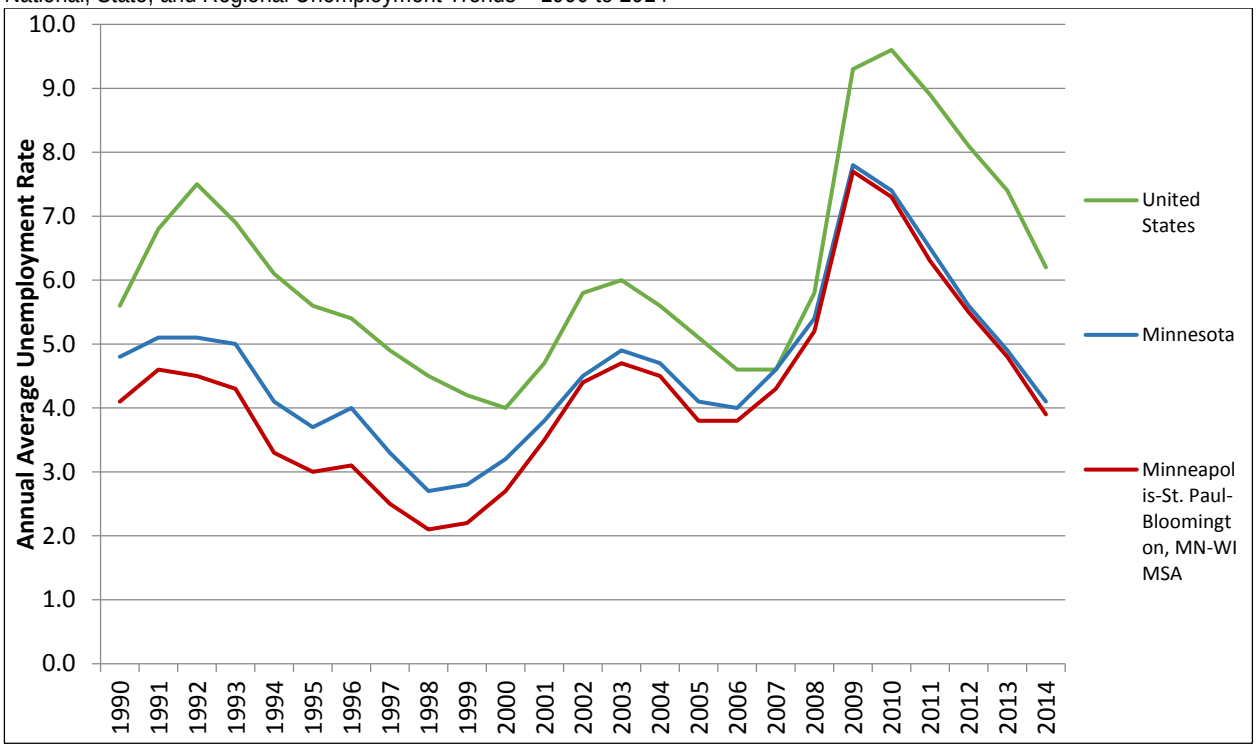
Exhibit 3.2-2 shows annual average unemployment data from the Minnesota Department of Employment and Economic Development for the MSA, the State of Minnesota, and the United States from 1990 through 2014. While the unemployment trends of the MSA and the state generally mirror the trends of the national unemployment rate, both the MSA and the State of Minnesota have a lower unemployment rate than the nation as a whole. The economic growth in the late 1990s helped reduce the unemployment rate in both the MSA and the state to levels unseen in the last 25 years. In 2009, unemployment rates in the MSA, the State of Minnesota, and the United States increased because of the recession of the regional and national economy. The federal, state, and regional average annual unemployment rates have declined from a high in 2009 (i.e., state and regional) and 2010 (i.e., federal) through 2014.

3.2.2.2 Property Tax Revenues

Property tax revenues are primarily divided among the counties, cities, and local school districts. While the potential property acquisitions associated with the proposed project will likely negatively impact total property tax revenues, they represent a relatively small proportion of the overall regional tax base, and will have a negligible impact on county and school district tax revenues. Therefore, for the purpose of this analysis, the impacts on property tax revenues associated with property acquisitions will include only an evaluation of the five cities where acquisitions will occur.

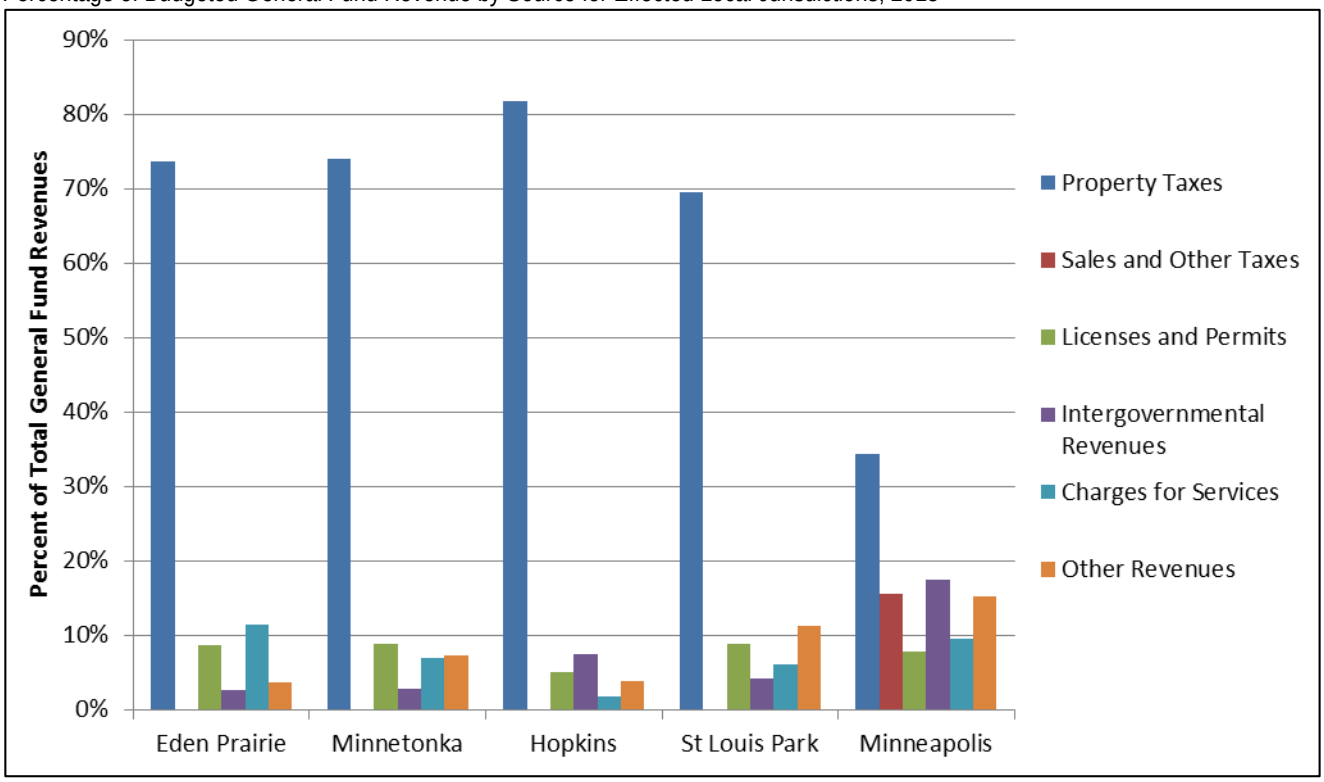
Exhibit 3.2-3 shows the percent of total general fund revenues by source for Eden Prairie, Minnetonka, Hopkins, St. Louis Park, and Minneapolis. In summary, Eden Prairie, Minnetonka, Hopkins, and St. Louis Park rely extensively on property tax collections as a revenue source for their respective general funds. Property tax revenues account for approximately 69 percent to 82 percent of total general fund revenues for these communities. The City of Minneapolis has a broader range of funding sources that includes sales and other taxes, intergovernmental revenues, and other revenue sources, and therefore property taxes represent a smaller proportion of the city's total general fund (i.e., approximately 33 percent).

EXHIBIT 3.2-2
National, State, and Regional Unemployment Trends – 1990 to 2014



Source: Minnesota Department of Employment and Economic Development, 2014b.

EXHIBIT 3.2-3
Percentage of Budgeted General Fund Revenue by Source for Effected Local Jurisdictions, 2015



Sources: Eden Prairie FY 2015 Budget, Minnetonka FY 2015 Budget, Hopkins FY 2015 Budget, St. Louis Park FY 2015 Budget, Minneapolis FY 2015 Budget.

3.2.2.3 Existing Businesses and Development

Activities that contribute to the local and regional economies are directly related to existing land uses which contribute to employment, earnings, and economic output, as well as local property tax revenue. Table 3.2-1 summarizes the existing land uses and activities that contribute to the local and regional economies near the proposed light rail stations. Refer to Section 3.1.2.1 for more information regarding existing and planned land use around the station areas.

3.2.3 Environmental Consequences

This section identifies the long-term and short-term direct and indirect impacts on economic activity from the Project. The evaluation of long-term direct economic impacts includes an assessment of the potential for increased regional employment and income, the potential impact on property tax revenues to local jurisdictions, impacts related to the acquisition and disposition of land uses, and potential economic impacts to freight rail owners and operators.

The evaluation of long-term indirect economic impacts includes an assessment of the potential changes in development patterns in the vicinity of light rail stations and the associated effect on economic activity and property values.

The evaluation of short-term economic impacts includes an assessment of potential short-term changes to regional employment and income, short-term changes to property tax revenues, potential economic effects on existing residents and businesses related to construction activities, and potential economic effects on freight rail owners and operators.

3.2.3.1 Long-term Direct Economic Impacts

This section includes a summary of the potential long-term direct impacts of the Project on economic activity, including regional employment and income, potential impacts on property tax revenues to local jurisdictions, potential economic impacts to freight rail owners and operators, potential impacts to local businesses, and potential development/redevelopment of land acquired along the proposed alignment.

Regional Employment

The Project will create long-term jobs and additional earnings as a result of Operations and Maintenance (O&M) expenditures. The Project is expected to add a total of 160 full-time equivalent jobs associated with operations of facilities and light rail vehicles (see the *Southwest LRT Operation and Maintenance Facility Basis of Design Report*, listed in Appendix C; instructions for accessing this report are also in Appendix C). The Project will also increase O&M by $39.5 million (2016$) annually over the No Build alternative. The expansion of transit service associated with the Project creates an expansion of economic activity in the Minneapolis-St. Paul-Bloomington MSA, thus generating long-term recurring net economic impacts.

Table 3.2-2 presents the estimated net change in local earnings and jobs generated by the Project and describes anticipated payroll expansion (Net Earnings Impacts) and jobs resulting from operating the Project. The direct-effect multipliers applied for the analysis are for the industry "Transit and Ground Passenger Transportation" (USBEA, 2010). Direct-effect employment multipliers are applied to the wage component of O&M costs. The transit earnings are derived by multiplying the incremental O&M cost over the No-Build Alternative by the transit on-site labor percentage (76 percent) (Council, 2015). The O&M labor component is the estimated percentage of total LRT O&M costs related to labor. The annual increase in household earnings will result in an increase in positive economic activity to the local economy, both through direct hiring to fill transit jobs and indirectly as these transit workers spend their earnings, thus creating additional consumer demand and jobs to meet that demand.
For the Minneapolis-St. Paul-Bloomington MSA, the effect of local O&M spending for the Project will result in an estimated $34.5million in local annual wages and salaries, compared to the No Build Alternative (in 2040). The local wages and salaries will support 172 jobs in the local economy.

TABLE 3.2-1
Summary of Existing Economic Activity in Proposed Light Rail Station Areas

Station Area	Existing Economic Activity
SouthWest Station	Includes retail, restaurant, office, multifamily residential, and a SouthWest Transit park-and-ride lot. Several restaurants serve the immediate station area. More retail, restaurant, and office uses are located to the east of the station area, near Eden Prairie Center and Hennepin County Technical College.
Eden Prairie Town Center Station	The predominant economic activity is auto-oriented retail, and restaurants. The Eden Prairie Center shopping mall is located approximately 0.5 mile east of the proposed station. Walmart and Costco stores also are located near the station area. Several other retail stores, shops, services, and restaurants also exist in the station area. In addition to retail uses, office, light industrial, and multifamily housing, exist in the station area. Emerson Process Management has more than 1,000 employees. Over 3,000 medical jobs within a 2-mile radius.
Golden Triangle Station	Primarily low-rise, low-density office, and light industrial. Starkey Labs, and CIGNA large employers located near the station.
City West Station	The Optum campus is a major employment center adjacent to the station. Other economic activity in the area includes a multifamily residential neighborhood to the south and a small commercial/retail area to the west, along Shady Oak Rd.
Opus Station	Large employment center with a mix of industrial, light industrial, and office uses. Nearby major employers include Opus, Optum, American Medical Systems, and Comcast.
Shady Oak Station	Consists almost entirely of older, low-rise industrial properties. The City of Hopkins Public Works Facility and Central Park are to the north of the station on Excelsior Blvd. Mainstreet and its mix of retail and housing uses is located approximately 0.5 mile to the north and could be accessed along 17th St.
Downtown Hopkins Station	A mix of retail, office, civic/institutional, residential, and light industrial. A block to the north of the station is the Hopkins historic commercial district, which is a mixed-use, retail/main street corridor. Major employers include Cargill, Hopkins Honda, and SuperValu.
Blake Station	The current mix of land uses includes industrial, light industrial, office, retail/commercial, institutional, and a variety of housing types and densities (e.g., single-family detached, single-family attached, and multifamily), including affordable housing options.
Louisiana Station	Many of the existing land uses are industrial and light industrial. Other land uses include institutional (e.g. Methodist Hospital), retail/commercial (e.g. Sam's Club), and residential (e.g. single-family detached and medium-density multifamily). The most significant existing land use anticipated to generate transit ridership is Methodist Hospital, which currently employs approximately 3,900 people.
Wooddale Station	In recent years, the area has seen redevelopment activity near the proposed station. Much of this redevelopment is medium- to high-density residential, located near the proposed station. Just to the east of State Hwy 100, land uses include a regional shopping center and light-industrial uses.
Beltline Station	Existing land uses include a significant amount of industrial, light industrial, and office uses along the south side of Hwy 25 and west of Beltline Blvd. Commercial and residential uses also exist in the station area. Located in the area are Nordic Ware, St. Louis Park municipal campus, the Park Nicollet Melrose Institute, and Excelsior & Grand shops and restaurants.
West Lake Station	A mix of residential types and densities, office, retail, and recreational land uses. Station area located near Calhoun Commons and Calhoun Village retail/commercial shops and restaurants, several office buildings, Lake Calhoun Executive Center, Lake Point Corp Center, and Fairview Uptown Clinic.
21st Street Station	Land uses are single-family residential and park land. Much of the area within the 0.5-mile radius around the station consists of Cedar Lake and Lake of the Isles.
Penn Station	Much of the existing land use is single-family residential. A small amount of commercial/light-industrial use is located just to the west of the station, along S Wayzata Blvd.
Van White Station	These properties include the City's vehicle impound lot and concrete-crushing facility located in the area. Several industrial uses are also located in the vicinity of the station. Several civic, cultural, and institutional (e.g., Dunwoody College of Technology) land uses, anticipated to generate transit ridership, exist in the area.
Royalston Station	Existing development is dominated by industrial and commercial uses. Significant land uses anticipated to generate transit ridership, located within walking distance from the station, include the Minneapolis Farmers Market, Target Field, Target Center, and International Market Square. The station will serve these destinations and local businesses, but also has the potential to serve the North Loop and Loring Park neighborhoods, which are approximately 1 mile from the proposed station.

Sources: *Southwest Corridor Investment Framework* (Hennepin County, 2013b); Southwest LRT Community Works—LRT Station Areas Existing Conditions (Hennepin County, 2014b).

TABLE 3.2-2
Annual Long-term Direct Earnings and Job Effect of Operations and Maintenance for the Project[a]

Earning Impact	
Transit System Operating and Maintenance Costs over the No Build Alternative (millions)	$39.5
Percent of O&M Cost attributed to Transit Wages[b]	76%
Transit Wages (millions)	$30.0
Direct Effect Earning Multiplier[c]	$1.1487
Net Change in Local Earnings (millions)[d]	$34.5
Employment Impact	
Additional Jobs over the No Build Alternative[e]	160
Direct Effect Jobs Multiplier[f]	1.0732
Net Change in Local Jobs[g]	172

[a] Based on the 2040 system-wide transit operating plan, 2016$.
[b] Source: Council, 2015.
[c] Source: USBEA direct multiplier for "Transit and Ground Passenger Transportation."
[d] Equals *transit wages* multiplied by the *direct effect earning multiplier*. Source: USBEA, 2010.
[e] Source: *SWLRT Operation and Maintenance Facility Basis of Design Report*, 2013 (see Appendix C).
[f] Source: USBEA direct effect jobs multiplier for "Transit and Ground Passenger Transportation."
[g] Equals *additional jobs over the No Build Alternative* multiplied by the *direct effect jobs multiplier*.
Source: Council; USBEA RIMS II, American Public Transportation Association (2014).

The Council's REMI PI model was used to supplement the results of the RIMS II model. The REMI PI is a different type of modeling approach which can be used to understand the economic impacts resulting from changes in labor accessibility such as improved transit access or reduced roadway congestion. The results of the Council's REMI PI analysis show that the Project may result in additional positive economic impacts beyond those estimated by the RIMS II model. Specifically, the REMI-PI model estimated greater gains in employment and economic output that are a result of improved labor accessibility for transit-dependent populations. If the Project results in improved livability in the region that attracts additional population and economic activity, additional economic benefits may be realized.

Note that the overall economic impact associated with the increased income will depend on the source of funding for these O&M expenses. Although funding for these O&M expenses would likely originate from local sources, they represent spending that would not take place except for the operation of the Project. If federal funds are received for future maintenance activities, they could generate additional net economic effects to the regional economy through increased employment and earnings.

Property Tax Revenue

Property taxes represent one of the major sources of revenues for county and city government. The Project will affect this source of funding during construction and operation. The economic effect of acquiring privately owned parcels would be the permanent removal of these parcels (full or partial) from the tax base of the affected cities, thus potentially lowering property tax collections.

The Project will result in the acquisition of public and privately owned property for additional right-of-way. The acquisition of publicly owned property will not affect property tax collections, because these parcels are exempt from paying property taxes. The economic effect of acquiring the privately owned parcels will be the permanent removal of these parcels (full or partial) from the tax base of the affected county, cities, and school district, thus potentially lowering property tax collections. Refer to Section 3.4.3.1 for a discussion on privately and publicly owned parcels that will be fully or partially acquired under the Project. In summary, a total of approximately 200 parcels have been identified as having total or partial permanent acquisition. Of these, approximately 50 parcels are owned by public agencies, and thus generate no property tax revenues. Table 3.2-3 summarizes the property tax impact of the land converted from privately owned to publicly owned land. The estimated tax effects for the Project will be between approximately 0.1 and 0.4 percent of

the general fund property tax collections in 2015 for the cities of Eden Prairie, Minnetonka, and St. Louis Park, and less than 0.1 percent for the City of Minneapolis. The estimate of the property tax impact for the City of Hopkins is approximately 1.9 percent of total property tax revenues, which is higher than the other communities based in part on the number of stations and the placement of the OMF in the City of Hopkins.

After construction activities are complete, the Council may dispose of excess property, consistent with state and federal laws and Council policy. The initial property tax impacts are presented in Table 3.2-3.

TABLE 3.2-3
Estimated Effects of Right-of-Way Property Acquisition

Municipality	General Fund Property Tax Revenues	Total Assessed Value of Properties located in Project ROW	Estimated Property Tax Impact	% of General Fund Property Tax Revenues Impact
Eden Prairie	$30,570,531	$220,668,500	$122,000	-0.4%
Minnetonka	$22,725,045	$71,885,200	$34,000	-0.1%
Hopkins	$9,307,729	$78,818,400	$179,000	-1.9%
St. Louis Park	$22,364,509	$8,430,000	$26,000	-0.1%
Minneapolis	$156,478,620	$66,440,600	$8,000	-0.0%
Total	$241,446,434	$446,242,700	$369,000	-0.2%

ROW = right-of-way.
Source: Council, 2015.

Existing Business and Development/Redevelopment Effects

The Project may affect local businesses as local traffic patterns are changed and the number of available off-street and on-street parking spots in the corridor is reduced, while pedestrian and vehicular traffic around stations and park-and-ride lots increase. Refer to Section 4.3 for more information on parking impacts. While there is a potential for loss of business revenue due to changes in vehicular patterns and parking, the net revenue loss may be minimal due to greater pedestrian presence and vehicular traffic associated with access to the stations.

The Project will acquire approximately 126 acres of land, affecting 143 land parcels and will convert the land to public use. This land will therefore be removed from the inventory of available land for potential development/redevelopment within the study area. See Section 3.2.3.2 for discussion on how the Project will indirectly affect potential development or redevelopment of properties in the corridor.

Freight Rail Owners and Operators

Beginning in the City of Hopkins, and continuing to its terminus at the existing Target Field Station in Minneapolis, portions of the proposed light rail alignment will be located within or adjacent to a combination of three active existing freight rail corridors (refer to Exhibit 4.4-1 in Section 4.4): the Bass Lake Spur; the Kenilworth Corridor; and the Wayzata Subdivision. A fourth freight rail line, the Minneapolis, Northfield, and Southern Railway (MN&S) Spur, intersects the Bass Lake Spur within the study area. Refer to Section 4.4.3.1 for a more detailed description of each of the freight rail corridors within the study area.

As described in Section 4.4.4.1, the Project will include freight rail modifications, which generally involve reconstruction of existing freight rail tracks (Bass Lake Spur, Kenilworth Corridor, and Wayzata Subdivision), removal/replacement of an existing switching wye (Bass Lake Spur and MN&S Spur), and removal of freight rail siding tracks (Bass Lake Spur) (refer to Appendix E for preliminary engineering plans showing these modifications). Table 3.2-4 includes an evaluation of potential economic effect on freight rail owners and operators, by rail corridor.

TABLE 3.2-4
Economic Effects on Freight Rail Owners/Operators

Freight Rail Corridor	Freight Rail Modification	Economic Effect on Freight Rail Owners/Operators
Wayzata Subdivision	Freight rail reconstruction	No effect: Geometry of the freight rail alignment will change; no changes to freight rail operations: no change in access to existing freight rail markets and customers; no access to new freight rail markets not currently served.
Kenilworth Corridor	Freight rail reconstruction	No effect: Geometry of the freight rail alignment will change; no changes to freight rail operations: no change in access to existing freight rail markets and customers; no access to new freight rail markets not currently served.
Bass Lake Spur	Freight rail/light rail swap	No effect: Owner (CP) will be compensated for the acquisition of the Bass Lake Spur[a]; long-term freight rail operations will not be affected.
	Southerly Connector/Skunk Hollow switching wye	No effect: Geometry of the freight rail alignment will change; no changes to freight rail operations: no change in access to existing freight rail markets and customers; no access to new freight rail markets not currently served.
	Siding track removal	No effect: The removal of the siding tracks will be addressed with CP (owner) and TC&W (operator) under the purchase agreement for the Bass Lake Spur which will include compensation for the removal of the siding tracks.[a]

[a] The purchase agreement between the Council and CP Railway for the acquisition of the Bass Lake Spur will be negotiated and executed after the publication of this Final EIS.

Source: Council, 2015.

CP = Canadian Pacific; TC&W = Twin Cities and Western Railway Company

3.2.3.2 Long-term Indirect Economic Impacts

The Project is likely to have the long-term indirect effect of increased development and redevelopment in the areas surrounding proposed light rail stations[13]

In the long-term, overall accessibility improvements from transit service, including reduced traffic congestion, improve workforce access and retail access in an extended area, resulting in greater economic activity in an extended area. These benefits are not captured in the economic impact model used, and have not been quantitatively estimated for this project.

Table 3.2-1 summarizes the existing land use and potential for development within each of the proposed light rail station areas, based on the *Southwest Corridor Investment Framework* (Hennepin County, 2013b). However, because the future potential developments would require the actions of others and are influenced by market forces, they are understood to be indirect impacts to land use. Development that is consistent with local land use plans and policies would not result in adverse long-term impacts.

Transit investments have proven to yield net positive effects on property values (Diaz, 1999). Research conducted by the Center for Transportation Studies at the University of Minnesota (Goetz et al., 2010 and Ko and Cao, 2010) on the impacts the METRO Blue Line (Hiawatha Line LRT) has had on residential, commercial, and industrial properties suggests that light rail has an overall positive effect on property values. Proximity to station areas was a major factor in the positive effect on residential and multifamily properties. The overall strength of the economy, local government policies, and land availability, are also critical factors in determining the value of the property.[14]

[13] Research on the impacts associated with light rail systems indicates that light rail is one of many factors that can influence development. In a study titled *Public Transportation: Multiple Factors Influence Extent of Transit-Oriented Development* (Wise, 2014), the U.S. Government Accountability Office (GAO) reviewed six federally funded transit projects and found a wide range in the amount of transit oriented development (TOD) near transit stations since transit operations began. The findings of the GAO study are consistent with a study conducted by the Center for Transit-Oriented Development (2011) that reviewed the development patterns along three light rail transit projects in the United States.

[14] The impact to residential and commercial property values of light rail projects has been studied in other markets throughout the nation. While impacts to property values have varied depending on the community, residential and

Light rail also has the potential to cause environmental impacts ("nuisance effects") that could reduce the value of an area for some existing or planned uses and/or lower the revenue of local businesses over the long term. These potential nuisance effects include disruptive noise levels; significant visual impacts; and significant reductions in vehicular access and parking. The rate and timing of such impacts would depend on the location of the business relative to the new station, changes in business activity during construction and operation of the system, business visibility, and local land use plans and development standards. For the Project, the potential nuisance effects are expected to be minimal. Mitigation measures for visual quality, noise, and vibration, and parking impacts are discussed in Sections 3.7, 3.12, 3.13, 4.3 respectively.

The Project is expected to indirectly lead to new development and/or redevelopment of land surrounding some of the proposed light rail stations, which could have the effect of increasing property tax revenues for the affected local jurisdictions. While development is regulated by the affected jurisdictions and is driven by regional and local economic conditions, light rail lines can advance the timing and increase the intensity of development, within the limits allowed by local zoning, particularly surrounding proposed station areas. To fully leverage this development potential and to support local land use goals, Hennepin County, in partnership with the Cities of Eden Prairie, Minnetonka, Hopkins, St. Louis Park, and Minneapolis, undertook a station area planning effort. The resulting Southwest Corridor Investment Framework (Hennepin County, 2013b) identifies short- and long- term infrastructure needs and land use plans for the station areas included in the Project, with the intent of supporting the local and regional vision for increased transit oriented development. Refer to Section 3.1.3.2 for more information on the potential for development/redevelopment in the areas surrounding proposed light rail stations.

To the extent the Project leads to new private development around light rail stations, new jobs could be created in the region as employees gain easier access to businesses, residential housing units, and other facilities. The creation of these jobs would provide a net benefit to the local economy.

3.2.3.3 Short-term Economic Impacts

Employment

In order to estimate the broader regional economic effects of the capital spending associated with the Project, the USBEA and RIMS multipliers for the Minneapolis-St. Paul-Bloomington, MN-WI MSA were used. The estimated capital expenditures for construction of the Project are presented in Section 7.1, Table 7.1-1. Total costs are estimated at $1.794 billion and are presented in year-of-expenditure dollars.

Construction of the Project will represent a substantial capital investment in the regional economy that will increase employment, earnings, and economic output during the short-term construction period. However, the degree to which the construction of the Project will provide an economic stimulus to the region depends on the source of project funding. Only those economic affects that are attributable to funds that are made available for this specific project (*new money*) should be considered as project related. Proposed funding sources for the Project are presented in Table 3.2-5. Currently, federal, state, and local sources have been identified. Approximately 59 percent of the funding is considered *new money*.

In order to estimate the regional impacts associated with the Project, final demand multipliers for the construction and professional services industry were applied to the amount of new funding that will be used for capital expenditures. The results of this analysis, as summarized in Table 3.2-6, are expressed as new short-term jobs that will span the duration of construction.

commercial properties located closer to light rail stations experienced greater increases in property values. In a report for the American Public Transportation Association entitled "Economic Impact of Public Transportation Investment" (2009), a number of studies in other cities were summarized and generally concluded a positive effect to property values.

TABLE 3.2-5
Summary of Proposed Capital Funding Sources (New or Existing) for the Project[a]

Source	Contribution (millions)	Share	New or Existing Funding
Federal Transit Administration[b]	$897.0	50.0%	New
State of Minnesota	$165.0	9.2%	New
County Transit Improvement Board	$496.0	27.7%	Existing
Hennepin County Regional Railroad Authority	$165.0	9.2%	Existing
Other Local Funding	$70.0	3.9%	Existing
Total	$1,793.0	100.00%	
Percentage New		59.2%	

[a] Does not include LRCIs.

[b] The FTA's share is proposed by the Project and does not constitute a commitment by the federal government.

Source: Council, August 2015g New Starts Report to FTA.

TABLE 3.2-6
Summary of Short-term Economic Impacts Resulting from the Project

	Construction	Vehicles	ROW	Professional Services	Total
Construction Expenditure Summary (YOE$)	$1,124,402,000	$123,490,000	$211,785,000	$333,190,000	$1,793,867000
Construction Expenditure affecting the Regional Economy[a,b]	$1,125,400,000	$0	$0	$333,190,000	$1,458,590,000
Percent of *New Money*[c]	59.2%	59.2%	59.2%	59.2%	
New Capital Expenditure within Region	$666,578,000	$0	$0	$197,350,000	$863,928,000
Final-demand multiplier:					
Output	$1.5135	NA	NA	$1.3367	
Earnings	$0.5397	NA	NA	$0.5826	
Jobs per $1 million spent	12.4824	NA	NA	11.472	
Short-term Regional Impacts to:					
Output	$1,008,866,000	NA	NA	$263,798,000	$1,272,664,000
Earnings	$359,752,000	NA	NA	$114,976,000	$474,728,000
Employment (jobs)[c]	8,300	NA	NA	2,300	10,600

[a] Light rail vehicle costs are not included, as vehicles will likely be purchased outside the region; right-of-way costs are not included, as right-of-way costs are for land only and the acquisition of land does not generate jobs or income; finance and real estate costs are included in Professional Services.

[b] The RIMS II multipliers account for the fact that local industries will likely purchase some supplies from outside the region.

[c] Percent of *new money* from Table 3.2-3

[d] Compared to the No-Build Alternative; one job is defined as a job for one person for one year. For example, a job for one person that lasts three years would equate to three person-year jobs.

Source: Council, August 2015g New Starts Report to FTA; USBEA, RIMS II Multipliers (2010).

The short-term effect of construction spending associated with the Project will result in an estimated $1.3 billion in overall economic activity (year of expenditure dollars) for the Minneapolis-St. Paul-Bloomington MSA over the construction period. It is estimated that construction-related spending will provide regional economic benefits by generating approximately $475 million in additional wages and salaries for households and by creating approximately 10,600 person-year jobs for all industries in the Minneapolis-St. Paul-Bloomington MSA during the construction phase of the Project. A person-year job is

defined as a job for one person for one year. If a job employs a single person for three years, it would equal three person-year jobs.

The Council's REMI PI model was used to supplement the results of the RIMS II model. The REMI PI is a different type of modeling approach which can be used to understand the economic impacts resulting from changes in labor accessibility such as improved transit access or reduced roadway congestion. The results of the Council's REMI PI analysis show that the Project may result in additional positive economic impacts beyond those estimated by the RIMS II model. The REMI-Pi model projects greater levels of employment, particularly in the construction industry, income, and overall economic output.

Additional projects funded by local jurisdictions may also be completed during the construction of the Project. These Locally Requested Capital Investments (LRCIs) will total approximately $20 million. The LRCI projects include building trails, enhancing lighting, providing aesthetic upgrades, and making roadway improvements around the Project. Because the LRCI projects will be funded locally and do not represent a source of external, or "new", money, they were excluded from the RIMS II modeling. However, the LRCI projects are expected to enhance the aesthetics of the stations, provide improved access to the Project, and provide livability benefits.

Project construction may result in lost revenues for businesses, affect the quality of life of residences on or near affected properties, and result in temporary property value reductions. Those effects would be caused by construction-related activities, such as the following:

- Temporary or permanent elimination of parking stalls
- Congestion, changes in access, and reduced visibility from the street (e.g., establishing a detour that requires customers to take longer or less familiar routes to a business, removing a left-hand turn lane into a shopping center, or eliminating the "street appeal" from a business that depends on drive-by or walk-up sales)
- Increased noise, dust, and perceived changes in visual quality (e.g., glare from nighttime construction lighting)

Retail and personal services businesses that depend on good access and an aesthetically pleasing experience for customers are most likely to experience short-term impacts during construction.

Property Tax Revenue

The Project will result in temporary occupancies of parcels through the use of construction easements or intergovernmental agreements. The construction easements or agreements will be temporary and are not expected to result in the displacement of businesses or residents. However, they could impact revenues for affected businesses. These temporary occupancies will not change existing land uses in the long term. Therefore, the Project is not expected to result in any substantial short-term changes to property tax revenues. Refer to Section 3.4.3.3 for more information on short-term acquisitions.

Existing Businesses Effects

The Project will result in short-term impacts to some existing businesses. Short-term impacts include potential increases in noise levels, dust, traffic congestion, visual changes, and increased difficulty accessing commercial and other uses, and some businesses may experience economic hardship during the construction period. Potential mitigation measures for visual quality, noise, vibration, and traffic impacts are discussed in Sections 3.7, 3.12, 3.13, and 4.2 respectively. In order to minimize short-term impacts to business, the Council has developed a Construction Communication Plan. The purpose of the Construction Communication Plan is to prepare project-area residents, businesses, and commuters for construction; listen to their concerns; and develop plans to minimize harmful or disruptive effects. Refer to Section 3.2.4 for more information on the Construction Communication Plan and mitigation measures for short-term impacts.

Freight Railway Owners and Operators

This section describes the potential short-term economic impacts associated with constructing the Project. Constructing the Project will have some effects on freight movements in the corridor that will be temporary

in nature. In general, the freight rail traffic may experience slower operations during construction, which will be managed with onsite flaggers paid for by the Project. There may be short periods of freight stoppage required to make some modifications to the freight rail track, expected to be less than eight to 18 hours in duration. These infrequent situations will be coordinated with and agreed upon by the affected operating railroads (CP and TC&W). Refer to Section 4.4 for a description of construction impacts on freight.

3.2.4 Mitigation Measures

This section describes the measures the Council will implement to mitigate the Project's long-term and short-term economic activity impacts. For each mitigation measure or set of associated mitigation measures, this section generally notes the anticipated impact or associated impacts that the mitigation measures will address (see Sections 3.2.3.1, 3.2.3.2 and 3.2.3.3 for additional information on the identified economic activity impacts and avoidance measures).

3.2.4.1 Regional Employment

No mitigation measures are warranted for long-term or short-term impacts to regional employment because there will be no adverse impacts to regional employment.

3.2.4.2 Property Tax Revenue

A. Long-term Mitigation Measures

No mitigation measures will be implemented for long-term impacts to property tax revenue; however, the Council is pursuing a joint development opportunity at the proposed Beltline Station, which could increase property tax revenues, if implemented. Joint development involves a partnership with the affected cities and property owners, to develop/redevelop land adjacent to a proposed station, in an effort to promote TOD and in order to increase the collectible tax revenues of the affected parcels of land.

The potential for joint development to occur is dependent on reaching agreement with affected jurisdictions and approval by FTA, and joint development sites are not part of the Project as defined in Section 2.1.1. Refer to Chapter 10 for more information on joint development.

B. Short-term Mitigation Measures

No mitigation measures are warranted for short-term impacts to property tax revenue because there will be no adverse impacts to property tax revenues in the short-term.

3.2.4.3 Freight Rail Owners and Operators

A. Long-term Mitigation Measures

No mitigation measures are warranted for long-term economic impacts to freight rail owners and operators because there will be no adverse long-term impacts.

B. Short-term Mitigation Measures

Impact. The Project will result in slower freight rail operations during construction and short periods of freight stoppage required to make some modifications to the freight rail track, expected to be less than eight to 18 hours in duration. Refer to Section 4.4 for a description of construction impacts on freight

> ***Mitigation.*** In order to mitigate short-term impacts to freight rail operations related to construction activities, the Council will develop and implement freight rail operation coordination plans. The purpose of this plan is to facilitate coordination between the Project and the affected freight railroads throughout the construction period to minimize impacts on freight owners and operators and to help ensure the Project does not create unreasonable constraints during construction of the Project. As part of this effort, Council staff will also work with affected freight rail owners and operators to provide provisions in the construction contract to identify how the contractor will interact with the railroads. Further, Council staff will work with affected freight rail owners and operators to sequence construction to minimize effects on freight movements and to identify optimal periods for closing the rail service and reducing speeds. Dates and times for all stoppages will be determined through coordination with the railroad owners and operators.

3.2.4.4 Existing Businesses and Development/Redevelopment Effects

A. Long-term Mitigation Measures

Impact. The Project will affect local businesses as local traffic patterns change and the number of available off-street and on-street parking spots in the corridor is reduced, which could result in a loss of overall parking for some businesses and a related loss in revenue.

> ***Mitigation.*** When acquiring property from a property owner, the Council will pay damages if the value of the property is decreased in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (Uniform Act). Refer to Section 3.4.1 for additional information on the Uniform Act.

B. Short-term Mitigation Measures

Impact. The Project will result in short-term impacts to some existing businesses. Short-term impacts include potential increases in noise levels, dust, traffic congestion, visual changes, and increased difficulty accessing residential, commercial, and other uses, and some businesses may experience economic hardship during the construction period. Potential mitigations for visual quality, noise, vibration, and traffic are discussed in Sections 3.7, 3.12, 3.13, and 4.2 respectively.

> ***Mitigation.*** Specific mitigation measures for short-term impacts businesses are identified in the Construction Mitigation Plan and Construction Communication Plan, which will be implemented by the Council prior to and during construction. The purpose of the Construction Communication Plan is to prepare project-area residents, businesses, and commuters for what to expect during construction, listen to their concerns, and develop plans to minimize disruptive effects. Strategies may include:
>
> - Issue construction updates and post them on the Project website
> - Provide advance notice of roadway closures, driveway closures, and utility shutoffs
> - Conduct public meetings
> - Establish a 24-hour construction hotline
> - Prepare materials with information about construction
> - Address property access issues
> - Assign staff to serve as liaisons between the public and contractors during construction
>
> In addition, the Council will develop and implement a construction staging plan (staging plan), which will be reviewed with the appropriate jurisdictions and railroads, and the contractor will be required to secure the necessary permits and follow the staging plan, unless otherwise approved. Components of a staging plan include traffic management plans and a detailed construction timeline.

3.3 Neighborhood and Community

This section describes potential long-term direct and indirect and short-term (construction) direct and indirect effects of the Project on neighborhoods and community facilities (see Section 3.17 for cumulative impacts). This section includes an overview of the regulatory context and methodology used for the analysis; a description of existing neighborhoods and community facilities; an assessment of the anticipated environmental consequences related to neighborhoods and community facilities; and a description of mitigation measures that will be implemented with the Project.

3.3.1 Regulatory Context and Methodology

This section includes definitions of the neighborhood and community study area and of community facilities as used in this analysis, and a description of the methodology used to determine neighborhood and community impacts.

3.3.1.1 Neighborhood and Community Study Area

The primary study area for the neighborhood and community analysis includes a half-mile radius on either side of the proposed light rail alignment centerline, and a one-half mile radius from the center point of the proposed light rail stations (referred to in this section as “station areas”); a half-mile radius is commonly used to represent the approximate maximum distance most transit users will walk to access a light rail

station. In some cases, the study area for a given environmental category was used, as appropriate, depending on the degree of impact.

The study area comprises portions of five communities. For the purpose of this analysis, communities are defined as the portion of the affected city (i.e., Eden Prairie, Minnetonka, Hopkins, St. Louis Park, and Minneapolis) that lies within the study area. This analysis also includes an evaluation of existing neighborhoods within each community. Specific neighborhoods with geographically defined boundaries are formally identified in the Cities of St. Louis Park and Minneapolis, and those geographic boundaries are used in this analysis. Formal neighborhoods with defined geographic boundaries are not identified for the Cities of Eden Prairie, Minnetonka, and Hopkins. For the purpose of this analysis, neighborhoods within these cities are identified using a proposed light rail station area (i.e., half-mile radius) as a geographic reference in describing neighborhoods where formal neighborhood boundaries are not present.

3.3.1.2 Definition of Community Facilities

For the evaluation of community facilities, a public facilities resource inventory was conducted for specific buildings or sites within the study area. Data pertaining to community services were collected from the five cities through which the Project will pass, and locations of facilities were verified through field observation. For the purpose of this analysis, community facilities include land uses that are frequently used by the public, such as schools, colleges, libraries, community centers, parks/recreation areas/open spaces,[15] medical facilities, places of worship, funeral chapels, and police and fire departments. Community facilities can be either publicly or privately owned.

While the analysis identifies the locations of public safety and emergency response facilities (i.e., police and fire), potential effects on the provision of these services are discussed in Section 4.6. A description of public utilities is provided in Section 3.15. Data on places of worship and school facilities are limited to identifiable buildings used regularly by community members and do not include locations of home-based practicing faiths or other religious study groups, or home-schooling facilities. Potential impacts to trails are addressed in Section 4.5.

3.3.1.3 Methodology for the Determination of Neighborhood and Community Effects

The analysis of long-term and short-term direct and indirect neighborhood and community effects is based on the following three criteria, each of which use a variety of measures as indicators of effect: changes to community facilities access; changes to community character; and changes to community cohesion.[16] Table 3.3-1 provides a summary of the measures used in this analysis for each of the neighborhood and community effects criteria. The evaluation measures are based on the findings included within this Final EIS for the following environmental categories: land use (Section 3.1), acquisitions and displacements (Section 3.4), visual quality and aesthetics (Section 3.7), noise (Section 3.12), vibration (Section 3.13), and transportation (Chapter 4).

[15] Parks, recreation areas, and open spaces may be subject to evaluation in the context of Section 4(f) of the Department of Transportation Act of 1966, which governs the use of publicly-owned and publicly accessible park and recreation areas of local significance, wildlife and waterfowl refuges, and historic resources independent of ownership. The study area for the neighborhoods and community study area is larger than the study area for parks, recreation areas, and open spaces; therefore, there are more parks identified in the neighborhood and community analysis than in the parks, recreations areas, and open spaces analysis. For additional information on parks and recreation areas, including the parks, recreation areas, and open spaces study area, see Section 3.6 and Appendix I.

[16] Public health is an important Project consideration with respect to neighborhoods and communities. While not specifically evaluated in the neighborhood and community analysis, public health and health equity are outcomes of multiple criteria and measures (see Table 3.3-1).

TABLE 3.3-1
Neighborhood and Community Impact Criteria and Measures

Criteria	Measure [a]
Community Facilities	• Physical property acquisition and/or displacement of the facility • Noise and vibration impacts to community facilities • Changes to roadways and transit service that can effect transit access to community facilities
Community Character	• Noise and vibration impacts on residences and business within a neighborhood • Visual changes within a neighborhood; property conversion (i.e., acquisitions of existing public or private property and its conversion to a publicly-owned transportation or related facility) • New at-grade light rail crossings of roadways and bicycle/pedestrian facilities
Community Cohesion	• Introduction of new physical barriers • Changes to the local road network • Changes to the bicycle and pedestrian network; and changes to parking

[a] All measures are derived from findings included within this Final EIS for the respective environmental category. All changes are compared to the No Build Alternative.

Source: Council, 2015.

3.3.2 Affected Environment

This section describes each of the neighborhoods and communities within the study area, including a summary of the general characteristics of each community (i.e., city) and a description of existing community facilities.[17] This section includes a description of the existing community character (e.g., development patterns, important physical features, residential neighborhoods), as well as existing major community connections and barriers (e.g., highways, freight rail alignments, trails).

3.3.2.1 Eden Prairie

Table 3.3-2 describes the existing community character (e.g., development patterns, important physical features, residential neighborhoods), and community connections and barriers within the study area in Eden Prairie, by proposed light rail station area. Table 3.3-3 lists the existing community facilities within the study area in the City of Eden Prairie, and they are mapped on Exhibit 3.3-1.

[17] For this analysis, communities are defined as the cities within which the neighborhood and community study area lies (i.e. Eden Prairie, Minnetonka, Hopkins, St. Louis Park, and Minneapolis). Community facilities include land and building uses that are frequently used by the public, such as schools, colleges, libraries, community centers, parks, medical facilities, places of worship, funeral chapels, and police and fire departments. Community facilities can be either publicly or privately owned.

TABLE 3.3-2
Community Character – City of Eden Prairie[a]

Station Area[b]	Community Character	Community Connections and Barriers
SouthWest Station	• Highway-oriented commercial development, retail, and open space • Existing park-and-ride lot (SouthWest Transit Center and a neighborhood retail center along the north side of Technology Dr, west of Prairie Center Dr • Purgatory Creek Conservation Area, a 200-acre wetland area with a 7-acre park and 2.5 miles of walking trails, south of Technology Dr • Residential condominiums to the west of SouthWest Station	• Technology Dr provides the primary connection to neighborhoods to the west and east. Prairie Center Dr provides connections to residential neighborhoods to the north and south. • Hwy 212 provides access to the regional roadway system at Prairie Center Dr but creates a barrier to north-south connectivity. • Sidewalks and trails are present on at least one side of all roads within the study area. • Access provided by pedestrian and bicycle network in the area is discontinuous.
Eden Prairie Town Center Station	• Highway-oriented commercial/retail development • Large regional shopping center (Eden Prairie Center) and employment along Flying Cloud Dr • Multifamily housing located along the north side of Single Tree Ln	• Technology Dr, Eden Rd, and Single Tree Ln provide east-west connectivity, and Prairie Center Dr and Flying Cloud Dr provide north-south connectivity. • Lack of pedestrian connectivity to station • Trails are located on at least one side of major roadways; no direct bicycle access from the north, south or west.
Golden Triangle Station	• Highway-oriented industrial employment center and high-density residential on east side of Hwy 212 • Low-density, single-family residential neighborhood on the west side of Hwy 212	• Shady Oak Rd, Valley View Rd, and Golden Triangle Dr provide neighborhood connectivity east of Hwy 212, and Bryant Lake Dr provides connectivity west of Hwy 212. • This area is generally bounded by Hwy 212 on the west, Hwy 169 on the east, and I-494 to the south, all of which are barriers to neighborhood connectivity. • No sidewalks in study area. • Limited bicycle access to existing land uses and station.
City West Station	• Large employment center, undeveloped land, high-density residential, low-density single-family residential, and neighborhood commercial • No established residential neighborhoods	• Hwy 212, Hwy-62, and Shady Oak Rd. • Few sidewalks and trails; no pedestrian access to station from north or east; trail connection under construction will provide access from the west. • Trails have limited connectivity to larger transportation system; no bicycle access to the station from the north and east.

[a] Within the neighborhood and community study area.

[b] Within a half-mile radius of the proposed light rail station.

Source: Council, 2015.

TABLE 3.3-3
Community Facilities – City of Eden Prairie [a]

Community Facility	Station Area	Address	Type of Facility
St. Andrew Lutheran Church	SouthWest	13600 Technology Dr	Place of worship
Eden Prairie Center Clinic	SouthWest	830 Prairie Center Dr	Healthcare provider
Purgatory Creek Park	SouthWest	13001 Technology Dr	Park/recreation area/open space
Northwest Technical Institute	Eden Prairie Town Center	11995 Single Tree Ln	Educational
Eagle Ridge Academy	Golden Triangle	7255 Flying Cloud Dr	Educational
Nine Mile Creek Conservation Area	Golden Triangle	East of Hwy 212 and Flying Cloud Dr	Park/recreation area
Flying Cloud Dog Park	Golden Triangle	7171 Flying Cloud Dr	Park/recreation area

[a] Within the neighborhood and community study area.

Source: Council, 2015.

EXHIBIT 3.3-1
Neighborhoods and Community Facilities – Eden Prairie

3.3.2.2 Minnetonka

Table 3.3-4 describes the existing community character (e.g., development patterns, important physical features, residential neighborhoods) and the major community connections and barriers within the study area in Minnetonka, by proposed light rail station area. Table 3.3-5 lists the existing community facilities within the study area in the City of Minnetonka. Community facilities are mapped on Exhibit 3.3-2.

TABLE 3.3-4
Community Character – City of Minnetonka

Station Area	Community Character	Community Connections and Barriers
Opus Station	• Employment center with more than 12,000 jobs. • Existing residential neighborhoods west of Shady Oak Rd. Housing includes a mix of suburban-style, single-family detached units, attached condominium townhome units, and multiunit apartment complexes.	• Shady Oak Rd and Bren Rd E provide limited connectivity within the area. • Suburban street system of cul-de-sacs and dead-end street located northwest of the proposed Opus Station limits connectivity. • Hwy 62 on the south and Hwy 169 are barriers. • Sidewalks on at least one side of all streets in study area; trail network provides pedestrian and bicycle access between the station and surrounding land uses.

[a] Within the neighborhood and community study area.
Source: Council, 2015.

TABLE 3.3-5
Community Facilities – City of Minnetonka[a]

Community Facility	Station Area	Address	Type of Facility
Bren Education Center	Opus	11140 Bren Rd W	Educational
Unnamed open space B	Opus	Between Bren Rd W on the south, Smetana Rd on the north, Green Circle Dr on the east, and private residential and commercial properties on the west.	Park/recreation area/open space
Opus Commercial District Trails	Opus	Trail system located within the Opus Commercial district north of Hwy 62 and east of Shady Oak Rd	Multiuse trail
Shady Oak Beach Park	Shady Oak	5200 Shady Oak Rd	Park/recreation area/open space
West Oaks Community Church	Shady Oak	11901 Excelsior Blvd	Place of worship
Cross of Glory Baptist Church	Shady Oak	4600 Shady Oak Rd	Place of worship
Lone Lake Park	Opus Station	5624 Shady Oak Rd	Park/recreation area/open space
Green Circle Park	Opus Station	5600 Green Circle Dr	Park/recreation area/open space

[a] Within the neighborhood and community study area.
Source: Council, 2015.

3.3.2.3 Hopkins

Table 3.3-6 describes the existing community character (e.g., development patterns, important physical features, residential neighborhoods), and major community connections and barriers within the study area in Hopkins, by proposed light rail station area. Table 3.3-7 lists the existing community facilities within the study area in the City of Hopkins. Community facilities are mapped on Exhibit 3.3-3.

EXHIBIT 3.3-2
Neighborhoods and Community Facilities –Minnetonka

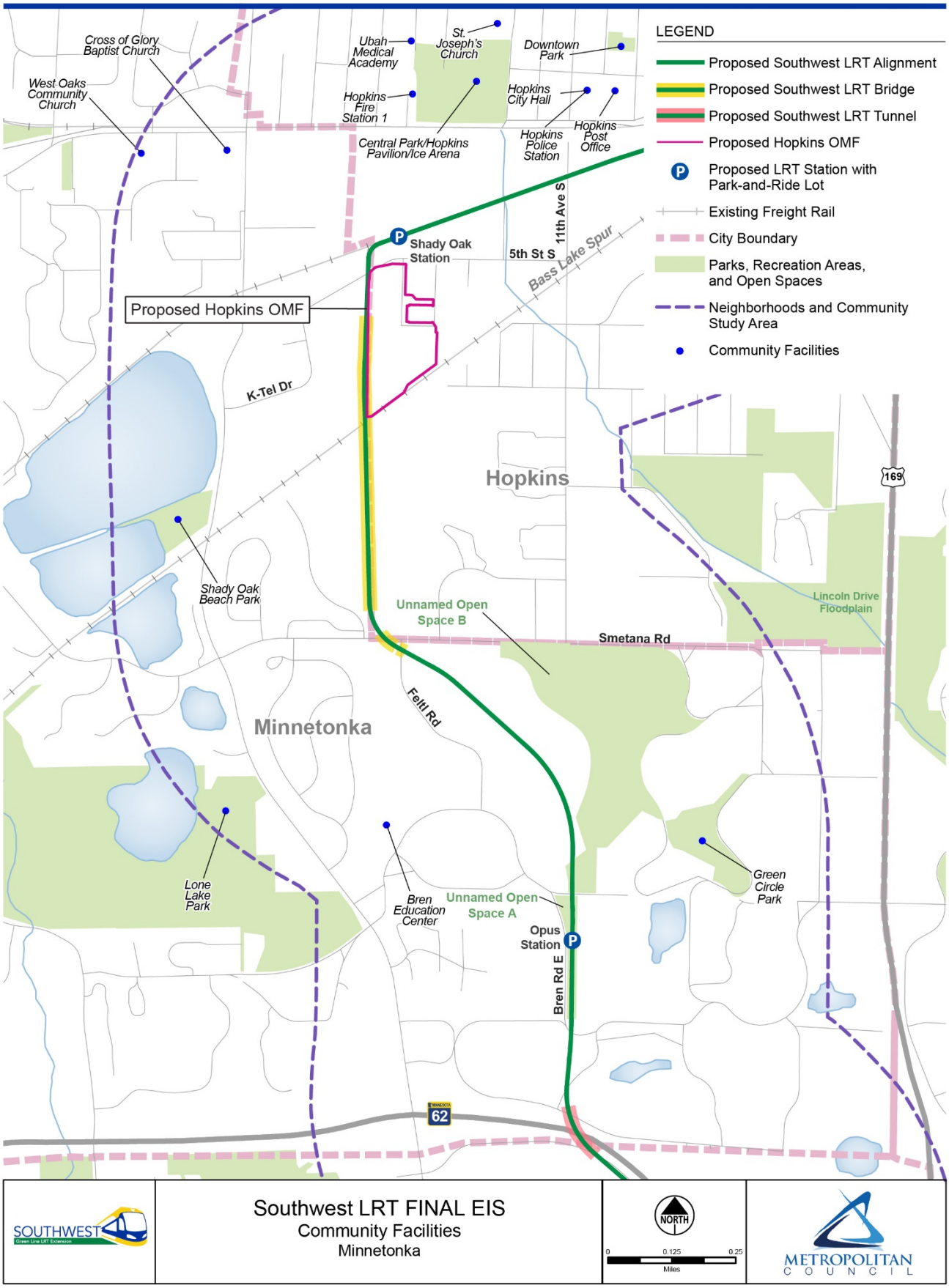


EXHIBIT 3.3-3
Neighborhoods and Community Facilities – Hopkins

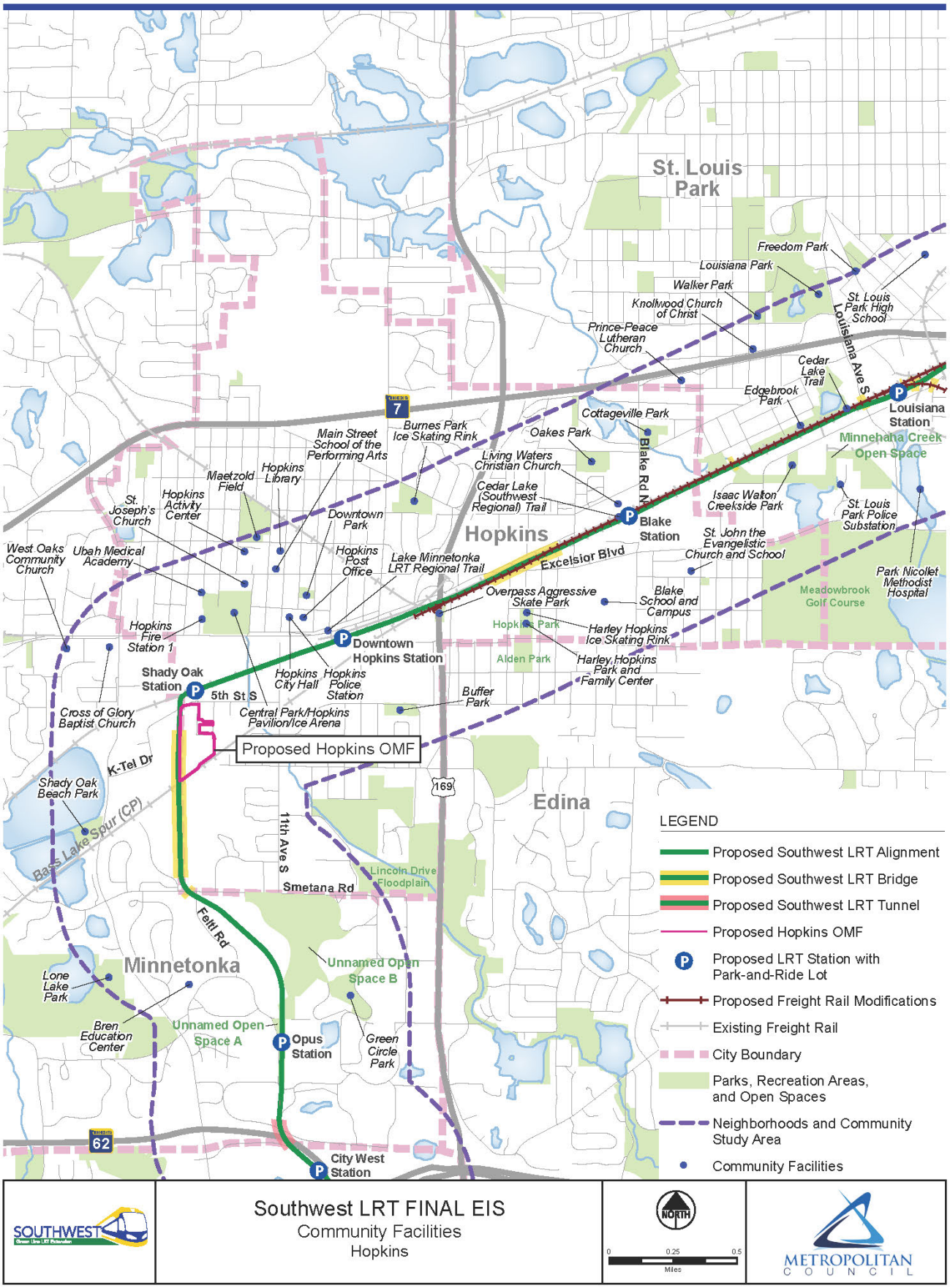


TABLE 3.3-6
Community Character – City of Hopkins [a]

Station Area	Community Character	Community Connections and Barriers
Shady Oak Station	• Predominantly single-family detached and attached condominium townhouse units; multi-unit apartment complexes north of Excelsior Blvd. • Employment center with auto- and industrial-related jobs; the City of Hopkins Public Works Facility, Hopkins Pavilion, Hopkins Fire Department, and Central Park located to the north of the station along Excelsior Blvd.	• Hwy 3 (Excelsior Blvd) provides east-west connections and Shady Oak Rd provides north-south connections but both create barriers to pedestrian connectivity. • 17th Ave N provides a north-south neighborhood connection between the northern residential area and the industrial area immediately surrounding the station while 11th Ave S provides a north-south connection that extends beyond the corridor. • The Minnesota River Bluffs LRT Regional Trail provides east-west pedestrian and bicyclist connections south of Excelsior Blvd. • Sidewalks present along some but not all roadways limits pedestrian accessibility. • The Bass Lake Spur freight rail creates a barrier.
Downtown Hopkins Station	• Industrial uses to the south of Excelsior Blvd with highway and downtown commercial and medium and high residential density to the north. • Single-family attached and detached housing north of the Lake Minnetonka Regional LRT Trail with multi-unit apartment complexes along Excelsior Blvd. and Main St. • Hopkins City Hall located to the northwest along 11th Avenue S. and the Supervalu Distribution Center, an existing employment center, is located to the east along Hwy 169.	• Hwy 169 and 11th Ave S provide north-south connections although Hwy 169, especially the Supervalu Distribution Center, limits east-west pedestrian connections. • Excelsior Blvd provides east-west connectivity but east-west connectivity is limited south of Excelsior Blvd. • The Minnesota River Bluffs LRT Regional Trail provides east-west pedestrian and bicyclist connections south of Excelsior Blvd. and the Lake Minnetonka LRT Regional Trail provides northeast-southwest pedestrian and bicyclist connections north of Excelsior Blvd to 6th Ave N. • Sidewalks are present along most roadways. • The Bass Lake Spur freight rail creates a barrier.
Blake Station	• Light-industrial, commercial, public uses, and single-family and multifamily residential development. • Mix of residential densities, including single-family attached and detached housing and multifamily units. • Highway commercial and Hopkins Cold Storage site and other shipping and receiving facilities provide employment opportunities. • Public uses include Blake Middle School and 43 Hoops Basketball Academy. •	• Hwy 169 and Blake Rd provide north-south connections although Hwy 169 also limits east-west pedestrian connections. • Excelsior Blvd. and Hwy 7 provide east-west connections although Hwy 7 also limits north-south pedestrian connections; east-west connectivity limited south of Excelsior Blvd. • The Cedar Lake Regional Trail provides southwest-northeast pedestrian and bicyclist connections to the station and provides a connection to the Minnesota River Bluffs LRT Regional Trail at the Depot Coffee House; North Cedar Lake Regional Trail provides north-south pedestrian and bicycle connectivity. • Sidewalks present on both sides of most roadways. • The Bass Lake Spur freight rail creates is a barrier.

[a] Within the neighborhood and community study area.

Source: Council, 2015.

TABLE 3.3-7
Community Facilities – City of Hopkins[a]

Community Facility	Station Area	Address	Type of Facility
Central Park/Hopkins Pavilion/Ice Arena	Shady Oak	101 16th Ave South	Park/recreation area/open space
Hopkins Fire Station 1	Shady Oak	101 17th Ave South	Public facility
Ubah Medical Academy	Shady Oak	1600 Main St	Educational
St. Joseph's Church	Shady Oak	1310 Main St	Place of worship
Minnesota Bluffs LRT Regional Trail	Shady Oak and Downtown Hopkins	Runs along the south side of the Twin Cities Western railroad right-of-way in Hopkins, from approx. Hwy 169, and extends to Chanhassen. Connects to the Cedar Lake LRT Regional Trail, which continues into St. Louis Park and Minneapolis.	Multiuse trail

Community Facility	Station Area	Address	Type of Facility
Hopkins Activity Center	Downtown Hopkins	33 14th Ave North	Public facility
Hopkins Center for the Arts/Mainstreet School for the Performing Arts	Downtown Hopkins	1111 Main St	Educational
Maetzold Field	Downtown Hopkins	1215 1st St N	Park/recreation area/open space
Hopkins Police Station	Downtown Hopkins	1010 1st St S	Public facility
Hopkins City Hall	Downtown Hopkins	1010 1st St S	Public facility
Hopkins Library	Downtown Hopkins	22 11th Ave N	Public facility
Hopkins Post Office	Downtown Hopkins	910 1st St S	Public facility
Downtown Park	Downtown Hopkins	40 9th Ave S	Park/recreation area
Burnes Park Ice Skating Rink	Downtown Hopkins	301 2nd St N	Park/recreation area
Overpass Aggressive Skate Park	Downtown Hopkins	100 Washington Ave S	Park/recreation area/open space
Buffer Park	Downtown Hopkins	400 5th St S	Park/recreation area/open space
Lake Minnetonka LRT Regional Trail	Downtown Hopkins	Runs north along 6th Ave S from the Cedar Lake (Southwest Regional) Trail in Hopkins in route to Minnetonka.	Multiuse trail
Cedar Lake LRT Regional Trail	Blake	Runs along the south sides of the Twin Cities Western railroad right-of-way in Hopkins and continues into St. Louis Park and Minneapolis. Connects to the Minnesota Bluffs LRT Regional Trail on the west side of Hwy 169.	Multiuse trail
Living Waters Christian Church	Blake	1002 2nd St N	Place of worship
Oakes Park	Blake	900 Lake St NE	Park/recreation area/open space
Cottageville Park	Blake	415 Blake Rd N	Park/recreation area/open space
St. John the Evangelistic Church and School	Blake	6 Interlachen Rd	Place of worship/Education
Blake School and Campus	Blake	110 Blake Rd S	Educational
Harley Hopkins Park and Family Center	Blake	501 1st St S	Park/recreation area/open space
Harley Hopkins Ice Rink	Blake	108 Jackson Ave S	Park/recreation area/open space

[a] Within the neighborhood and community study area.

Source: Council, 2015.

3.3.2.4 St. Louis Park

The City of St. Louis Park has formally recognized neighborhoods with defined geographic boundaries (see Exhibit 3.3-4), 10 of which fall partially within the study area. Table 3.3-8 describes the existing community character (e.g., development patterns, important physical features, residential neighborhoods), and community connections and barriers for each of the St. Louis Park neighborhoods within the study area. Table 3.3-9 lists the existing community facilities within the study area in the City of St. Louis Park. Community facilities are mapped on Exhibit 3.3-4.

EXHIBIT 3.3-4
Neighborhoods and Community Facilities – St. Louis Park

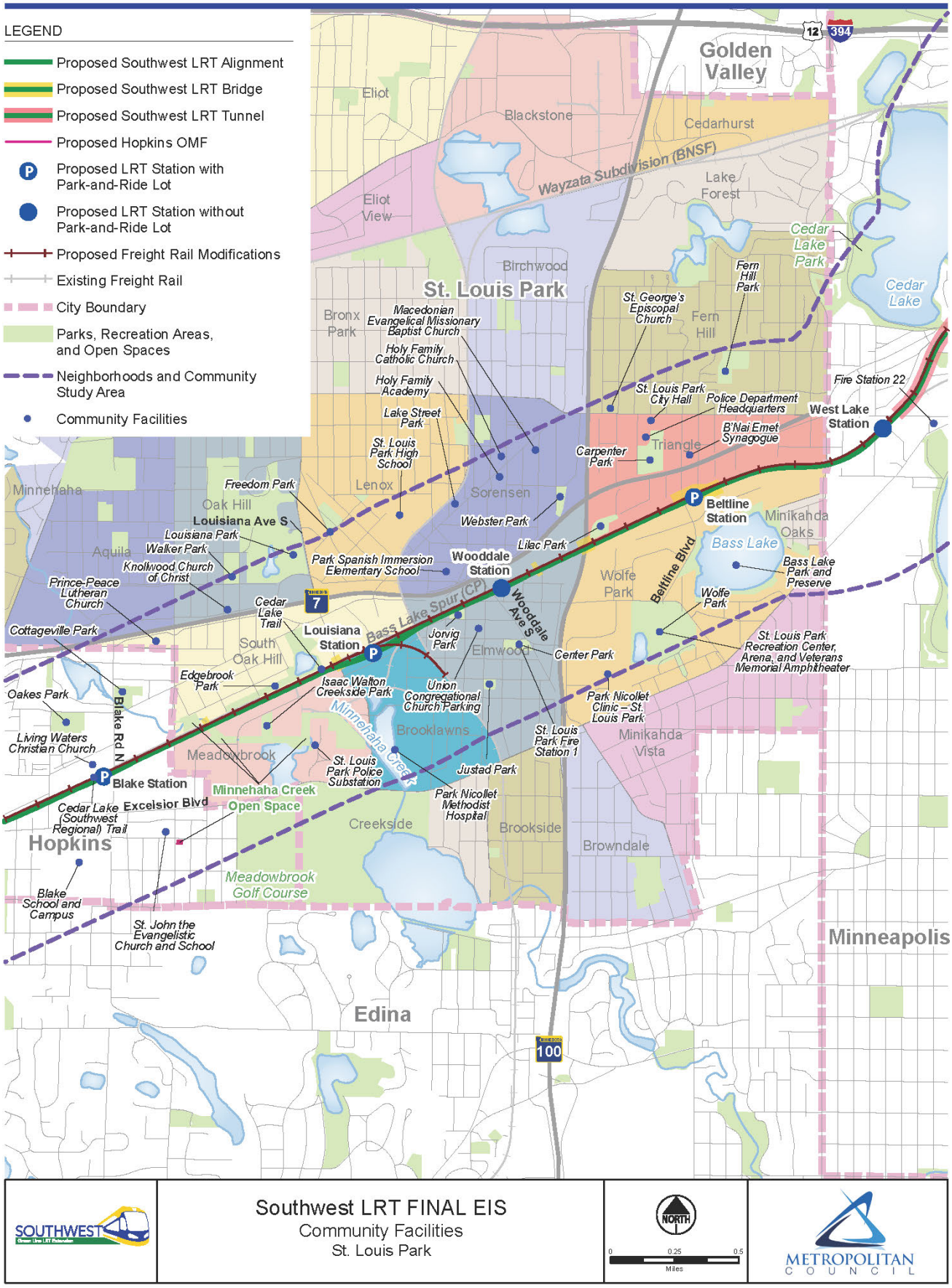


TABLE 3.3-8
Community Character – City of St. Louis Park[a]

Neighborhood[b]	Station Area	Community Character[c]	Community Connections and Barriers
Oak Hill	Louisiana Station	• This neighborhood occupies 277 acres with 26 residential blocks in the geographic center of the city. • Single-family residential is the most common land use. Parks and open space account for 25.8% of the land use, with commercial/industrial uses accounting for less than 1%. • The 1,182 residential housing units are divided between 636 single-family homes, 128 condominiums, 2 town homes, 388 apartment units, and 28 duplexes. • The largest park in the city, Oak Hill Park, is in this neighborhood.	• Louisiana Ave S provides a continuous north-south connection along the eastern border of the neighborhood and Texas Avenue S provides a continuous north-south connection along the western border of the neighborhood. • Trails along both sides of Louisiana provides bicycle access. • Minnetonka Blvd provides a continuous east-west connection along the northern border of the neighborhood as does Hwy 7, which also limits pedestrian connectivity. • The neighborhood includes a mix of grids and cul-de-sacs separated by parkland, which limit auto connectivity but provide pedestrian and bicyclist connectivity throughout the neighborhood.
South Oak Hill	Louisiana Station	• This neighborhood occupies approximately 195 acres, with 12 blocks for residential land uses. • Most of the 300 housing units are single-family detached homes (288); 12 homes are duplex units. • Commercial and industrial land uses account for approximately 27.8% of the total neighborhood's acreage. Parks and open space account for 8% of the neighborhood's land area and include Edgebrook Park.	• Louisiana Ave S provides access to a north-south connection to the neighborhood and Texas Ave N, which terminates south of Lake St, provides direct access to the neighborhood along its western border. • West Lake St provides an east-west connection that terminates at the western border of the neighborhood and does not intersect the north-south Texas Ave N connection but continues east to connect to Wooddale Ave. • Texas Ave N and West Lake St via Louisiana Ave S are the only auto accessible access points to the neighborhood. • The Cedar Lake Trail provides east-west pedestrian and bicyclist connections and provides access to the neighborhood at Rhode Island Avenue S.
Meadowbrook	Louisiana Station	• The neighborhood occupies approximately 173 acres and includes a mix of land uses. • Commercial and industrial lands account for more than 50% of the total neighborhood land area, with housing and parks or open spaces contributing much of the remaining land area. • Minnehaha Creek flows through the neighborhood, and public spaces include the St. Louis Park Municipal Service Center and Isaac Walton League/Creekside Park.	• Excelsior Blvd provides a continuous east-west connection along the southern border of the neighborhood. • Louisiana Avenue S provides a north-south connection along the eastern border of the neighborhood. • Meadowbrook Lane and Meadowbrook Blvd provide the only two access points to the curvilinear residential section of the neighborhood, with Excelsior Way a dead-end street that provides access for a single row of apartment complexes. The curvilinear nature of these streets limit pedestrian connectivity. • The Cedar Trail provides east-west pedestrian and bicyclist connections and can be accessed from Louisiana Ave S. • The Bass Lake Spur borders to the neighborhood along its northern edge and limits connectivity.
Lenox	Louisiana Station	• The neighborhood occupies a total of approximately 285 acres and includes mostly residential land use. • The residential mix is 825 single-family homes, 13 apartment units, and 30 duplex units. • The Lenox Community Center, the Senior Highway School, the St. Louis Park Public Library, Roxbury Park, Freedom Park, and Parkview Park are located in this neighborhood.	• Louisiana Ave S provides a north-south connection along the western border of the neighborhood and Dakota Ave S provides the only other continuous north-south connection through the neighborhood. • Minnetonka Blvd borders the neighborhood along its northern edge and Walker St runs east-west through the southern portion of the neighborhood. These two streets are the only continuous east-west connections through the neighborhood while Hwy 7, which runs parallel to and south of Walker St, limits connectivity. • The neighborhood is comprised of a grid except for the portion located east of Louisiana Ave S, north of Walker St, and southwest of Library Ln, which runs diagonally through the southwestern portion of the neighborhood.
Brooklawns	Louisiana Station	• The neighborhood occupies approximately 150 acres of land, with 57.8% of the land area occupied by commercial or industrial land uses.	• Louisiana Ave S provides a north-south connection along the western border of the neighborhood. Alabama Ave S provides a north-south connection from Excelsior Blvd to 36th St, which intersects Wooddale Ave.

Neighborhood[b]	Station Area	Community Character[c]	Community Connections and Barriers
		• The signature feature of the neighborhood is Methodist Hospital, a large regional hospital serving the central and southwest metropolitan region. • The neighborhood is bordered to the north by the Bass Lake Spur freight railroad corridor, which has contributed to the development of industrial land uses.	• Trails along both sides of Louisiana provides bicycle access. • Excelsior Blvd provides the only continuous east-west connection with four access points to the neighborhood. • Oxford St provides access to the northern portion of the neighborhood from Louisiana Ave S and Cambridge St provides access from Alabama Ave S but both streets terminate within the neighborhood and are connected by the north-south running Edgewood Ave S, which also terminates within the neighborhood. • Although the Cedar Lake Trail runs along the northern border of the neighborhood, the closest access point from the neighborhood is at Wooddale Ave S. • Access to the neighborhood is limited by the MN&S Spur along its eastern border and by the Bass Lake Spur along its northern border; connectivity within the neighborhood is limited by the Skunk Hollow switching wye that bisects Brunswick Ave S.
Sorenson	Wooddale Station	• The neighborhood comprises approximately 208 acres, most of which is residential use. • Commercial, industrial, and parks and open spaces contribute a small percentage of the land use in the neighborhood. • Civic facilities include the Central Community Center, Keystone Park, and Webster Park.	• Hwy 7 provides an east-west connection along the southern border of the neighborhood but greatly limits connectivity to the neighborhood. • The only southern access point to the neighborhood is along the diagonally running Wooddale Ave S, which becomes Dakota Ave S as it turns directly north. • Hwy 100 is a north-south connection but greatly limits east-west connectivity along the eastern border of the neighborhood. • The neighborhood is comprised of an asymmetrical grid with West Lake St bisecting the neighborhood diagonally southwest from Walker St and runs northeast to Minnetonka Blvd. • Access to the neighborhood is limited by the MN&S Spur along its western border. • The east-west running Cedar Lake Trail can be accessed from Wooddale Ave S. • Commercial and residential areas are generally served by intermittent sidewalk network; sidewalks are lacking in industrial areas.
Elmwood	Wooddale Station	• The neighborhood occupies approximately 232 acres of land and includes 518 housing units. The housing stock is split between single-family detached units (272), apartments (168), and duplex units (78). • One of St. Louis Park's oldest neighborhoods, with roots dating back to the 1880s, when housing development was influenced by the railroad. • Many of the city's original homes are located in this neighborhood. • Two neighborhood parks, Jorvig Park and Justad Park, are located in the neighborhood, as is St. Louis Park Fire Station #1 on Wooddale Dr.	• Hwy 7 provides an east-west connection north of the neighborhood but greatly limits the connectivity of the neighborhood. The only northern access point to the neighborhood is along Wooddale Ave S. • Excelsior Blvd. provides an east-west connection with three access points to the neighborhood. • Hwy 100 provides a north-south connection with an exit to Wooddale Ave S, but greatly limits east-west connectivity. • The neighborhood is comprised of a grid with Wooddale Ave S running diagonally northwest to southwest. • The MN&S Spur borders to the neighborhood along the entire length of its western border and greatly limits connectivity. • Trails along some roadways and the Cedar Lake Regional Trail provide bicycle access. • The east-west running Cedar Lake Trail can be accessed from Wooddale Ave S.
Triangle	Beltline Station	• The neighborhood is approximately 190 acres and includes a mixture of land uses, including residential, commercial, industrial, public, and public buildings and parks and open space. • The neighborhood dates back to 1887 and was one of St. Louis Park's earliest subdivisions.	• Hwy 100 is a north-south connection that runs along the western border of the neighborhood but greatly limits east-west connectivity. • Beltline Blvd provides the only continuous north-south connection through the neighborhood. • East-west connections are Hwy 7, which greatly limits north-south connectivity, and Minnetonka Blvd, which runs along the northern border of the neighborhood.

Neighborhood[b]	Station Area	Community Character[c]	Community Connections and Barriers
		• There are a variety of housing styles and types, including single-family detached, apartments, duplexes, and townhomes. • Civic land uses include City Hall, the city police station, and Carpenter Park.	• The neighborhood is bordered along its entire southern border by the east-west running Cedar Lake Trail and the Bass Lake Spur; the Cedar Lake Trail can be accessed at Beltline Blvd or by a trail connection at Carpenter Park. The Bass Lake Spur limits north-south connectivity.
Wolfe Park	Beltline Station	• The Wolfe Park neighborhood is approximately 386 acres and is the largest neighborhood in St. Louis Park. • The land uses in the neighborhood are a mixture of high-density housing, commercial and industrial land uses, and parks and open spaces. • On the south side, the neighborhood is bordered by Excelsior Blvd, one of St. Louis Park's primary commercial activity centers. • The neighborhood has several amenities, including the Excelsior and Grand Commons mixed-use development, Wolfe Park, the St. Louis Park Recreation Center, and Bass Lake.	• Hwy 100 is a north-south connection that runs along the western border of the neighborhood but greatly limits east-west connectivity. • Beltline Blvd. is a north-south connection through the neighborhood that provides the only northern access point to the neighborhood and terminates at 36th St W. • W 36th St is an east-west connection that becomes Monterey Dr as it turns south to meet Excelsior Blvd. • Excelsior is an east-west connection that provides southern access points to the neighborhood at Park Center Blvd and Monterey Dr. • The neighborhood is bordered along its entire northern border by the east-west running Cedar Lake Trail and the Bass Lake Spur; the Cedar Lake Trail can be accessed at Beltline Blvd, Park Glen Rd, and France Ave S; the Bass Lake Spur greatly limits north-south connectivity.
Minikahda Oaks	Beltline Station	• A very small residential neighborhood, occupying approximately 30 acres with 4 residential blocks. Parks and open space account for 22.3% of the land use, with commercial uses accounting for 2.3%. • The 77 residential housing units are all single-family homes. There is one park (Bass Lake Park) in this neighborhood.	• The only auto connections to the neighborhood are Minikahda Court and France Ave S via Excelsior Blvd, which runs along the southern border of the neighborhood. • France Ave S provides the only north-south connection to the majority of the neighborhood. Minikahda Court provides the only access to the southern portion of the neighborhood. • The neighborhood is bordered on its west by the Bass Lake Preserve, by the Cedar Lake Trail and Bass Lake Spur to its north, and on its east by the Minikahda Club, which limit auto connectivity.

[a] Within the neighborhood and community study area.

[b] Formally designated by the City of St. Louis Park.

[c] Applies to entire neighborhood and not just the study area.

Source: City of St. Louis Park, Neighborhoods Webpage, Access September, 2015 (http://www.stlouispark.org/list-of-neighborhoods.html).

TABLE 3.3-9
Community Facilities – City of St. Louis Park[a]

Community Facility	Neighborhood/ Station Area	Address	Type of Facility
Cedar Lake Regional LRT Trail	Triangle, Elmwood, South Oak Hill/Beltline, Wooddale, Louisiana	Between Hwy 7 and existing Bass Lake Spur freight rail rights-of-way. Extends from Hopkins, through St. Louis Park, and into Minneapolis.	Multiuse trail
Prince-Peace Lutheran Church	South Oak Hill/Blake	8115 Hwy 7	Place of worship
Edgebrook Park	South Oak Hill/Louisiana	3920 Pennsylvania Ave	Park/recreation area/open space
Isaac Walton Creekside Park	Meadowbrook/Louisiana	7341 Oxford St	Park/recreation area/open space
Minnehaha Creek Open Space	Meadowbrook/Louisiana	East of Louisiana Ave and north of Excelsior Blvd	Park/recreation area/open space
St. Louis Park Police Substation	Meadowbrook/Louisiana	4072 Meadowbrook Ln	Public facility
Knollwood Church of Christ	Oak Hill/Louisiana	3639 Quebec Ave S	Place of worship

Community Facility	Neighborhood/ Station Area	Address	Type of Facility
Walker Park	Oak Hill/Louisiana	3500 Pennsylvania Ave S	Park/recreation area/open space
Louisiana Park	Oak Hill/Louisiana	3500 Louisiana Ave S	Park/recreation area/open space
Union Congregational Church Parking	Elmwood/Wooddale	3700 Alabama Ave S	Place of worship
Center Park	Elmwood/Wooddale	3750 Wooddale Ave	Park/recreation area/open space
Jorvig Park	Elmwood/Wooddale	6100 W 37th St	Park/recreation area/open space
Justad Park	Elmwood/Wooddale	5917 Cambridge St	Park/recreation area/open space
St. Louis Park Fire Station 1	Elmwood/Wooddale	3750 Wooddale Ave	Public facility
Holy Family Catholic Church	Sorensen/Wooddale	5900 W Lake St	Place of worship
Holy Family Academy	Sorensen/Wooddale	5925 W Lake St	Educational
Macedonian Evangelical Missionary Baptist Church	Sorensen/Wooddale	3208 Xenwood Ave S	Place of worship
Lake Street Park	Sorensen Wooddale	6212 W Lake St	Park/recreation area/open space
Park Spanish Emersion Elementary School	Sorensen/Wooddale	6300 Walker St	Educational
Webster Park	Sorensen/Wooddale	3301 Webster Ave	Park/recreation area/open space
Freedom Park	Lenox/Louisiana	3261 Gorham Ave	Park/recreation area/open space
St. Louis Park High School	Lenox/Wooddale	6425 W 33rd St	Educational
B'Nai Emet Synagogue	Triangle/Beltline	3115 Ottawa Ave S	Place of worship
Lilac Park	Triangle/Wooddale	NE quadrant of Hwy 100 and Bass Lake Spur right-of-way	Park/recreation area/open space
St. Louis Park City Hall	Triangle/Beltline	5005 Minnetonka Blvd	Public facility
Police Department Headquarters	Triangle/Beltline	3015 Raleigh Ave S	Public facility
Carpenter Park	Triangle/Beltline	3001 Raleigh Ave S	Park/recreation area/open space
St George's Episcopal Church	Fern Hill/Beltline	5224 Minnetonka Blvd	Place of worship
Fern Hill Park	Fern Hill/Beltline	4421 28th St W	Park/recreation area/open space
Bass Lake Park and Preserve	Wolfe Park/Beltline	3450 Glenherst Ave	Park/recreation area/open space
St. Louis Park Recreation Center, Arena, and Veterans Memorial Amphitheater	Wolfe Park/Beltline	3700 Monterey Dr	Park/recreation area
Wolfe Park	Wolfe Park/Beltline	3700 Monterey Dr	Park/recreation area
Park Nicollet Clinic – St. Louis Park	Wolfe Park/Wooddale	3800 Park Nicollet Blvd	Healthcare clinic
Park Nicollet Methodist Hospital	Brooklawns/Louisiana	6500 Excelsior Blvd	Hospital

[a] Within the neighborhood and community study area.

Source: Council, 2015.

3.3.2.5 Minneapolis

The City of Minneapolis has formally recognized neighborhoods with defined geographic boundaries (see Exhibit 3.3-5), nine of which fall partially within the study area.[18] With an active freight rail alignment (i.e., Bass Lake Spur and Kenilworth Corridor) creating a barrier to community connectivity, the locations of crossings where motorists, pedestrians and bicyclists can safely cross the tracks is an important feature of the community. Today, the crossings are located at West Lake Street, Cedar Lake Parkway, Burnham Road, Penn Avenue South, Van White Memorial Parkway, East Lyndale Avenue, Glenwood Avenue, Royalston Avenue, and South 10th Street. The Kenilworth Regional Trail and the Cedar Lake Regional Trail also parallel the freight corridors throughout the City of Minneapolis, providing regional connectivity for pedestrians and bicyclists.

Table 3.3-10 describes the existing community character (e.g., development patterns, important physical features, residential neighborhoods) and the community connections and barriers for each of the Minneapolis neighborhoods within the study area. Table 3.3-11 lists the existing community facilities within the study area in the City of Minneapolis. Community facilities are mapped on Exhibit 3.3-5.

TABLE 3.3-10
Community Character – City of Minneapolis[a]

Neighborhood[b]	Station Area	Community Character	Community Connections and Barriers
West Calhoun	West Lake Station	• Principally residential, including both medium- to high-density multifamily housing and low-density, single-family homes. • Includes a shopping center in the area of W Lake St. Lake Calhoun and the Minikahda Golf Course are community facilities located in this neighborhood.	• W Lake St is an east-west connection that provides access to the neighborhood. • Excelsior Blvd provides a diagonally-running east-west continuous connection through the neighborhood. • W Calhoun Pkwy runs north-south along Lake Calhoun, which is also the eastern border of the neighborhood. • Neighborhood connectivity is limited by the Bass Lake Spur, which runs within the northeastern corner of the neighborhood. • The east-west Cedar Lake LRT Regional Trail provides pedestrian and bicycle access to the Station from the southwest and northeast; this trail becomes the Midtown Greenway at W Lake St, can be accessed via Chowen Ave S and Abbott Ave S.
Cedar Isles Dean	West Lake and 21st Street Stations	• Lake of the Isles, Cedar Lake, and the Kenilworth Lagoon are natural amenities that contribute to the character of the neighborhood and define its borders. • There are single-family residential neighborhoods to the east and west of the Kenilworth Corridor.	• W Lake St is an east-west connection that provides many access points to the neighborhood. • Cedar Lake Pkwy is a north-south route that provides connectivity within the neighborhood. • Drew Ave S and Chowen Ave S provide north-south connections in the southwestern portion of the neighborhood and Dean Pkwy provides a north-south connection in the southeastern portion of the neighborhood. • The southwestern portion of the neighborhood is grid-like with the diagonally-running Sunset Blvd running east from France Ave S to Cedar Lake Ave. • The eastern half of the neighborhood is characterized by curvilinear streets, which limit pedestrian and bicycle connectivity as compared to a traditional street grid. • The Midtown Greenway runs east-west through the neighborhood and becomes the Kenilworth Trail at Cedar Lake Ave where it meets the Cedar Lake Trail that runs along western half of Cedar Lake. • Kenilworth Trail provides bicycle access to the 21st Street Station from the north and south, but residential roadways must be used for access from the east.

[18] There are two historic (listed or eligible) neighborhood residential districts within the City of Minneapolis, including the Lake of the Isles Residential Historic District, and the Kenwood Parkway Residential Historic District. Refer to Section 3.5 for more information on historic districts.

Neighborhood[b]	Station Area	Community Character	Community Connections and Barriers
Kenwood	21st Street and Penn Stations	• Primarily a residential community. • Homes are built on the shores of Cedar Lake, while Lake of the Isles homes are set back from the lake on parkways, which provide low-speed routes for cars and paved or dirt trail systems for bikes, joggers, and walkers. • The Kenilworth Lagoon connects Cedar Lake and Lake of the Isles and is used for boaters to travel between the lakes.	• W. Lake of the Isles Pkwy is a connection through the neighborhood that runs along the northern portion of Lake of the Isles and is the only southern access point for vehicles to the neighborhood. • Kenwood Pkwy and Penn Ave S are north-south connections through the neighborhood • Burnham Road is the only western access point for vehicles to the neighborhood. • W 21st St is an east-west connection that bisects Penn Avenue S and terminates in the west at Cedar Lake and in the east at W Lake of the Isles Pkwy. • The neighborhood is characterized by curvilinear streets and limited auto access into the neighborhood. • The Kenilworth Trail is a north-south pedestrian and bicyclist connection that runs along the western edge of development within the neighborhood until it meets the Cedar Lake Trail at the northern edge of the neighborhood. Bike and pedestrian paths around the Lake of the Isles also connect to the neighborhood. • The Bass Lake Spur runs adjacent to the Kenilworth Trail and creates a barrier to travel.
Bryn-Mawr	Penn and Van White Stations	• The neighborhood includes residential and neighborhood-scale commercial land uses, as well as abundant parkland, including Theodore Wirth Park, Bassett Creek, Bryn Mawr Meadows, and Cedar Lake Park. • Bordered on the south by the BNSF Wayzata Subdivision railroad corridor and the Cedar Lake Regional Trail.	• The neighborhood is bordered by the Bass Lake Spur to the south and the Wayzata Subdivision to the north. • The neighborhood is bisected by Hwy 394, which limits north-south connectivity. • The only southern access points into the southwestern portion of the neighborhood are Ewing Ave S. and Cedar Lake Pkwy. Cedar Lake Pkwy provides the only continuous north-south connection through the neighborhood where it turns into Theodor Wirth Pkwy as it crosses Hwy 394. Penn Avenue S and Van White Memorial Blvd. are two other north-south connections. • Pedestrian and bicyclist connections are the Cedar Lake Trail, which runs along the southern border of the neighborhood, and Bassett's Creek Trail, which runs through Bryn Mawr Meadows Park to connect with the Cedar Lake Trail.
Harrison	Penn and Van White Stations	• A mix of land uses, including residential, neighborhood commercial, and industrial. • The neighborhood is bordered by Theodore Wirth Park, Olson Hwy (Hwy 55), I-394, and I-94. Features include Bassett Creek Park along Bassett Creek. • Bordered on the south by the BNSF Wayzata Subdivision railroad corridor and the Cedar Lake LRT Regional Trail.	• Hwy 55 is an east-west connection, but it limits north-south connectivity within the neighborhood. • Glenwood Avenue is the major east-west connection through the neighborhood and provides connections throughout the neighborhood. • Hwy 94 is a north-south connection that also limits connectivity to and from the neighborhood. • The Wayzata Subdivision railroad borders the neighborhood to the south except where it runs through the northeastern portion of the neighborhood in Theodore Wirth Park, creating a barrier to travel. • Bassett Creek Trail and the Luce Line Extension provide several north-south and east-west pedestrian and bicyclist connections within the neighborhood. The Cedar Lake Trail can be accessed from the northernmost portion of the neighborhood by the Bassett Creek Trail via W Chestnut Avenue then Cedar Lake Road S, which connects with the southern portion of Bassett's Creek Trail with its northern portion.
Sumner Glenwood	Van White Station	• Hwy 55 bisects the neighborhood, with I-94 serving as the eastern boundary. • North of Hwy 55, the neighborhood is made up of predominantly single-family detached and low-rise apartment buildings. • A regional commercial use, International Market Square, is located along the neighborhood's southern border. • A charter school, vocational school, and public library are located on Hwy 55.	• Hwy 94 is a north-south connection along the eastern border of the neighborhood, but it limits connectivity to and from the neighborhood. Van White Memorial Blvd, N Bryant Ave, and West Lyndale Ave N provide north-south connections through the neighborhood. • Hwy 55 is an east-west connection that bisects the neighborhood and limits connectivity. • Glenwood Avenue is an east-west connection along the eastern border of the neighborhood and provides many access points to the neighborhood.

Neighborhood[b]	Station Area	Community Character	Community Connections and Barriers
Lowry Hill	Van White Station	• The neighborhood has a mix of land uses but is primarily a retail commercial and residential neighborhood, with some multiunit apartment buildings, brownstone walkups, condominiums, and single-family detached housing. • The Walker Art Gallery, Minneapolis Sculpture Garden, and Dunwoody Technical Institute are located in this neighborhood.	• Hwy 394 is an east-west connection that borders the neighborhood to the north, but it limits neighborhood connectivity. Hwy 94 borders the northeastern portion of the neighborhood and also presents connectivity challenges. • Lyndale Ave S and Hennepin Ave are north-south connections that extend along the northeastern border of the neighborhood • Kenwood Pkwy, Douglas Ave, Summit Ave, W Franklin Ave, and W 22nd St are east-west connections that extend across the neighborhood from its western to eastern borders. • The Cedar Lake Trail runs north along Hwy 394 to connect with Bassett's Creek Trail and along Kenwood Pkwy to connect with the Loring Greenway.
North Loop	Royalston Station	• The neighborhood has experienced redevelopment of warehouse buildings into apartments, condominiums, lofts, offices, and artist studio spaces. • The Minneapolis Farmers Market is located in this neighborhood.	• Hwy 94 borders the neighborhood along its western border and Hwy 394 borders the neighborhood along its southern and most of its eastern border. Both highways present connectivity challenges. • Plymouth Ave N is an east-west connection that borders the neighborhood to the north and N 3rd St is a north-south diagonally-running connection along the northeastern border of the neighborhood. N 7th St is also a north-south diagonally-running connection through the neighborhood. • Olson Memorial Hwy and Glenwood Ave are also east-west connections through the neighborhood. • The Cedar Lake Trail provides an east-west pedestrian and bicyclist connection through the southern half of the neighborhood. • The Wayzata Subdivision railroad runs, which along the Cedar Lake Trail, creates a barrier to travel to north-south connections through the neighborhood.
Downtown West	Target Field Station[c]	• The Downtown West neighborhood is an intensely developed urban core and central business district of downtown Minneapolis, with many high-rise office commercial towers, shopping centers, and entertainment facilities. • Residential land uses are concentrated along the Mississippi River and some high- and medium-rise housing is available.	• Hwy 394 borders the neighborhood to the northwest and is an importation connection that limits connectivity to and from the neighborhood. • Hennepin Ave borders the neighborhood along its northern border and provides connectivity. • This neighborhood is characterized by large city blocks with several designated bicycle lanes.

[a] Within the neighborhood and community study area.

[b] Formally designated by the City of Minneapolis.

[c] Target Field Station is an existing light rail station that will connect to the Southwest LRT Project.

Source: City of Minneapolis, Neighborhoods Webpage, Access September, 2015 (http://www.ci.minneapolis.mn.us/neighborhoods/).

TABLE 3.3-11
Community Facilities – City of Minneapolis[a]

Community Facility	Neighborhood/ Station Area	Address	Type of Facility
Fire Station 22	West Calhoun/West Lake	3025 Market Plaza	Public facility
Minneapolis Chain of Lakes Regional Park, which includes Cedar Lake, Lake of the Isles, Lake Calhoun, Kenilworth Lagoon, Theodore Wirth Parkway	West Calhoun, Cedar-Isles Dean, Kenwood, Lowry Hill/West Lake, 21st, Penn	N/A[b]	Park/recreation area/open space
Kenilworth Trail	West Calhoun, Cedar-Isles Dean, Kenwood/West Lake, 21st, Penn	Generally runs along the east side of the Kenilworth Corridor and connects to the Cedar Lake Regional LRT Trail on the west and the Cedar Lake Trail on the east	Multiuse trail
Cedar Lake Trail	Kenwood, Bryn Mawr, Lowry Hill, North Loop/Penn, Wan White, Royalston	Generally runs along the south side of the Wayzata Subdivision freight rail alignment	Multiuse trail
Midtown Greenway	West Calhoun, Cedar-Isles Dean/ West Lake	Generally runs east-west between Lake of the Isles and Lake Calhoun, parallel to Lake Street, until merging with the Kenilworth Corridor	Multiuse trail
Alcott Triangle	Cedar-Isles Dean	3400½ 29th St W	Park/recreation area/open space
Park Siding Park	Cedar-Isles Dean	3113 28th St W	Park/recreation area/open space
Kenwood Elementary	Kenwood/21st Street	2013 Penn Ave S	Educational
Performing Arts Magnet	Kenwood/21st Street	2013 Penn Ave S	Educational
Kenwood Park	Kenwood/Penn	2101 Franklin Ave W	Park/recreation area/open space
Lake of the Isles Lutheran Church	Kenwood/21st Street	2020 W Lake of the Isles Pkwy	Place of worship
St. Paul's Episcopal Church	Lowry Hill/Penn	1917 Logan Ave S	Place of worship
The Parade	Lowry Hill/Van White	400 Kenwood Pkwy	Park/recreation area/open space
Thomas Lowry Park	Lowry Hill/Van White	Douglas/Mt. Curve Ave	Park/recreation area/open space
Blake School Northrup Campus	Lowry Hill/Van White	511 Kenwood Pkwy	Educational
Loring Park	Loring Park/Van White	1500 Willow St	Park/recreation area/open space
Dunwoody Institute	Lowry Hill/Van White	818 Dunwoody Blvd	Educational
Basilica of St. Mary	Lowry Hill/Van White	88 17th St N	Place of worship
Minneapolis Community and Technical College	Loring Park/Van White	1501 Hennepin Ave	Educational
KIPP Charter School	Loring Park/Van White	1601 Laurel Ave	Educational
Fair School – Downtown	Downtown West/Royalston	10 S 10th St	Educational
Orpheum Theater	Downtown West/Royalston	910 Hennepin Ave	Commercial
State Theater	Downtown West/Royalston	805 Hennepin Ave	Commercial

Community Facility	Neighborhood/ Station Area	Address	Type of Facility
Pantages Theater	Downtown West/Royalston	710 Hennepin Ave	Commercial
First Avenue/7th Street Entry	Downtown West/Royalston	701 1st Ave N	Commercial
Augsburg Academy for Health Careers	Downtown West/Royalston	730 Hennepin Ave	Educational
Target Field	North Loop/Royalston	353 N 5th St	Sports stadium
Ubah Medical Academy Charter School	North Loop/Royalston	277 12th Ave N	Educational
Minnesota International Middle Charter School	North Loop/Royalston	277 12th Ave N	Educational
Twin Cities International Elementary	North Loop/Royalston	277 12th Ave N	Educational
Sumner Park	Sumner-Glenwood/Royalston	Bryant Ave/Olson Memorial Hwy	Park/recreation area/open space /open space
Bassett Creek Valley Park	Harrison/Van White	110 Penn Ave N	Park/recreation area
Fire Station 16	Harrison/Van White	1600 Glenwood Ave N	Public facility
Bryn Mawr Meadows Park	Bryn-Mawr/Penn	601 Morgan Ave S	Park/recreation area/open space
Bryn Mawr Elementary	Bryn-Mawr/Penn	252 Upton Ave S	Educational
Anwatin Middle School	Bryn-Mawr/Penn	256 Upton Ave S	Educational
Fire Station 4	North Loop/Royalston	1101 N 6th St	Public facility
Minneapolis Farmers Market	North Loop/Royalston	312 East Lyndale Ave N	Commercial

[a] Within the neighborhood and community study area.

[b] N/A = address is not applicable due to the size of the park. The Minneapolis Chain of Lakes Regional Park covers approximately 1,555 acres in nine neighborhoods in Minneapolis and St. Louis Park. Associated with the Minneapolis Chain of Lakes Regional Park is the 52-mile Grand Rounds National Scenic Byway, which is part of FHWA's National Scenic Byway Program. For a map of the Grand Rounds Scenic Byway, see http://www.fhwa.dot.gov/byways/byways/2243/maps.

Source: Council, 2015

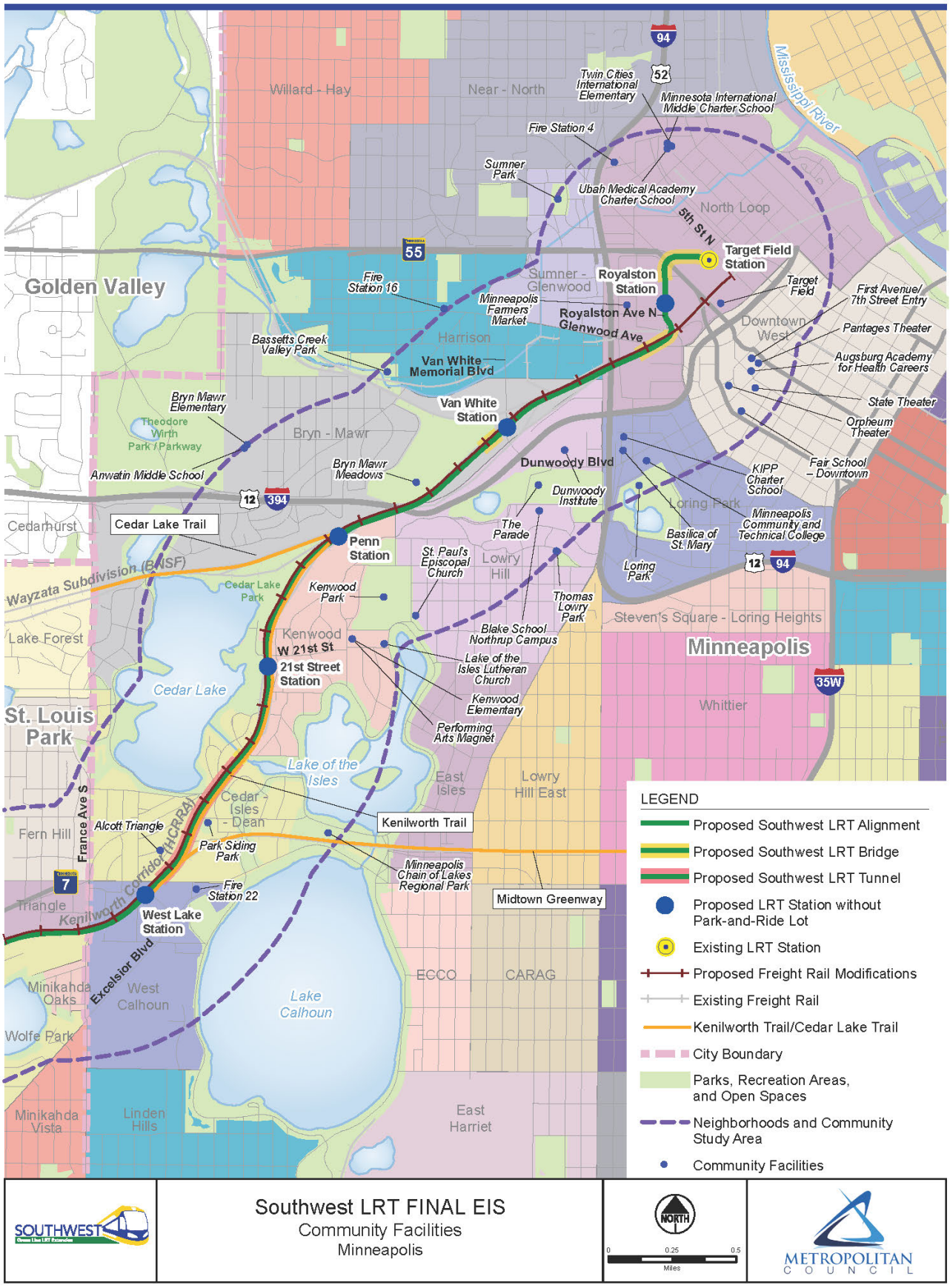
3.3.3 Environmental Consequences

This section identifies the long-term and short-term direct and indirect impacts on neighborhoods and communities from the Project. The evaluation of neighborhood and community effects includes an assessment of potential changes to community facilities access, community character, and community cohesion (refer to Section 3.3.3.1 for the methodology). This analysis considers evaluation measures that are based on the analysis for other environmental categories documented in this Final EIS. Refer to these other sections of the Final EIS for additional information regarding land use (Section 3.1), property acquisitions (Section 3.4), visual quality and aesthetics (Section 3.7), noise (Section 3.12), vibration (Section 3.13), and transportation (Chapter 4).

3.3.3.1 Long-term Direct Impacts on Neighborhoods and Communities

This section includes a summary of the potential direct and indirect impacts of the Project and the effect of those impacts on access to community facilities, community character, and community cohesion. The analysis in this section is organized by community (i.e., Eden Prairie, Minnetonka, Hopkins, St. Louis Park, and Minneapolis), moving from southwest to northeast (see Exhibits 3.3-1 and 3.3-5).

EXHIBIT 3.3-5
Neighborhoods and Community Facilities – Minneapolis



Eden Prairie

As shown in Table 3.3-12 and summarized below, there will be no adverse impacts to community facilities, community character, or community cohesion within the City of Eden Prairie:

- **Community Facilities.** There are seven community facilities within the study area in the City of Eden Prairie (see Table 3.3-3 and Exhibit 3.3-1), including two educational facilities, one place of worship, three park/recreation areas, and one healthcare provider. Based on measures described in Table 3.3-12, none of these facilities will be adversely affected by the Project.
- **Community Character.** Some changes in visual character directly next to the proposed light rail alignment and associated improvements (e.g., structured park-and-ride lots, roadway modifications) may occur. Also, acquisition of some commercial, industrial, and residential properties is anticipated. These changes will be confined to limited areas and will not adversely impact the overall community character in the Eden Prairie portion of the study area.
- **Community Cohesion.** While changes in the local roadway, pedestrian, and bicycle networks will occur, existing roadway and sidewalk/trail connectivity and access will be maintained or improved, and there will be no adverse impacts to community cohesion within the study area in Eden Prairie.

TABLE 3.3-12
Impacts to Community Facilities, Community Character, and Community Cohesion – Eden Prairie

Station Area	Impact Category	Long-term Effects by Impact Criteria/Measure
SouthWest Station	Community Facilities	• *Property acquisition and displacement:* None. • *Noise and vibration impacts*: None. • *Changes in roadway access*: Some roadway modifications within the general vicinity of community facilities, but access to these facilities will be maintained. • *Changes to transit access*: Benefit of improved transit access to St. Andrew Lutheran Church, Eden Prairie Center Clinic, and Purgatory Creek Park.
	Community Character	• *Noise and vibration impacts:* No adverse impacts after mitigation • *Visual changes:* Moderate level of impact on representative viewpoints. As a mitigation, the Council will implement the *Visual Quality Design Guidelines for Key Structures* (Council, 2015 – refer to Appendix C to access the Guidelines). Considering mitigation, the Project will not change the overall visual quality of the area. • *Property conversion, acquisitions, and displacements:* Full acquisition of one commercial parcel (approx. one acre) and partial acquisition of eight commercial parcels (approximately 11 acres). These acquisitions are not anticipated to change the overall land use of the surrounding areas. • *New at-grade light rail crossings of roadways and pedestrian/bicycle facilities:* None.
	Community Cohesion	• *New physical barriers:* LRT alignment will be on a new right-of-way near the proposed SouthWest Station (i.e., west LRT/Technology Dr intersection to east LRT/Technology Dr) (see Appendix E for the Project's preliminary engineering plans). The new light rail right-of-way will create a new physical barrier, but all existing roadway, sidewalk, and trail connections and access points will be maintained. • *Changes to the local roadway network:* New roadway turning lanes, changes in the number of through lanes, and other roadway geometric modifications (see Appendix E for a more detailed description of the changes to the local roadway network). All existing roadway connections will be maintained. • *Changes to the pedestrian and bicycle network:* None. • *Changes to vehicle parking:* Addition of 450 park-and-ride spaces and reduction of 18 off-street parking spaces at commercial properties. Loss in off-street parking will not adversely affect surrounding neighborhoods because there will be adequate parking supply to meet the needs of the existing land uses (see Section 4.3.3 for more information on parking impacts).
Eden Prairie Town Center Station[a]	Community Facilities	• *Property acquisition and displacement:* None. • *Noise and vibration impacts*: None. • *Changes in roadway access*: None. • *Changes to transit access*: Benefit of improved transit access to Northwest Technical Institute.
	Community Character	• *Noise and vibration impacts:* No adverse impacts after mitigation. • *Visual changes:* Low level of impact on representative viewpoint within this area. • *Property conversion, acquisitions, and displacements:* Full acquisition of one commercial parcel (approx. 2.3 acres) and partial acquisition of seven commercial and residential parcels (3.5 acres).

Station Area	Impact Category	Long-term Effects by Impact Criteria/Measure
		There will be no residential displacements and these acquisitions are not anticipated to change the overall land use of the surrounding areas. • *New at-grade light rail crossings of roadways and pedestrian/bicycle facilities:* One new at-grade light rail/roadway crossing, which will be controlled by flashing lights and gates to allow for safe crossings by pedestrians and vehicles and to maintain acceptable traffic operations.
	Community Cohesion	• *New physical barriers:* LRT alignment will be on a new right-of-way from Prairie Center Dr to Eden Road, immediately west of the proposed Town Center Station (see Appendix E for the Project's preliminary engineering plans). The new light rail right-of-way will create a new physical barrier, but all existing roadway, sidewalk, and trail connections and access points will be maintained. • *Changes to the local roadway network:* New roadway extension connecting Eden Road and Single Tree Lane, and other roadway geometric modifications will provide enhanced access to/from the proposed station (see Appendix E for a more detailed description of the changes to the local roadway network). All existing roadway connections will be maintained. • *Changes to the pedestrian and bicycle network:* None. • *Changes to vehicle parking:* Addition of 150 on-street parking spaces and reduction of 131 off-street parking spaces. Loss in off-street parking will not adversely affect surrounding neighborhoods because there will be adequate parking supply to meet the needs of the existing land uses (see Section 4.3.3 for more information on parking impacts).
Golden Triangle Station	Community Facilities	• *Property acquisition and displacement:* None. • *Noise and vibration impacts*: None. • *Changes in roadway access*: None. • *Changes to transit access*: Benefit of improved transit access to Eagle Ridge Academy, Nine Mile Creek Conservation Area, and Flying Cloud Dog Park.
	Community Character	• *Noise and vibration impacts:* No adverse impacts after mitigation. • *Visual changes:* Substantial level of impact on representative viewpoint within this area. As a mitigation, the Council will implement the *Visual Quality Design Guidelines for Key Structures* (Council, 2015 – refer to Appendix C to access the Guidelines). The Project will also include mitigation measures identified in Section 3.7.4. Considering these mitigation measures, the Project will not adversely affect the overall visual quality of the neighborhood. • *Property conversion, acquisitions, and displacements:* Partial acquisition of 13 commercial and industrial parcels (approx. 10.4 acres). These acquisitions are not anticipated to change the overall land use of the surrounding areas. • *New at-grade light rail crossings of roadways and pedestrian/bicycle facilities:* One new at-grade light rail/roadway crossing, which will be controlled by flashing lights and gates to allow for safe crossings by pedestrians and vehicles and to maintain acceptable traffic operations.
	Community Cohesion	• *New physical barriers:* LRT alignment will be partially located on a new right-of-way from Flying Cloud Dr to Shady Oak Rd (see Appendix E for the Project's preliminary engineering plans). The new light rail right-of-way will create a new physical barrier, but all existing roadway, sidewalk, and trail connections and access points will be maintained. • *Changes to the local roadway network:* Slight realignment of West 70th St and related geometric modifications (see Appendix E for a more detailed description of the changes to the local roadway network). All existing roadway connections will be maintained. • *Changes to the pedestrian and bicycle network:* None. • *Changes to vehicle parking:* Addition of 200 park-and-ride spaces and reduction of 237 off-street parking spaces. Loss in off-street parking will not adversely affect surrounding neighborhoods because there will be adequate parking supply to meet the needs of the existing land uses (see Section 4.3.3 for more information on parking impacts).
City West Station	Community Facilities	• *Property acquisition and displacement:* None. • *Noise and vibration impacts*: None. • *Changes in roadway access*: None. • *Changes to transit access*: None.
	Community Character	• *Noise and vibration impacts:* No adverse impacts after mitigation • *Visual changes:* None. • *Property conversion, acquisitions, and displacements:* Full acquisition of six commercial parcels (9.7 acres) and partial acquisition of 13 commercial and industrial parcels (approx. 3 acres). These acquisitions are not anticipated to change the overall land use of the surrounding areas. • *New at-grade light rail crossings of roadways and pedestrian/bicycle facilities:* None.
	Community Cohesion	• *New physical barriers:* None. • *Changes to the local roadway network:* Slight realignment of West 62nd St and related geometric modifications (see Appendix E for a more detailed description of the changes to the local roadway network). All existing roadway connections will be maintained.

Station Area	Impact Category	Long-term Effects by Impact Criteria/Measure
		• *Changes to the pedestrian and bicycle network:* None. • *Changes to vehicle parking:* Addition of 160 park-and-ride spaces and reduction of 81 off-street parking spaces. Loss in off-street parking will not adversely affect surrounding neighborhoods because there will be adequate parking supply to meet the needs of the existing land uses (see Section 4.3.3 for more information on parking impacts).

[a] As described in Section 2.1.1, the Eden Prairie Town Center Station and associated roadway improvements are deferred and are not expected to be in place when the Project opens in 2020. The station and associated roadway improvements are planned to be in place by 2040. If the station and associated roadway improvements are not in place by 2040, there would be Project effects on access to community facilities, community character, or community cohesion within the area of the proposed Eden Prairie Town Center Station.

Source: Council, 2015.

Minnetonka

As shown in Table 3.3-13 and summarized below, there will be no adverse impacts to community facilities, community character, or community cohesion within the City of Minnetonka:

- **Community Facilities**. There are eight community facilities within the study area in the City of Minnetonka (see Table 3.3-5 and Exhibit 3.3-2), including three park/recreation areas, one educational facility, one multiuse trail, and two places of worship. Based on the measures described in Table 3.3-13, none of these facilities will be adversely affected by the Project.
- **Community Character.** Some changes in visual character directly adjacent to the proposed light rail alignment and associated improvements (e.g., LRT alignment on structure, roadway modifications, etc.) may occur and the acquisition of some commercial, industrial, and residential properties is anticipated. These changes will be confined to limited areas and are not expected to adversely impact the overall community character within the study area in Minnetonka.
- **Community Cohesion.** While changes in the local roadway, pedestrian, and bicycle networks will occur, existing roadway and sidewalk/trail connectivity and access will be maintained or improved, and there will be no adverse impacts to community cohesion the Minnetonka portion of the study area.

TABLE 3.3-13
Impacts to Community Facilities, Community Character, and Community Cohesion – Minnetonka

Station Area	Impact Category	Long-term Effects by Impact Criteria/Measure
Opus Station	Community Facilities	• Property acquisition and displacement: None. • Noise and vibration impacts: None. • Changes in roadway access: None. • *Changes to transit access:* Benefit of improved transit access to Bren Education Center, Unnamed Open Space B, and Opus Commercial District Trails.
	Community Character	• *Noise and vibration impacts:* No adverse impacts after mitigation. • *Visual changes:* Substantial level of impact on representative viewpoint within this area. As a mitigation, the Council will implement the Visual Quality Design Guidelines for Key Structures (Council, 2015 – refer to Appendix C to access the Guidelines). The Project will also include mitigation measures identified in Section 3.7.4. Considering these mitigation measures, the Project will not adversely affect the overall visual quality of the neighborhood. • *Property conversion, acquisitions, and displacements:* Full acquisition of six commercial parcels (9.7 acres) and partial acquisition of 13 commercial and industrial parcels (approx. 3 acres). These acquisitions are not anticipated to change the overall land use of the surrounding areas. • *New at-grade light rail crossings of roadways and pedestrian/bicycle facilities:* Two new at-grade light rail/roadway crossing which will be controlled by flashing lights and gates to allow for safe crossings by pedestrians and vehicles and to maintain acceptable traffic operations.
	Community Cohesion	• *New physical barriers:* LRT alignment will be on a new right-of-way north of the proposed Opus Station, between Bren Rd W and Smetana Rd (see Appendix E for the Project's preliminary engineering plans). The new light rail right-of-way will create a new physical barrier, but all existing roadway, sidewalk, and trail connections and access points will be maintained. • *Changes to the local roadway network:* New roadway turning lanes, changes in the number of through lanes, and other roadway geometric modifications (see Appendix E for a more detailed description of the changes to the local roadway network). All existing roadway connections will be maintained.

Station Area	Impact Category	Long-term Effects by Impact Criteria/Measure
		• *Changes to the pedestrian and bicycle network:* Stairs and ramps will be provided to make the connection between existing facilities and station; ramps will accommodate pedestrian and bicycle users, and will be ADA-compliant. • *Changes to vehicle parking:* Addition of 450 park-and-ride spaces and reduction of 18 off-street parking spaces at commercial properties. Loss in off-street parking will not adversely affect surrounding neighborhoods because there will be adequate parking supply to meet the needs of the existing land uses (see Section 4.3.3 for more information on parking impacts).

Source: Council, 2015.

Hopkins

As shown in Table 3.3-14 and summarized below, there will be no adverse impacts to community facilities, community character, or community cohesion within the City of Hopkins:

- **Community Facilities.** There are 25 community facilities within the study area in the City of Hopkins (see Table 3.3-7 and Exhibit 3.3-3), including six public facilities, three educational facilities, two places of worship, one facility that is both a place of worship and educational facility, 10 park/recreation areas, and three multiuse trails. Based on the measures described in Table 3.3-14, none of these facilities will be adversely affected by the Project.
- **Community Character.** Some changes in visual character within the vicinity of the proposed light rail alignment and associated improvements, and the acquisition of some commercial and industrial property. These changes will be generally confined to the areas directly adjacent to the existing Bass Lake Spur railroad corridor and will not adversely impact the overall community character within Hopkins.
- **Community Cohesion.** While changes in the local roadway, pedestrian, and bicycle networks within the City of Hopkins will occur as a result of the Project, existing roadway and sidewalk/trail connectivity and access will be maintained or improved, and there will be no adverse impacts to community cohesion in Hopkins.

TABLE 3.3-14
Impacts to Community Facilities, Community Character, and Community Cohesion – Hopkins

Station Area	Impact Category	Long-term Effects by Impact Criteria/Measure
Shady Oak Station	Community Facilities	• *Property acquisition and displacement:* The Project will result in the partial acquisition of multiple parcels used for the Cedar Lake LRT Regional Trail. The Project will not displace the trail or have a long-term effect on trail users because all existing trail connections, access points, and roadway crossings will be maintained. • Noise and vibration impacts: None. • *Changes in roadway access:* Some roadway modifications within the general vicinity of several community facilities, including additional turn lanes, a new cul-de-sac, extension of two existing streets, and elimination of one roadway; however, access to these facilities will be maintained. • *Changes to transit access:* Benefit of improved transit access to Shady Oak Beach Park, West Oaks Community Church, Cross of Glory Baptist Church, Central Park/Hopkins Pavilion/Ice Arena, Ubah Medical Academy, St. Joseph's Church, and the Minnesota Bluffs LRT Regional Trail.
	Community Character	• *Noise and vibration impacts:* No adverse impacts after mitigation. • *Visual changes:* Substantial level of impact for trail users within this area, but this impact is localized and will not adversely affect the overall community character of the area. • *Property conversion, acquisitions, and displacements:* Full acquisition of seven industrial parcels (30 acres) and partial acquisition of 12 industrial, commercial, and residential parcels (50 acres). There will be no residential displacements, and these acquisitions are not anticipated to change the overall land use of the surrounding areas. • *New at-grade light rail crossings of roadways and pedestrian/bicycle facilities:* One new at-grade light rail/roadway crossing, which will be controlled by flashing lights and gates to allow for safe crossings by pedestrians and vehicles and to maintain acceptable traffic operations.
	Community Cohesion	• *New physical barriers:* Light rail alignment will be located adjacent to the existing Bass Lake Spur, which is an active freight rail corridor (refer to Exhibit 2.1-5). All existing sidewalk, trail, and roadway crossings of the Bass Lake Spur will be maintained, and, because the existing

Station Area	Impact Category	Long-term Effects by Impact Criteria/Measure
		freight rail alignment is currently a physical barrier, the Project will not create a new physical barrier. • *Changes to the local roadway network:* New roadway extensions and a cul-de-sac to serve the new light rail station and park-and-ride lot, intersection reconfiguration to provide station access, and other roadway geometric modifications (see Appendix E for a more detailed description of the changes to the local roadway network). All existing roadway connections will be maintained. • *Changes to the pedestrian and bicycle network:* ADA-compliant curb ramps and detectable warnings will be installed at modified roadway intersections. The Minnesota Bluffs LRT regional trail will be reconstructed and will maintain existing connectivity. All existing sidewalk and trail connections will be maintained. • *Changes to vehicle parking:* Addition of 700 park-and-ride spaces and reduction of 86 off-street parking spaces. Net gain of five on-street parking spaces (gain of 36 new spaces and loss of 31 spaces). Loss of parking will not adversely affect surrounding neighborhoods because there will be adequate parking supply to meet the needs of the existing land uses (see Section 4.3.3 for more information on parking impacts).
Downtown Hopkins Station	Community Facilities	• *Property acquisition and displacement:* The Project will result in the partial acquisition of multiple parcels used for the Cedar Lake LRT Regional Trail. The Project will not displace the trail or have a long-term effect on trail users because all existing trail connections, access points, and roadway crossings will be maintained. • Noise and vibration impacts: None. • Changes in roadway access: None. • *Changes to transit access:* Benefit of improved transit access to Hopkins Activity Center, Hopkins Center for the Arts/Mainstreet School for the Performing Arts, Maetzold Field, Hopkins Police Station, Hopkins City Hall, Hopkins Library, Hopkins Post Office, Downtown Park, Burnes Park Ice Skating Rink, Overpass Aggressive Skate Park, Buffer Park, Minnesota Bluffs Regional Trail, and Lake Minnetonka LRT Regional Trail.
	Community Character	• *Noise and vibration impacts:* No adverse impacts after mitigation. • *Visual changes:* Low level of impact on representative viewpoint within this area. • *Property conversion, acquisitions, and displacements:* Partial acquisition of 11 commercial, industrial, and railroad parcels (52 acres). These acquisitions are not anticipated to change the overall land use of the surrounding areas. • *New at-grade light rail crossings of roadways and pedestrian/bicycle facilities:* Two new at-grade light rail/roadway crossing, which will be controlled by flashing lights and gates to allow for safe crossings by pedestrians and vehicles and to maintain acceptable traffic operations.
	Community Cohesion	• *New physical barriers:* Light rail alignment will be located adjacent to the existing Bass Lake Spur, which is an active freight rail corridor (refer to Exhibit 2.1-5). All existing sidewalk, trail, and roadway crossings of the Bass Lake Spur will be maintained, and, because the existing freight rail alignment is currently a physical barrier, the Project will not create a new physical barrier. • *Changes to the local roadway network:* One new traffic signal and other roadway/intersection geometric modifications (see Appendix E for a more detailed description of the changes to the local roadway network). All existing roadway connections will be maintained. • *Changes to the pedestrian and bicycle network:* Stairs and ramps will be provided to make the connection between existing facilities and station, and crosswalk improvements at all four legs of the Excelsior Blvd and 8th Ave S intersection. The Minnesota Bluffs LRT Regional Trail will be reconstructed and will maintain existing connectivity. All existing sidewalk and trail connections will be maintained. • *Changes to vehicle parking:* Addition of 190 park-and-ride spaces.
Blake Station	Community Facilities	• *Property acquisition and displacement:* The Project will result in the partial acquisition of multiple parcels used for the Cedar Lake LRT Regional Trail and the partial acquisition of one parcel used for the Blake School to allow for the reconstruction of an existing driveway. The Project will not displace the trail or have a long-term effect on trail users because all existing trail connections, access points, and roadway crossings will be maintained. The property acquisition adjacent to the Blake School will not displace any buildings associated with the Blake School, will not affect the operations of the School, and will not change access to and from the School. • Noise and vibration impacts: None. • *Changes in roadway access:* A new traffic signal will be installed at the Excelsior Boulevard and Pierce Avenue intersection at the entrance of a parking lot used for Blake School buses, but will not adversely affect access to the parking lot. • *Changes to transit access:* Benefit of improved transit access to Living Waters Christian Church, Oakes Park, Cottageville Park, St. John the Evangelistic Church and School, Blake School and campus, Harley Hopkins Park and Family Center, Harley Hopkins Ice Rink, and the Cedar Lake LRT Regional Trail.

Station Area	Impact Category	Long-term Effects by Impact Criteria/Measure
	Community Character	• *Noise and vibration impacts:* No adverse impacts after mitigation. • Visual changes: None. • *Property conversion, acquisitions, and displacements:* Full acquisition of three commercial and industrial parcels (2.6 acres) and partial acquisition of 12 commercial and railroad parcels (27.5 acres). These acquisitions are not anticipated to change the overall land use of the surrounding areas. • *New at-grade light rail crossings of roadways and pedestrian/bicycle facilities:* One new at-grade light rail/roadway crossing, which will be controlled by flashing lights and gates to allow for safe crossings by pedestrians and vehicles and to maintain acceptable traffic operations.
	Community Cohesion	• *New physical barriers:* Light rail alignment will be located adjacent to the existing Bass Lake Spur, which is an active freight rail corridor (refer to Exhibit 2.1-5). All existing sidewalk, trail, and roadway crossings of the Bass Lake Spur will be maintained, and, because the existing freight rail alignment is currently a physical barrier, the Project will not create a new physical barrier. • *Changes to the local roadway network:* New roadway extension to serve the new light rail station and park-and-ride lot, other roadway/intersection geometric modifications (see Appendix E for a more detailed description of the changes to the local roadway network). All existing roadway connections will be maintained. • *Changes to the pedestrian and bicycle network:* New grade-separated trail crossing at Blake Road and ADA-compliant curb ramps and detectable warnings at modified roadway intersections. The Cedar Lake LRT regional trail will be reconstructed and will maintain existing connectivity. All existing sidewalk and trail connections will be maintained. • *Changes to vehicle parking:* Addition of 89 park-and-ride spaces.

Source: Council, 2015,

St. Louis Park

As shown in Table 3.3-15 and summarized below, there will be no adverse impacts to community facilities, community character, or community cohesion within the City of St. Louis Park:

- **Community Facilities.** There are 34 community facilities within the study area in the City of St. Louis Park (see Table 3.3-9 and Exhibit 3.3-4), including four public facilities (e.g., city hall, police station, etc.), three educational facilities, 7 places of worship, 17 park/recreation areas, one multiuse trail, one hospital, and one healthcare provider. Based on the measures described in Table 3.3-15, none of these facilities will be adversely affected by the Project.
- **Community Character.** Some minor changes in visual character directly adjacent to the proposed light rail alignment and associated improvements will occur and the acquisition of some commercial, industrial, and residential properties is anticipated. These changes will be confined to limited areas and will not adversely affect overall community character in St. Louis Park.
- **Community Cohesion.** While changes in the local roadway, pedestrian, and bicycle networks within the City of St. Louis Park will occur as a result of the Project, existing roadway and sidewalk/trail connectivity and access will be maintained or improved, and there will be no adverse impacts to community cohesion within St. Louis Park.

TABLE 3.3-15
Impacts to Community Facilities, Community Character, and Community Cohesion – St. Louis Park

Neighborhood/ Station Area	Impact Category	Long-term Effects by Impact Criteria/Measure
Oak Hill/ Louisiana Station	Community Facilities	• Property acquisition and displacement: None. • Noise and vibration impacts: None. • *Changes in roadway access:* Some roadway modifications within the general vicinity of multiple community facilities (see Table 3.3-9), but access to these facilities will be maintained. • *Changes to transit access:* Benefit of improved transit access to Knollwood Church of Christ, Walker Park, and Louisiana Park.
	Community Character	• Noise and vibration impacts: None. • Visual changes: None. • Property conversion, acquisitions, and displacements: None.

Neighborhood/ Station Area	Impact Category	Long-term Effects by Impact Criteria/Measure
		• New at-grade light rail crossings of roadways and pedestrian/bicycle facilities: None.
	Community Cohesion	• *New physical barriers:* Light rail alignment will be located adjacent to the existing Bass Lake Spur, which is an active freight rail corridor (refer to Exhibit 2.1-5). All existing sidewalk, trail, and roadway crossings of the Bass Lake Spur will be maintained, and, because the existing freight rail alignment is currently a physical barrier, the Project will not create a new physical barrier. • Changes to the local roadway network: None. • Changes to the pedestrian and bicycle network: None. • Changes to vehicle parking: None.
South Oak Hill/Blake and Louisiana Station	Community Facilities	• *Property acquisition and displacement:* The Project will result in the partial acquisition of multiple parcels used for the Cedar Lake LRT Regional Trail. The Project will not displace the trail or have a long-term effect on trail users because all existing trail connections, access points, and roadway crossings will be maintained. • Noise and vibration impacts: None. • *Changes in roadway access:* Some roadway modifications within the general vicinity of multiple community facilities (see Table 3.3-9), but access to these facilities will be maintained. • *Changes to transit access:* Benefit of improved transit access to Edgebrook Park, Prince-Peace Lutheran Church, and the Cedar Lake LRT Regional Trail.
	Community Character	• *Noise and vibration impacts:* No adverse impacts after mitigation. • *Visual changes:* The freight rail line and the trail will be shifted to the northern edge of the corridor, bringing about removal of much of the thick tree cover along the trail, and the visual impacts of the Project will be substantial. This will be a localized impact and will not adversely affect the overall community character of the area. • *Property conversion, acquisitions, and displacements:* Partial acquisition of one publicly owned parcel currently used as right-of-way for the Cedar Lake LRT Regional Trail. This acquisition are not anticipated to change the overall land use of the surrounding areas. • New at-grade light rail crossings of roadways and pedestrian/bicycle facilities: None.
	Community Cohesion	• *New physical barriers:* Light rail alignment will be located adjacent to the existing Bass Lake Spur, which is an active freight rail corridor (refer to Exhibit 2.1-5). All existing sidewalk, trail, and roadway crossings of the Bass Lake Spur will be maintained, and, because the existing freight rail alignment is currently a physical barrier, the Project will not create a new physical barrier. • *Changes to the local roadway network:* Roadway geometric modifications near the light rail and freight rail bridge over Louisiana Ave (see Appendix E for a more detailed description of the changes to the local roadway network). All existing roadway connections will be maintained. • *Changes to the pedestrian and bicycle network:* ADA-compliant curb ramps and detectable warnings will be installed at modified roadway intersections. The Cedar Lake LRT Regional Trail will be reconstructed and will maintain existing connectivity. All existing sidewalk and trail connections will be maintained. • Changes to vehicle parking: None.
Meadowbrook/ Louisiana Station	Community Facilities	• Property acquisition and displacement: None. • Noise and vibration impacts: None. • *Changes in roadway access:* Some roadway modifications within the general vicinity of two community facilities, but access to these facilities will be maintained. • *Changes to transit access:* Benefit of improved transit access to Isaac Walton Creekside Park, Minnehaha Creek Open Space, and St. Louis Park Police Station.
	Community Character	• *Noise and vibration impacts:* No adverse impacts after mitigation. • Visual changes: None. • Property conversion, acquisitions, and displacements: None. • New at-grade light rail crossings of roadways and pedestrian/bicycle facilities: None.
	Community Cohesion	• *New physical barriers:* Light rail alignment will be located adjacent to the existing Bass Lake Spur, which is an active freight rail corridor (refer to Exhibit 2.1-5). All existing sidewalk, trail, and roadway crossings of the Bass Lake Spur will be maintained, and, because the existing freight rail alignment is currently a physical barrier, the Project will not create a new physical barrier. • *Changes to the local roadway network:* Roadway geometric modifications near the light rail and freight rail bridge over Louisiana Ave (see Appendix E for a more detailed description of the changes to the local roadway network). All existing roadway connections will be maintained. • *Changes to the pedestrian and bicycle network:* ADA-compliant curb ramps and detectable warnings will be installed at modified roadway intersections. • Changes to vehicle parking: None.

Neighborhood/ Station Area	Impact Category	Long-term Effects by Impact Criteria/Measure
Lenox/Louisiana Station	Community Facilities	• Property acquisition and displacement: None. • Noise and vibration impacts: None. • Changes in roadway access: None. • *Changes to transit access:* Benefit of improved transit access to Freedom Park and St. Louis Park High School.
	Community Character	• Noise and vibration impacts: None. • Visual changes: None. • Property conversion, acquisitions, and displacements: None. • New at-grade light rail crossings of roadways and pedestrian/bicycle facilities: None.
	Community Cohesion	• *New physical barriers:* Light rail alignment will be located adjacent to the existing Bass Lake Spur, which is an active freight rail corridor (refer to Exhibit 2.1-5). All existing sidewalk, trail, and roadway crossings of the Bass Lake Spur will be maintained, and, because the existing freight rail alignment is currently a physical barrier, the Project will not create a new physical barrier. • Changes to the local roadway network: None. • Changes to the pedestrian and bicycle network: None. • Changes to vehicle parking: None.
Brooklawns/ Louisiana Station	Community Facilities	• Property acquisition and displacement: None. • Noise and vibration impacts: None. • *Changes in roadway access:* Some roadway modifications within the general vicinity of some community facilities, including reconstruction of intersection at Oxford St and Edgewood Ave S; access to community facilities will be maintained. • *Changes to transit access:* Benefit of improved transit access to Park Nicollet Methodist Hospital.
	Community Character	• *Noise and vibration impacts:* No adverse impacts after mitigation. • *Visual changes:* The freight rail line and the trail will be shifted to the northern edge of the corridor, bringing about removal of much of the thick tree cover along the trail, and the visual impacts of the Project will be substantial. This will be a localized impact and will not adversely affect the overall community character of the area. • *Property conversion, acquisitions, and displacements:* Full acquisition of nine industrial parcels (7.6 acres) and partial acquisition of four railroad parcels (0.2 acre). These acquisitions are not anticipated to change the overall land use of the surrounding areas. • New at-grade light rail crossings of roadways and pedestrian/bicycle facilities: None.
	Community Cohesion	• *New physical barriers:* Light rail alignment will be located adjacent to the existing Bass Lake Spur, which is an active freight rail corridor (refer to Exhibit 2.1-5). All existing sidewalk, trail, and roadway crossings of the Bass Lake Spur will be maintained, and, because the existing freight rail alignment is currently a physical barrier, the Project will not create a new physical barrier. • *Changes to the local roadway network:* Roadway/intersection improvements on Louisiana Ave S and Oxford Ave to provide access to the proposed Louisiana Station and park-and-ride-lot (see Appendix E for a more detailed description of the changes to the local roadway network). All existing roadway connections will be maintained. • *Changes to the pedestrian and bicycle network:* ADA-compliant curb ramps and detectable warnings will be installed at modified roadway intersections. • *Changes to vehicle parking:* Addition of 350 park-and-ride spaces and reduction of 11 on-street parking spaces. Loss of parking will not adversely affect surrounding neighborhoods because there will be adequate parking supply to meet the needs of the existing land uses (see Section 4.3.3 for more information on parking impacts).
Sorensen/ Wooddale Station	Community Facilities	• Property acquisition and displacement: None. • Noise and vibration impacts: None. • Changes in roadway access: None. • *Changes to transit access:* Benefit of improved transit access to Holy Family Catholic Church, Holy Family Academy, Macedonian Evangelical Missionary Baptist Church, Lake Street Park, Park Spanish Emersion Elementary School, and Webster Park.
	Community Character	• Noise and vibration impacts: None. • Visual changes: None. • Property conversion, acquisitions, and displacements: None. • New at-grade light rail crossings of roadways and pedestrian/bicycle facilities: None.

Neighborhood/ Station Area	Impact Category	Long-term Effects by Impact Criteria/Measure
	Community Cohesion	• *New physical barriers:* Light rail alignment will be located adjacent to the existing Bass Lake Spur, which is an active freight rail corridor (refer to Exhibit 2.1-5). All existing sidewalk, trail, and roadway crossings of the Bass Lake Spur will be maintained, and, because the existing freight rail alignment is currently a physical barrier, the Project will not create a new physical barrier. • *Changes to the local roadway network:* Roadway/intersection improvements on Wooddale Ave S (see Appendix E for a more detailed description of the changes to the local roadway network). All existing roadway connections will be maintained. • *Changes to the pedestrian and bicycle network:* ADA-compliant curb ramps and detectable warnings will be installed at modified roadway intersections. • Changes to vehicle parking: None.
Elmwood/ Wooddale Station	Community Facilities	• *Property acquisition and displacement:* The Project will result in the partial acquisition of multiple parcels used for the Cedar Lake LRT Regional Trail. The Project will not displace the trail or have a long-term effect on trail users because all existing trail connections, access points, and roadway crossings will be maintained. • Noise and vibration impacts: None. • *Changes in roadway access:* Some roadway modifications within the general vicinity of each multiple community facilities (see Table 3.3-9), including expansion of lanes, new signalized intersections, and improved access at Minnesota 7 Service road. Access to these facilities will be maintained. • *Changes to transit access:* Benefit of improved transit access to Union Congregational Church Parking, Center Park, Jorvig Park, Justad Park, and the Cedar Lake LRT Regional Trail.
	Community Character	• *Noise and vibration impacts:* No severe noise impacts after mitigation. Moderate noise impacts at one building (32 units). The moderate impacts at these locations do not meet the threshold for mitigation (e.g., impact does not meet 3-decibel [dB] increase threshold) as defined by the Council's Regional Transitway Guidelines (see Appendix K). These moderate impacts will be localized and will not adversely affect the overall community character of the area. • *Visual changes:* The freight rail line and the trail will be shifted to the northern edge of the corridor, bringing about removal of much of the thick tree cover along the trail, and the visual impacts of the Project will be substantial. This will be a localized impact and will not adversely affect the overall community character of the area. • *Property conversion, acquisitions, and displacements:* Full acquisition of one railroad parcel (4.2 acres) and partial acquisition of three railroad parcels (0.1 acre). These acquisitions are not anticipated to change the overall land use of the surrounding areas. • *New at-grade light rail crossings of roadways and pedestrian/bicycle facilities:* One new at-grade light rail/roadway crossing, which will be controlled by flashing lights and gates to allow for safe crossings by pedestrians and vehicles and to maintain acceptable traffic operations.
	Community Cohesion	• *New physical barriers:* Light rail alignment will be located adjacent to the existing Bass Lake Spur, which is an active freight rail corridor (refer to Exhibit 2.1-5). All existing sidewalk, trail, and roadway crossings of the Bass Lake Spur will be maintained, and, because the existing freight rail alignment is currently a physical barrier, the Project will not create a new physical barrier. • *Changes to the local roadway network:* Roadway/intersection geometric modifications in the vicinity of the Proposed Wooddale Station (see Appendix E for a more detailed description of the changes to the local roadway network). All existing roadway connections will be maintained. • *Changes to the pedestrian and bicycle network:* New grade-separated trail crossing at Wooddale Ave S and ADA-compliant curb ramps and detectable warnings at modified roadway intersections. The Cedar Lake LRT Regional Trail will be reconstructed and will maintain existing connectivity. All existing sidewalk and trail connections will be maintained. • Changes to vehicle parking: None.
Triangle/ Wooddale and Beltline Station	Community Facilities	• *Property acquisition and displacement:* The Project will result in the partial acquisition of multiple parcels used for the Cedar Lake LRT Regional Trail. The Project will not displace the trail or have a long-term effect on trail users because all existing trail connections, access points, and roadway crossings will be maintained. • Noise and vibration impacts: None. • *Changes in roadway access:* Some roadway modifications within the general vicinity of each of community facilities, including additional turn lanes, new access roads, a road closure, and the reconfiguration of existing roadways; access to these facilities will be maintained. • *Changes to transit access:* Benefit of improved transit access to Lilac Park, B'Nai Emet Synagogue, St. Louis Park City Hall, Police Department Headquarters, Carpenter Park, and the Cedar Lake LRT Regional Trail.
	Community Character	• *Noise and vibration impacts:* No adverse impacts after mitigation. • *Visual changes:* The freight rail line and the trail will be shifted to the northern edge of the corridor, bringing about removal of much of the thick tree cover along the trail, and the visual

Neighborhood/ Station Area	Impact Category	Long-term Effects by Impact Criteria/Measure
		impacts of the Project will be substantial. This will be a localized impact and will not adversely affect the overall community character of the area. • *Property conversion, acquisitions, and displacements:* Partial acquisition of six railroad parcels (0.2 acre). These acquisitions are not anticipated to change the overall land use of the surrounding areas. • *New at-grade light rail crossings of roadways and pedestrian/bicycle facilities:* One new at-grade light rail/roadway crossing, which will be controlled by flashing lights and gates to allow for safe crossings by pedestrians and vehicles and to maintain acceptable traffic operations. One new at-grade light rail crossing of the Cedar lake LRT Regional Trail, which will be controlled by flashing lights and gates to allow for safe crossings by pedestrians and bicycles.
	Community Cohesion	• *New physical barriers:* Light rail alignment will be located adjacent to the existing Bass Lake Spur, which is an active freight rail corridor (refer to Exhibit 2.1-5). All existing sidewalk, trail, and roadway crossings of the Bass Lake Spur will be maintained, and, because the existing freight rail alignment is currently a physical barrier, the Project will not create a new physical barrier. • *Changes to the local roadway network:* New roadway turning lanes, changes in the number of through lanes, and other roadway geometric modifications in the vicinity of the proposed Beltline Station (see Appendix E for a more detailed description of the changes to the local roadway network). All existing roadway connections will be maintained. • *Changes to the pedestrian and bicycle network:* New grade-separated trail bridge spanning over the LRT and freight rail tracks and Beltline Boulevard. ADA-compliant curb ramps and detectable warnings at modified roadway intersections. The Cedar Lake LRT regional trail will be reconstructed and will maintain existing connectivity. All existing sidewalk and trail connections will be maintained. • *Changes to vehicle parking:* Addition of 268 park-and-ride spaces and reduction of 12 on-street parking spaces. Loss of parking will not adversely affect surrounding neighborhoods because there will be adequate parking supply to meet the needs of the existing land uses (see Section 4.3.3 for more information on parking impacts).
Wolfe Park/ Wooddale and Beltline Station	Community Facilities	• Property acquisition and displacement: None. • Noise and vibration impacts: None. • *Changes in roadway access:* Some roadway modifications within the general vicinity of some community facilities (see Table 3.3-9), but access to these facilities will be maintained. • *Changes to transit access:* Benefit of improved transit access to Park Nicollet Clinic – St. Louis Park, Bass Lake Park and Reserve; St. Louis Park Recreation Center, Arena, and Veterans Memorial Amphitheater; and Wolfe Park.
	Community Character	• *Noise and vibration impacts:* No severe impacts after mitigation. Moderate noise impacts at 16 units. The moderate impacts at these locations do not meet the threshold for mitigation (e.g., impact does not meet 3-dB increase threshold) as defined by the Council's Regional Transitway Guidelines (see Appendix K). These moderate impacts will be localized and will not adversely affect the overall community character of the area. • *Visual changes:* The freight rail line and the trail will be shifted to the northern edge of the corridor, bringing about removal of much of the thick tree cover along the trail, and the visual impacts of the Project will be substantial. This will be a localized impact and will not adversely affect the overall community character of the area. • *Property conversion, acquisitions, and displacements:* Partial acquisition of two commercial and railroad parcels (0.3 acre). These acquisitions are not anticipated to change the overall land use of the surrounding areas. • *New at-grade light rail crossings of roadways and pedestrian/bicycle facilities:* One new at-grade light rail/roadway crossing, which will be controlled by flashing lights and gates to allow for safe crossings by pedestrians and vehicles and to maintain acceptable traffic operations.
	Community Cohesion	• *New physical barriers:* Light rail alignment will be located adjacent to the existing Bass Lake Spur, which is an active freight rail corridor (refer to Exhibit 2.1-5). All existing sidewalk, trail, and roadway crossings of the Bass Lake Spur will be maintained, and, because the existing freight rail alignment is currently a physical barrier, the Project will not create a new physical barrier. • *Changes to the local roadway network:* New roadway turning lanes, changes in the number of through lanes, and other roadway geometric modifications in the vicinity of the proposed Beltline Station (see Appendix E for a more detailed description of the changes to the local roadway network). All existing roadway connections will be maintained. • *Changes to the pedestrian and bicycle network:* ADA-compliant curb ramps and detectable warnings at modified roadway intersections. The Cedar Lake LRT Regional Trail will be reconstructed and will maintain existing connectivity. All existing sidewalk and trail connections will be maintained. • Changes to vehicle parking: None.

Neighborhood/ Station Area	Impact Category	Long-term Effects by Impact Criteria/Measure
Fern Hill/Beltline Station	Community Facilities	• Property acquisition and displacement: None. • Noise and vibration impacts: None. • Changes in roadway access: None. • *Changes to transit access:* Benefit of improved transit access to Fern Hill Park and St. George's Episcopal Church.
	Community Character	• Noise and vibration impacts: None. • Visual changes: None. • Property conversion, acquisitions, and displacements: None. • New at-grade light rail crossings of roadways and pedestrian/bicycle facilities: None.
	Community Cohesion	• *New physical barriers:* Light rail alignment will be located adjacent to the existing Bass Lake Spur, which is an active freight rail corridor (refer to Exhibit 2.1-5). All existing sidewalk, trail, and roadway crossings of the Bass Lake Spur will be maintained, and, because the existing freight rail alignment is currently a physical barrier, the Project will not create a new physical barrier. • Changes to the local roadway network: None. • Changes to the pedestrian and bicycle network: None. • Changes to vehicle parking: None.
Minikahda Oaks/Beltline Station	Community Facilities	• Property acquisition and displacement: None. • Noise and vibration impacts: None. • Changes in roadway access: None. • Changes to transit access: None.
	Community Character	• Noise and vibration impacts: None. • Visual changes: None. • Property conversion, acquisitions, and displacements: None. • New at-grade light rail crossings of roadways and pedestrian/bicycle facilities: None.
	Community Cohesion	• *New physical barriers:* Light rail alignment will be located adjacent to the existing Bass Lake Spur, which is an active freight rail corridor (refer to Exhibit 2.1-5). All existing sidewalk, trail, and roadway crossings of the Bass Lake Spur will be maintained, and, because the existing freight rail alignment is currently a physical barrier, the Project will not create a new physical barrier. • Changes to the local roadway network: None. • Changes to the pedestrian and bicycle network: None. • Changes to vehicle parking: None.

Source: Council, 2015.

Minneapolis

As shown in Table 3.3-16 and summarized below, there will be no adverse impacts to community facilities, community character, or community cohesion within the City of Minneapolis:

- **Community Facilities.** There are 38 community facilities within the study area in the City of Minneapolis (see Table 3.3-11 and Exhibit 3.3-5), including three public facilities (e.g., fire stations, etc.), 13 educational facilities, three places of worship, seven commercial areas, three multiuse trails, 10 park/recreation areas, and one sports stadium. Based on the measures described in Table 3.3-16, none of these facilities will be adversely affected by the Project.
- **Community Character.** Some changes in visual character directly adjacent to the proposed light rail alignment and associated improvements (e.g., roadway modifications) may occur and the acquisition of some commercial, industrial, and residential properties is anticipated. These changes will be confined to limited areas and will not adversely impact the overall community character in Minneapolis.
- **Community Cohesion.** While changes in the local roadway, pedestrian, and bicycle networks within the City of Minneapolis will occur, existing roadway and sidewalk/trail connectivity and access will be maintained or improved, and there will be no adverse impacts to community cohesion in Minneapolis.

TABLE 3.3-16
Impacts to Community Facilities, Community Character, and Community Cohesion – Minneapolis

Neighborhood/ Station Area	Impact Category	Long-term Effects by Impact Criteria/Measure
West Calhoun/West Lake Station	Community Facilities	• *Property acquisition and displacement:* The Project will result in the partial acquisition of multiple parcels used for the Cedar Lake LRT Regional Trail and one partial acquisition of a parcel used for the Midtown Greenway. The Project will not displace either trail or have a long-term effect on trail users because all existing trail connections, access points, and roadway crossings will be maintained. • Noise and vibration impacts: None. • *Changes in roadway access:* Some roadway modifications within the general vicinity of multiple community facilities (see Table 3.3-11), including the reconfiguration of lane widths and creation of a new street. Access to all community facilities will be maintained. • *Changes to transit access:* Benefit of improved transit access to Minneapolis Chain of Lakes Regional Park and Kenilworth Trail.
	Community Character	• *Noise and vibration impacts:* No adverse impacts after mitigation. • *Visual changes:* Much of the thick tree cover along the trail will be removed, but these visual impacts will be low. Visual impacts will be localized impact and will not adversely affect the overall community character of the area. • *Property conversion, acquisitions, and displacements:* Partial acquisition of 11 commercial and railroad parcels (1.0 acre). These acquisitions are not anticipated to change the overall land use of the surrounding areas. • New at-grade light rail crossings of roadways and pedestrian/bicycle facilities: None.
	Community Cohesion	• *New physical barriers:* Light rail alignment will be located adjacent to the existing Kenilworth Corridor, which is an active freight rail corridor (refer to Exhibit 2.1-5). All existing sidewalk, trail, and roadway crossings of the Kenilworth Corridor will be maintained, and, because the existing freight rail alignment is currently a physical barrier, the Project will not create a new physical barrier. • *Changes to the local roadway network:* Reconfiguration of lane widths, modification of roadway alignments, and other roadway/geometric modifications (see Appendix E for a more detailed description of the changes to the local roadway network). All existing roadway connections will be maintained. • *Changes to the pedestrian and bicycle network:* New stairs and ramps to make the connection between existing facilities and station, enhanced pedestrian connections along West Lake St between Drew Ave S and Market Plaza and along Excelsior Blvd between Market Plaza and West 32nd St. ADA-compliant curb ramps and detectable warnings at modified roadway intersections. The Kenilworth Trail will be reconstructed and will maintain existing connectivity. All existing sidewalk and trail connections will be maintained. • *Changes to vehicle parking:* Net loss of 80 on-street parking spaces (loss of 97 at one location and addition of 17 at another location). Loss of parking will not adversely affect surrounding neighborhoods because there will be adequate parking supply to meet the needs of the existing land uses (see Section 4.3.3 for more information on parking impacts).
Cedar Isles Dean/West Lake and 21st Street Stations	Community Facilities	• *Property acquisition and displacement:* The Project will result in the partial acquisition of one parcel used for the Midtown Greenway. The Project will not displace the trail or have a long-term effect on trail users because all existing trail connections, access points, and roadway crossings will be maintained. • *Noise and vibration impacts:* No adverse impacts to the Kenilworth Channel after mitigation • *Changes in roadway access:* Some roadway modifications within the general vicinity of multiple community facilities (see Table 3.3-11), including a new roadway and trail signal and an intersection reconstruction; access to these facilities will be maintained. • *Changes to transit access:* Benefit of improved transit access to the Minneapolis Chain of Lakes Regional Park, Kenilworth Trail, Alcott Triangle, and Park Siding Park.
	Community Character	• *Noise and vibration impacts:* No severe noise impacts after mitigation. Moderate noise impacts at 8 units. The moderate impacts at these locations do not meet the threshold for mitigation (e.g., impact does not meet 3-dB increase threshold) as defined by the Council's Regional Transitway Guidelines (see Appendix K). These moderate impacts will be localized and will not adversely affect the overall community character of the area. • *Visual changes:* Substantial level of impact on multiple representative viewpoints within this area. Visual impacts associated with the Project include those related to vegetation removal, relocation of the existing freight rail tracks, relocation of trails, and the addition of an LRT station. The crossing of the Kenilworth Channel will require construction of new bridge structures. In the transition areas between the at-grade and below-grade segments, there will be substantial visual impacts because of the extensive tree clearing required to accommodate the Project and the visual dominance of the trenches and the concrete retaining walls they will require. As a mitigation, the Council will implement the Visual Quality Design Guidelines for Key Structures (Council, 2015 – refer to Appendix C to access the Guidelines). The Project will also include

Neighborhood/ Station Area	Impact Category	Long-term Effects by Impact Criteria/Measure
		mitigation measures identified in Section 3.7.4. Considering these mitigation measures, the Project will not adversely affect the overall visual quality of the neighborhood. • *Property conversion, acquisitions, and displacements:* Full acquisition of five commercial, industrial, and railroad parcels (5.5 acres) and partial acquisition of eight commercial and residential parcels (0.5 acre). There will be no residential displacements, and these acquisitions are not anticipated to change the overall land use of the surrounding areas. • *New at-grade light rail crossings of roadways and pedestrian/bicycle facilities:* None.
	Community Cohesion	• *New physical barriers:* Light rail alignment will be located adjacent to the existing Kenilworth Corridor, which is an active freight rail corridor (refer to Exhibit 2.1-5). All existing sidewalk, trail, and roadway crossings of the Kenilworth Corridor will be maintained, and, because the existing freight rail alignment is currently a physical barrier, the Project will not create a new physical barrier. • *Changes to the local roadway network:* Reconstruction of existing intersection and at Cedar Lake Parkway and other roadway/intersection geometric modifications (see Appendix E for a more detailed description of the changes to the local roadway network). All existing roadway connections will be maintained. • *Changes to the pedestrian and bicycle network:* New trail crossing improvements at Cedar Lake Parkway. ADA-compliant curb ramps and detectable warnings at modified roadway intersections. The Kenilworth Trail will be reconstructed and will maintain existing connectivity. All existing sidewalk and trail connections will be maintained. • *Changes to vehicle parking:* None.
Kenwood/21st Street and Penn Stations	Community Facilities	• *Property acquisition and displacement:* The Project will result in the partial acquisition of multiple parcels used for the Kenilworth Trail. The Project will not displace the trail or have a long-term effect on trail users because all existing trail connections, access points, and roadway crossings will be maintained. • *Noise and vibration impacts:* No adverse impacts after to the Kenilworth Channel after mitigation. • *Changes in roadway access:* Some roadway modifications within the general vicinity of multiple community facilities (see Table 3.3-11), including a new roadway and trail signal and an intersection reconstruction; access to these facilities will be maintained. • *Changes to transit access:* Benefit of improved transit access to Kenwood Elementary, Performing Arts Magnet, Kenwood Park, Lake of the Isles Lutheran Church, Minneapolis Chain of Lakes Regional Park, and the Cedar Lake LRT Regional Trail.
	Community Character	• *Noise and vibration impacts:* No adverse impacts after mitigation. • *Visual changes:* Substantial level of impact on multiple representative viewpoints within this area. Visual impacts associated with the Project include those related to vegetation removal, relocation of the existing freight rail tracks, relocation of trails, and the addition of an LRT station. The crossing of the Kenilworth Channel would require construction of new bridge structures. In the transition areas between the at-grade and below-grade segments, there will be substantial visual impacts because of the extensive tree clearing required to accommodate the Project and the visual dominance of the trenches and the concrete retaining walls they will require. As a mitigation, the Council will implement the Visual Quality Design Guidelines for Key Structures (Council, 2015 – refer to Appendix C to access the Guidelines). The Project will also include mitigation measures identified in Section 3.7.4. Considering these mitigation measures, the Project will not adversely affect the overall visual quality of the neighborhood. • *Property conversion, acquisitions, and displacements:* Partial acquisition of eight railroad and residential parcels. There will be no residential displacements and these acquisitions are not anticipated to change the overall land use of the surrounding areas. • *New at-grade light rail crossings of roadways and pedestrian/bicycle facilities:* One new at-grade light rail/roadway crossing, which will be controlled by flashing lights and gates to allow for safe crossings by pedestrians and vehicles and to maintain acceptable traffic operations.
	Community Cohesion	• *New physical barriers:* Light rail alignment will be located adjacent to the existing Kenilworth Corridor, which is an active freight rail corridor (refer to Exhibit 2.1-5). All existing sidewalk, trail, and roadway crossings of the Kenilworth Corridor will be maintained, and, because the existing freight rail alignment is currently a physical barrier, the Project will not create a new physical barrier. • *Changes to the local roadway network:* Reconstruction of the 21st St roadway/light rail and freight crossing and other roadway/intersection geometric modifications (see Appendix E for a more detailed description of the changes to the local roadway network). All existing roadway connections will be maintained. • *Changes to the pedestrian and bicycle network:* New trail crossing improvements northeast of 21st St at the at-grade LRT crossing of the Kenilworth Trail. ADA-compliant curb ramps and detectable warnings at modified roadway intersections. The Kenilworth Trail will be reconstructed and will maintain existing connectivity. All existing sidewalk and trail connections will be maintained. • *Changes to vehicle parking:* None.

Neighborhood/ Station Area	Impact Category	Long-term Effects by Impact Criteria/Measure
Bryn-Mawr/Penn and Van White Stations	Community Facilities	• *Property acquisition and displacement:* The Project will result in the partial acquisition of multiple parcels used for the Cedar Lake Trail. The Project will not displace the trail or have a long-term effect on trail users because all existing trail connections, access points, and roadway crossings will be maintained. • *Noise and vibration impacts:* None • *Changes in roadway access:* Some roadway modifications within the general vicinity of multiple community facilities (see Table 3.3-11), including the reconfiguration of lane widths, removal of a turn lane, and the creation of a new access road; access to these facilities will be maintained. • *Changes to transit access:* Benefit of improved transit access to Bryn Mawr Meadows Park, Bryn Mawr Elementary, Anwatin Middle School, and Cedar Lake Trail.
	Community Character	• *Noise and vibration impacts:* No adverse impacts after mitigation. • *Visual changes:* None. • *Property conversion, acquisitions, and displacements:* Partial acquisition of four commercial and railroad parcels (0.1 acre). These acquisitions are not anticipated to change the overall land use of the surrounding areas. • *New at-grade light rail crossings of roadways and pedestrian/bicycle facilities:* One new at-grade light rail crossing of the Cedar Lake Trail, which will include signage and pavement markings to allow for safe crossings by pedestrians and bicycles.
	Community Cohesion	• *New physical barriers:* Light rail alignment will be located adjacent to the existing Wayzata Subdivision, which is an active freight rail corridor (refer to Exhibit 2.1-5). All existing sidewalk, trail, and roadway crossings of the Wayzata Subdivision will be maintained, and, because the existing freight rail alignment is currently a physical barrier, the Project will not create a new physical barrier. • *Changes to the local roadway network:* Reconfiguration of turning lanes, changes in the number of through lanes, and other roadway geometric modifications in the vicinity of the proposed Van White Station (see Appendix E for a more detailed description of the changes to the local roadway network). All existing roadway connections will be maintained. • *Changes to the pedestrian and bicycle network:* New elevators, stairs, and ramps to make the connection between existing facilities and Penn Station. Enhanced pedestrian connections from Penn Station across I-394 and north to Mount View Ave. Additional sidewalks along the south side of Wayzata Blvd from the I-394 pedestrian bridge at Thomas Ave to the access to Penn Station. Light and sign improvements along Cedar Lake Trail. New sidewalk improvements along Dunwoody Blvd. New pedestrian bridge to Bryn Mawr Meadows (replacing the existing trail bridge). ADA-compliant curb ramps and detectable warnings at modified roadway intersections. The Cedar Lake Trail will be reconstructed and will maintain existing connectivity. All existing sidewalk and trail connections will be maintained. • *Changes to vehicle parking:* Reduction of 25 on-street parking spaces in the vicinity of the proposed Van White Station. Loss of parking will not adversely affect surrounding neighborhoods because there will be adequate parking supply to meet the needs of the existing land uses (see Section 4.3.3 for more information on parking impacts).
Harrison/Penn and Van White Stations	Community Facilities	• *Property acquisition and displacement:* None. • *Noise and vibration impacts:* None. • *Changes in roadway access:* None. • *Changes to transit access:* Benefit of improved transit access to Bassett Creek Valley Park.
	Community Character	• *Noise and vibration impacts:* None. • *Visual changes:* None. • *Property conversion, acquisitions, and displacements:* None. • *New at-grade light rail crossings of roadways and pedestrian/bicycle facilities:* None.
	Community Cohesion	• *New physical barriers:* Light rail alignment will be located adjacent to the existing Wayzata Subdivision, which is an active freight rail corridor (refer to Exhibit 2.1-5). All existing sidewalk, trail, and roadway crossings of the Wayzata Subdivision will be maintained, and, because the existing freight rail alignment is currently a physical barrier, the Project will not create a new physical barrier. • *Changes to the local roadway network:* None. • *Changes to the pedestrian and bicycle network:* None. • *Changes to vehicle parking:* None.
Sumner Glenwood/Van White Stations	Community Facilities	• *Property acquisition and displacement:* None. • *Noise and vibration impacts:* None. • *Changes in roadway access:* Some roadway modifications within the general vicinity of each of community facilities, including modification of a two-lane roadway to a three-lane roadway; access to these facilities will be maintained.

Neighborhood/ Station Area	Impact Category	Long-term Effects by Impact Criteria/Measure
		• *Changes to transit access:* Benefit of improved transit access to Sumner Park.
	Community Character	• Noise and vibration impacts: None. • Visual changes: None. • Property conversion, acquisitions, and displacements: None. • New at-grade light rail crossings of roadways and pedestrian/bicycle facilities: None.
	Community Cohesion	• New physical barriers: Light rail alignment will be located adjacent to the existing Wayzata Subdivision, which is an active freight rail corridor (refer to Exhibit 2.1-5). All existing sidewalk, trail, and roadway crossings of the Wayzata Subdivision will be maintained, and, because the existing freight rail alignment is currently a physical barrier, the Project will not create a new physical barrier. • Changes to the local roadway network: None. • Changes to the pedestrian and bicycle network: None. • Changes to vehicle parking: None.
Lowry Hill/Penn and Van White Stations	Community Facilities	• Property acquisition and displacement: The Project will result in the partial acquisition of multiple parcels used for the Cedar Lake Trail. The Project will not displace the trail or have a long-term effect on trail users because all existing trail connections, access points, and roadway crossings will be maintained. • Noise and vibration impacts: None. • Changes in roadway access: Some roadway modifications within the general vicinity of multiple community facilities (see Table 3.3-11), including the reconfiguration of lane widths, removal of a turn lane, and the creation of a new access road; access to these facilities will be maintained. • Changes to transit access: Benefit of improved transit access to St. Paul's Episcopal Church, The Parade, Thomas Lowry Park, Blake School Northrup Campus, Dunwoody Institute, Basilica of St. Mary, Minneapolis Chain of Lakes Regional Park, and Cedar Lake Trail.
	Community Character	• Noise and vibration impacts: No adverse impacts after mitigation. • Visual changes: None. • Property conversion, acquisitions, and displacements: None. • New at-grade light rail crossings of roadways and pedestrian/bicycle facilities: None.
	Community Cohesion	• New physical barriers: Light rail alignment will be located adjacent to the existing Wayzata Subdivision, which is an active freight rail corridor (refer to Exhibit 2.1-5). All existing sidewalk, trail, and roadway crossings of the Wayzata Subdivision will be maintained, and, because the existing freight rail alignment is currently a physical barrier, the Project will not create a new physical barrier. • Changes to the local roadway network: Reconfiguration of turning lanes, changes in the number of through lanes, and other roadway geometric modifications in the vicinity of the proposed Van White Station (see Appendix E for a more detailed description of the changes to the local roadway network). All existing roadway connections will be maintained. • Changes to the pedestrian and bicycle network: Light and sign improvements along Cedar Lake Trail. New sidewalk improvements along Dunwoody Blvd. ADA-compliant curb ramps and detectable warnings at modified roadway intersections. The Cedar Lake Trail will be reconstructed and will maintain existing connectivity. All existing sidewalk and trail connections will be maintained. • Changes to vehicle parking: None.
North Loop/ Royalston Station	Community Facilities	• Property acquisition and displacement: None. • Noise and vibration impacts: None. • Changes in roadway access: Some roadway modifications within the general vicinity of multiple community facilities (see Table 3.3-11), including the reconfiguration of lane widths, replacement of an existing bridge, modification of four-lane roadways to two-lane roadways, intersection reconstructions, and a new traffic signal. Access to the Minneapolis Farmers Market and other facilities will be maintained. • Changes to transit access: Benefit of improved transit access to Target Field, Ubah Medical Academy Charter School, Minnesota International Middle Charter School, Twin Cities International Elementary, Minnesota Farmers Market, and Cedar Lake Trail.
	Community Character	• Noise and vibration impacts: No adverse impacts after mitigation. • Visual changes: Low level of impact on representative viewpoint within this area. • Property conversion, acquisitions, and displacements: Partial acquisition of nine commercial, industrial, and railroad parcels (3.1 acres). These acquisitions are not anticipated to change the overall land use of the surrounding areas. • New at-grade light rail crossings of roadways and pedestrian/bicycle facilities: Two new at-grade light rail/roadway crossings, which will be controlled by traffic signals, flashing lights, and gates

Neighborhood/ Station Area	Impact Category	Long-term Effects by Impact Criteria/Measure
		to allow for safe crossings by pedestrians and vehicles and to maintain acceptable traffic operations.
	Community Cohesion	• *New physical barriers:* Light rail alignment will be located adjacent to the existing Wayzata Subdivision, which is an active freight rail corridor (refer to Exhibit 2.1-5). All existing sidewalk, trail, and roadway crossings of the Wayzata Subdivision will be maintained, and, because the existing freight rail alignment is currently a physical barrier, the Project will not create a new physical barrier. • *Changes to the local roadway network:* Reconfiguration of turning lanes, changes in the number of through lanes, and other roadway geometric modifications in the vicinity of the proposed Royalston Station (see Appendix E for a more detailed description of the changes to the local roadway network). All existing roadway connections will be maintained. • *Changes to the pedestrian and bicycle network:* Enhanced pedestrian connections to the Farmers Market, from both the north and south, via the frontage road and Holden Ave and Border Ave. ADA-compliant curb ramps and detectable warnings at modified roadway intersections. The Cedar Lake Trail will be reconstructed and will maintain existing connectivity. All existing sidewalk and trail connections will be maintained. • *Changes to vehicle parking:* Net loss of 33 on-street parking spaces (gain of 45 new spaces and loss of 78 spaces). Loss of parking will not adversely affect surrounding neighborhoods because there will be adequate parking supply to meet the needs of the existing land uses (see Section 4.3.3 for more information on parking impacts).
Downtown West/Royalston and Target Field Station[a]	Community Facilities	• *Property acquisition and displacement:* None. • *Noise and vibration impacts:* None. • *Changes in roadway access:* None. • *Changes to transit access:* Benefit of improved transit access to the Fair School – Downtown, Orpheum Theater, State Theater, Pantages Theater, First Avenue/7th Street Entry, and Augsburg Academy for Health Careers.
	Community Character	• *Noise and vibration impacts:* None. • *Visual changes:* None. • *Property conversion, acquisitions, and displacements:* None. • *New at-grade light rail crossings of roadways and pedestrian/bicycle facilities:* None.
	Community Cohesion	• *New physical barriers:* Light rail alignment will be located adjacent to the existing Wayzata Subdivision, which is an active freight rail corridor (refer to Exhibit 2.1-5). All existing sidewalk, trail, and roadway crossings of the Wayzata Subdivision will be maintained, and, because the existing freight rail alignment is currently a physical barrier, the Project will not create a new physical barrier. • *Changes to the local roadway network:* None. • *Changes to the pedestrian and bicycle network:* None. • *Changes to vehicle parking:* None.

[a] Target Field Station is an existing light rail station that will connect to the Southwest LRT Project.

Source: Council, 2015.

3.3.3.2 Long-term Indirect Impacts on Neighborhoods and Communities

Long-term indirect impacts related to the Project that could affect access to community facilities, community character, and community cohesion generally include property conversion related to station area development, and increased demand for parking in the neighborhoods surrounding proposed stations.

The Project has the potential to result in indirect impacts related to property conversion in the areas surrounding proposed light rail stations. In particular, light rail lines can advance the timing and increase the intensity of private and public development surrounding proposed station areas (see Section 3.1.3.2 for more information on station area development). Any development/redevelopment would be in accordance with applicable city plans and policies, which were developed, in part, based on the desires of neighborhood and community residents. As a result, potential property conversion surrounding proposed station will not have an adverse effect on community facilities, community character, or community cohesion.

The Project could also affect the supply of and demand for off-street and on-street parking in the areas surrounding the proposed light rail stations, as a result of station area development/ redevelopment. Any development would, however, be required to comply with the parking requirements of the local jurisdiction,

which would tend to ensure a long-term balance of parking supply and demand (see Section 3.1.3.2 for more information on potential station area development).

In addition, planned park-and-ride lots under the Project have been sized to cumulatively meet forecast (2040) demand for park-and-ride spaces, which will help to minimize "spillover" or unwanted parking in neighborhoods adjacent to proposed light rail stations. Therefore, no adverse effects to community facilities, community character, or community cohesion related to changes in the supply of vehicle parking are expected.

3.3.3.3 Short-term Impacts on Neighborhoods and Communities

Access to Community Facilities

The Project will result in short-term direct and indirect changes to access to community facilities during construction. Short-term impacts include changes to roadways alignments, intersections modifications, and trail and sidewalk detours for routes which provide access to community facilities (see Sections 4.2.3.3 and 4.5.3.3 for more information on temporary construction impacts to roadways and pedestrian/bicycle facilities, respectively). Depending on conditions (e.g., levels of traffic), at times these construction activities will likely result in delays and longer travel times/distances for people using the facilities. In addition, the creation of temporary construction easements on the property of community facilities will be required in cases where short-term excavation and construction disturbance are anticipated. Construction activities within temporary easements on community facilities properties may cause temporary inconveniences to users of these facilities as a result of construction-generated noise, dust, and congestion. Access to community facilities will be maintained during construction.

Community Character

Construction impacts, such as increased levels of noise and dust, may temporarily affect neighborhood character at times of heavy construction, primarily in areas that are relatively quiet. In addition, the presence of large construction equipment may be perceived as visually disruptive, resulting in temporary effects to community character, particularly for residential neighborhoods adjacent to the limits of disturbance for the Project (see Appendix E). The following are neighborhoods directly adjacent to the Project's limits of disturbance (see Exhibits 3.3-1 and 3.3-5):

- Residential neighborhood west of SouthWest Station (Eden Prairie)
- Residential neighborhood north of Opus Station (Minnetonka)
- Residential neighborhood north of Shady Oak Station (Hopkins)
- Residential neighborhood north of Downtown Hopkins Station (Hopkins)
- South Oak Hill (St. Louis Park)
- Wolfe Park (St. Louis Park)
- Triangle (St. Louis Park)
- West Calhoun (Minneapolis)
- Cedar-Isles-Dean (Minneapolis)
- Kenwood (Minneapolis)

Community Cohesion

Although temporary in nature, short-term (construction) impacts may affect community cohesion. Construction activities could result in increased roadway congestion, temporary closures of roadways, and roadway detours, all of which may increase both automobile and truck traffic through residential neighborhoods. Construction activities could also result in temporary increases in vehicle traffic on local roadways where relatively little vehicle traffic exists today. Roadways which provide connectivity to and from neighborhoods are of particular importance to community cohesion. Table 3.3-17 identifies short-term construction impacts for key roadways.

TABLE 3.3-17
Short-term Roadway Construction Impacts[a]

Location	City	Neighborhood[b]	Summary of construction impacts
Technology Drive, west of Prairie Center Drive	Eden Prairie	SouthWest Station area	Temporary lane closure/shifts to facilitate roadway widening and reconstruction, and track, signal and utility construction activities
Excelsior Boulevard, at 17th Ave S, 8th Ave S, and Jackson Ave N/Milwaukee St	Hopkins	Shady Oak and Downtown Hopkins Station areas	Temporary lane closures/shifts to facilitate intersection reconstruction, turn lane widening, utility construction, and LRT bridge construction
Blake Road, in the area of the at-grade LRT alignment crossing	Hopkins	Blake Station Area	Temporary lane closures/shifts to facilitate the construction of the at-grade, gated light rail, freight rail, and trail crossing reconstruction
Louisiana Ave S, in the area of the at-grade LRT alignment crossing	St. Louis Park	South Oak Hill and Meadowbrook	Temporary lane closures /shifts to facilitate the reconstruction of the light rail, freight rail, and trail bridges
West Lake Street, in the area of the at-grade LRT alignment crossing	Minneapolis	West Calhoun	Temporary lane closures/shifts to add barrier and sidewalk on the existing bridge over the Kenilworth Corridor
Cedar Lake Pkwy, in the area of the existing Kenilworth Corridor crossing	Minneapolis	Cedar-Isles-Dean	Temporary lane closures/shifts to facilitate the construction of the light rail tunnel, and at-grade freight rail /trail crossings

[a] Includes a summary of construction activities of note when considering effects to community cohesion. Does not represent an all-inclusive list of construction activities.

[b] For the purpose of this analysis, station areas (i.e., ½-mile radius around proposed LRT stations) was used to describe neighborhoods for communities with no formally defined neighborhood boundaries (refer to Section 3.3.1 for more information).

Source: Council, 2015.

Temporary sidewalk closures and detours may affect pedestrian traffic patterns and temporary trail closures or detours during construction would likely be required, but these would be short-term (construction) effects. Refer to Sections 4.2.3.3 and 4.5.3.3 for more information on short-term (construction) impacts related to roadways and traffic, and pedestrian and bicycle facilities, respectively.

3.3.4 Mitigation Measures

This section describes the measures the Council will implement to mitigate the Project's long-term and short-term direct and indirect neighborhood and community impacts. For each mitigation measure or set of associated mitigation measures, this section generally notes the anticipated impact or associated impacts that the mitigation measures will address (see Sections 3.3.3.1, 3.3.3.2, and 3.3.3.3 for additional information on the identified neighborhood and community impacts and avoidance measures).

3.3.4.1 Long-term Mitigation Measures

No mitigation measures are warranted for long-term neighborhood and community impacts, because there will be no adverse impacts due to the effectiveness of mitigation measures that have been identified and will be implemented for specific environmental categories (including but not limited to noise, vibration, visual quality and aesthetics, transit, roadways and traffic, parking, and pedestrian and bicycle). Specific mitigation for the long-term impacts such as property acquisitions and displacements, visual quality, and noise are discussed in other sections of this Final EIS (i.e., Acquisitions and Displacements [Section 3.4], Parklands, Recreation Areas, and Open Spaces [Section 3.6], Visual Quality and Aesthetics [Section 3.7], Noise [Section 3.12], Vibration [Section 3.13], Parking [Section 4.3], and Pedestrian and Bicycle [Section 4.5]).

3.3.4.2 Short-term Mitigation Measures

Impact. The Project will result in short-term changes to access to community facilities during construction. Short-term impacts include changes to roadways alignments, intersections modifications, and trail and sidewalk detours for routes which provide access to community facilities (see Sections 4.2.3.3 and 4.5.3.3 for more information on temporary construction impacts to roadways and pedestrian/bicycle facilities, respectively).

Impact. Construction impacts, such as increased levels of noise, vibration, and dust may temporarily affect neighborhood character at times of heavy construction, primarily in areas that are relatively quiet. In addition, the presence of large construction equipment may be perceived as visually disruptive, resulting in temporary effects to community character, particularly for residential neighborhoods adjacent to the limits of disturbance for the Project (see Appendix E).

Impact. Construction activities could result in short term impacts to community cohesion, such as increased roadway congestion, temporary closures of roadways, and roadway detours, all of which may increase both automobile and truck traffic through residential neighborhoods. Construction activities could also result in temporary increases in vehicle traffic on local roadways where relatively little vehicle traffic exists today.

Mitigation. Specific mitigation measures for short-term impacts to land use related to temporary construction easements and other construction activities will be identified in the Construction Mitigation Plan and Construction Communication Plan, which will be implemented by the Council prior to and during construction. The purpose of the Construction Communication Plan is to prepare project-area residents, businesses, and commuters for construction; listen to their concerns; and develop plans to minimize harmful or disruptive effects. Specific mitigation measures included in the Construction Communication Plan will be site specific and may include the following:

- Issue construction updates and post them on the Project website.
- Provide advance notice of roadway closures, driveway closures, and utility shutoffs.
- Conduct public meetings.
- Establish a 24-hour construction hotline.
- Prepare materials with applicable construction information.
- Address property access issues.
- Assign staff to serve as liaisons between the public and contractors during construction.

In addition, the Council will develop and implement a construction staging plan (staging plan), which will be reviewed with the appropriate jurisdictions and railroads, and the contractor will be required to secure the necessary permits and follow the staging plan, unless otherwise approved. Components of a staging plan include traffic management plans and a detailed construction timeline.

3.4 Acquisitions and Displacements

This section describes the long-term direct and indirect effects and short-term (construction) direct and indirect effects of the Project related to acquisitions and displacements. This section includes the identification of the parcels of land that will be permanently acquired for the Project and the displacements associated with those acquisitions, as well as the temporary easements that will be acquired for construction (see Section 3.17 for cumulative impacts). This section includes an overview of the regulatory context and methodology used for the analysis; an assessment of existing built environment; a description of the anticipated impacts related to acquisitions and displacements; and a description of mitigation measures to implement with the Project. A complete listing of acquisitions related to the Project is included in the *Southwest LRT Acquisitions Technical Report* (refer to Appendix C for instructions on how to access this document).

3.4.1 Regulatory Context and Methodology

Federal and state laws require that when property is acquired for a public project that property owners be paid fair market value for their land and buildings and, where applicable, be assisted in finding replacement sites for business or residential dwellings. In addition, any tenant of the property to be acquired is required to receive relocation assistance, if desired. Any property acquired for the Project will be acquired in accordance with the Uniform Relocation and Real Property Acquisitions Policies Act of 1970, as amended, (42 U.S.C. 4601 et seq.), which also is known as the Uniform Relocation Act. The objective of the Uniform Relocation Act is to provide fair and equitable treatment of people whose real property is acquired or who are displaced in connection with federally funded projects; help ensure that relocation assistance is provided; and help ensure that decent, safe, and sanitary housing is available within the displaced person's

financial means. Property acquired for the Project will also be subject to MN Stat. 117 which sets forth requirements for acquisition of land (MN Stat. 117.38), compensation (MN Stat. 117.155 – 117.187), and uniform relocation benefits (MN Stat. 117.52).[19] The Uniform Relocation Act and MN Statutes are applicable to full and partial acquisitions, displacement, and permanent and temporary easements.[20] The property acquisition process for the Project will follow the *Southwest LRT Project Real Estate Acquisition and Management Plan* (Council and MnDOT, 2014), which will be maintained during final design and construction.

The study area for the acquisitions and displacements analysis is the Project's limits of disturbance, which is inclusive of the Project's permanent and temporary right-of-way requirements.[21] See Appendix E for an illustration of the Project's limits of disturbance (LOD). Aerial photography, project engineering design, and county land parcel data were used to determine the properties or portions of properties, within the Project's LOD and to determine the extent of impact on each property. For partial acquisitions, a determination was made whether acquisition would affect the use of the property as currently designed and/or whether modifications to the property would be required to maintain use.

3.4.2 Affected Environment

As described in Section 3.1, the study area is an urban/sub-urban area comprising a mix of uses including residential, commercial, industrial and institutional uses. Mapping showing the existing land use conditions within the LOD is provided in Section 3.1.

Beginning in the City of Hopkins, and continuing to its terminus at Target Field Station in Minneapolis, the proposed light rail alignment will be located within three active existing freight rail and recreation corridors (refer to Exhibit 4.4-1 in Section 4.4 Freight [Rail and Truck]): the Bass Lake Spur; the Cedar Lake Junction (locally referred to as the Kenilworth Corridor); and the Wayzata Subdivision. Refer to Section 4.4.3.1 for a description of the current ownership and use of each of these freight rail corridors.

The specific regulations associated with parkland acquisition are described in Section 3.6 and in Appendix J, Section 4(f) Evaluation. Utilities and potential utility relocations are discussed in Section 3.15 and existing freight operations and ownership of freight rail corridors are described in Section 4.4.

3.4.3 Environmental Consequences

This section identifies the long-term and short-term direct and indirect impacts that will result from the need to acquire land to implement the Project.

3.4.3.1 Long-term Direct Acquisitions and Displacements

Based on the Project's preliminary engineering plans (see Appendix E), the Project will directly result in the partial acquisition of 159 parcels (totaling approximately 133.5 acres) and full acquisition of 36 parcels (totaling approximately 64 acres). Of these, 145 parcels (totaling approximately 126 acres) are private

[19] Land acquisitions for Locally Requested Capital Investments (LRCIs) may not include federal funding and therefore may not be subject to the requirements of the Uniform Relocation Act. Acquisitions for LRCIs would still be subject to MN Stat. 117. Acquisitions for LRCIs will generally follow the same process as non-LRCI Project acquisitions, unless otherwise noted in the *Southwest LRT Project Real Estate Acquisition and Management Plan*.

[20] *Fee simple* means property is fully acquired with change in ownership; *permanent easement* means the right to use the property permanently for a specific purpose is acquired but original ownership remains; *temporary easement* means the right to use the property for specific purpose and a specified time period is granted but original ownership remains. Refer to the *Southwest LRT Acquisitions Technical Report* for more detailed definitions of these types of real estate transactions (instructions on how to access this document can be found in Appendix C).

[21] Temporary right-of-way, or temporary easements, includes land needed temporarily for construction activities, such as construction staging, construction access roads, and storage yards, which will be removed after construction is finished. Refer to Section 3.4.3.3 for more information on temporary right-of-way acquisitions.

property and 50 parcels (totaling approximately 71.5 acres) are currently under public ownership.[22,23,24] The existing land use of properties that will be acquired includes railroad (public and privately owned), industrial, commercial, residential, and open space. Refer to Section 3.1 for more information on the conversion of existing land uses to public transportation use. The number of full and partial acquisitions, by land use type, are shown in Table 3.4-1. The locations of these partial and full parcel acquisitions are illustrated on Exhibits 3.4-1 and 3.4-2. A detailed table showing the name, Hennepin County property ID, location, ownership type (i.e., private or public), type of acquisition (e.g., full or partial), and size of impacted parcels is included in the *Southwest LRT Acquisitions Technical Report* (Technical Report) (refer to Appendix C).

TABLE 3.4-1
Permanent Acquisitions under the Project[a]

Type of Permanent Acquisition	Number of Parcels	Acres
Private Property Right-of-Way Acquisitions – Partial[b]	117	71.4
Private Property Right-of-Way Acquisitions – Full	28	54.6
Public Property Right-of-Way Acquisitions – Partial	42	62.1
Public Property Right-of-Way Acquisitions – Full	8	9.0
Total	195	197.1

[a] Acquisitions quantities are approximate and may change as a result of implementation of the property acquisition process.

[b] As described in Section 2.1.1, the Eden Prairie Town Center Station and associated roadway improvements are deferred and are not expected to be in place when the Project opens in 2020. The station and associated roadway improvements are planned to be in place by 2040. If the station and associated roadway improvements are not in place by 2040, there would be a reduction of six partial acquisitions of private property (totaling 1.23 acres) in the vicinity of the station and the number of private parcels acquired by the Project would be 111 parcels (totaling approximately 70 acres), rather than 117 parcels (totaling approximately 71 acres).

Source: Council, 2015

Of the land to be acquired, approximately 49 tax parcels are currently used as an existing railroad corridor (i.e., Bass Lake Spur, Kenilworth Corridor, and Wayzata Subdivision) and reserved for transportation use. Of the 49 parcels, there are 17 parcels of privately owned property within the Bass Lake Spur and Wayzata Subdivisions and 32 parcels of public property currently owned by HCRRA within the Kenilworth Corridor. Final ownership of these rights-of-way will be determined as Engineering progresses, but it is likely that portions of the railroad corridors will be transferred to public ownership, with continued operating rights for the railroads that currently operate in the area.

The full or partial acquisition of property with industrial and commercial uses will result in the relocation of up to 72 businesses that currently operate on or use 20 of the parcels to be acquired by the Project.

Depending on the preferences of the owner, the Project would work to relocate displaced businesses in accordance with the Uniform Relocation Act.

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[22] Partial acquisitions include four privately owned parcels related to Locally Requested Capital Investments (LRCIs), which are not part of the LPA (see Section 2.1.1). These four parcels would already be partially acquired as a result of the LPA, but the partial acquisition area will be larger as a result of the LRCIs. One full acquisition of a privately owned parcel is attributed to the LRCIs. Refer to the Southwest LRT Acquisitions Technical Report (see Appendix C) for more information.

[23] As described in Section 2.1.1, the Eden Prairie Town Center Station and associated roadway improvements are deferred and are not expected to be in place when the Project opens in 2020. The station and associated improvements are planned to be in place by 2040. If the station and associated improvements are not in place by 2040, there would be a reduction of partial acquisitions of private property (totaling 1.23 acres) in the vicinity of the station by 2040, and thus the number of private parcels acquired by the Project would be 141 parcels (totaling approximately 122 acres), rather than 143 parcels (totaling approximately 126 acres).

[24] These acquisitions will consist of fee simple acquisitions, permanent easements, or a combination of fee simple acquisition and permanent easement. Decisions regarding the type(s) of acquisition used for each parcel will be made during Engineering and will be determined prior to initiating the acquisition process. Project acquisition quantities are approximate and may change as a result of implementation of the property acquisition process.

EXHIBIT 3.4-1
Property Acquisitions

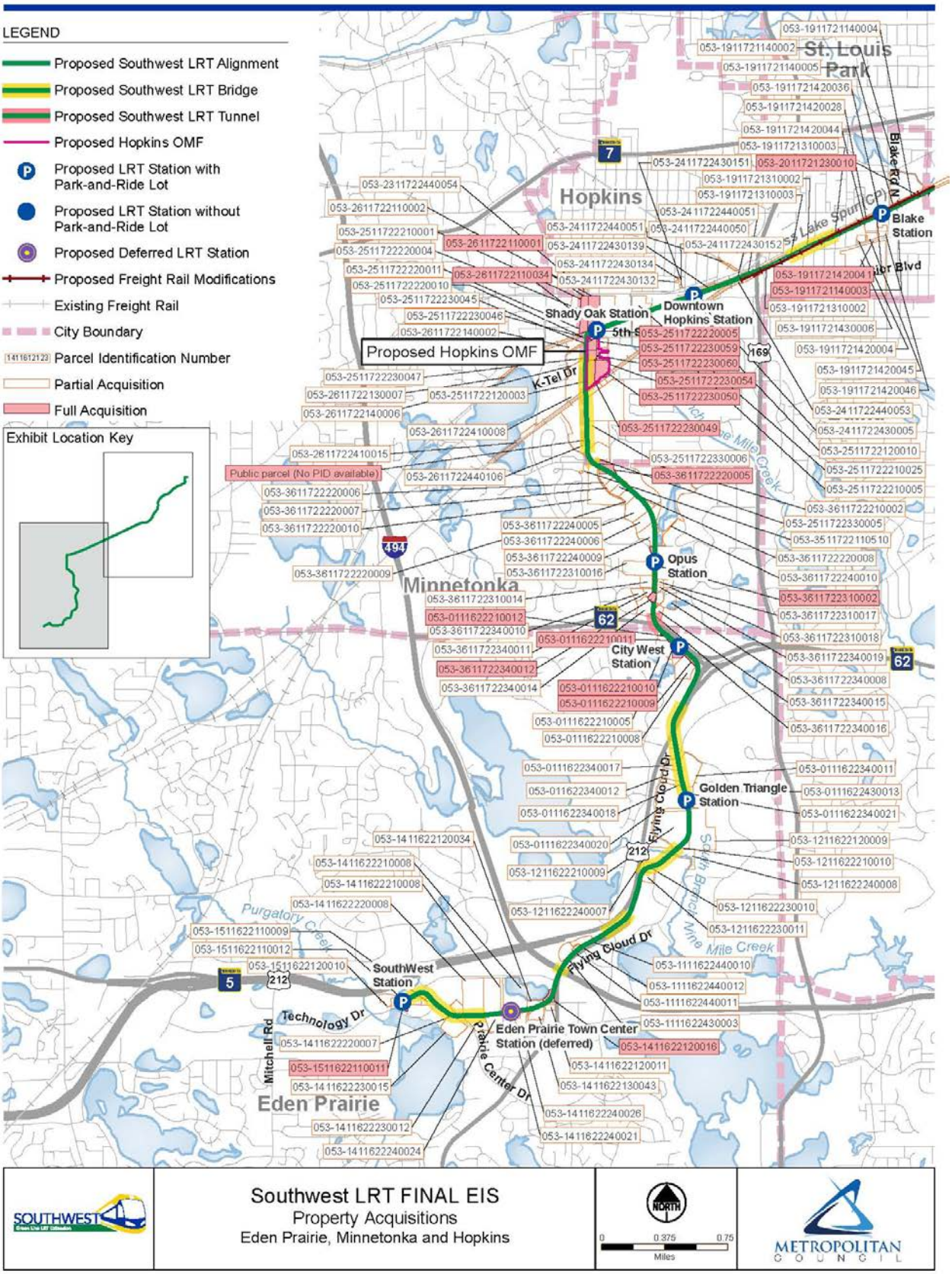
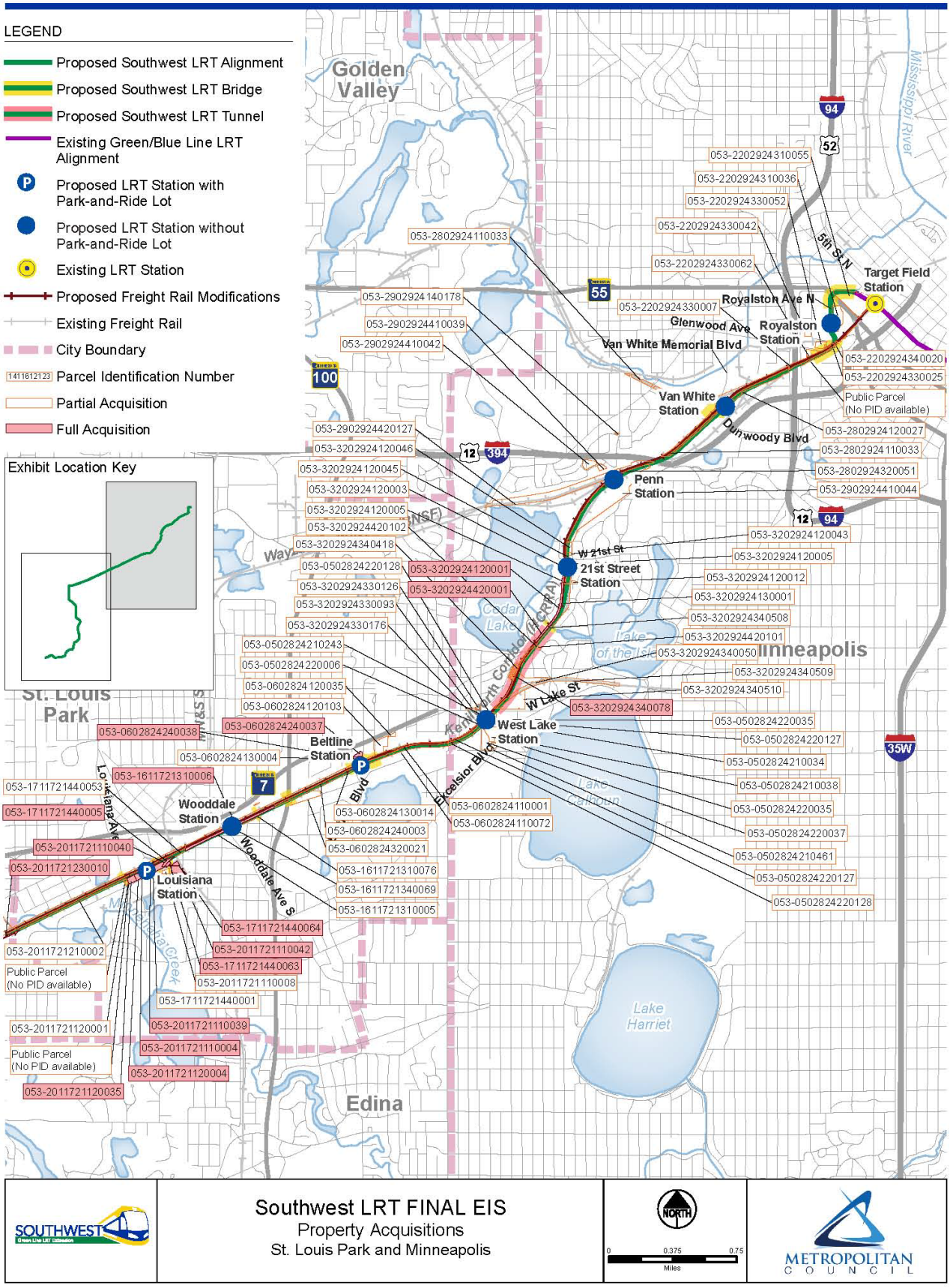


EXHIBIT 3.4-2
Property Acquisitions



The Project would not result in any residential displacement. However, a combined total of approximately 68 acres of land would be acquired from a total of 27 residential parcels, which are currently occupied by multiple condominiums and apartment complexes. These partial acquisitions will generally involve the purchase of a small strip of land along an edge of the parcel and those acquisitions are not expected to lead to the displacement of any occupied residential structures.

3.4.3.2 Long-term Indirect Acquisitions and Displacements

As noted in Section 3.1.3.2, there is potential for increased development and redevelopment in areas surrounding proposed light rail stations because of improved transit access. While development and redevelopment is regulated by the affected local jurisdictions and is driven by regional and local economic conditions, light rail lines can advance the timing and increase the intensity of development, within the limits allowed by local comprehensive plans, particularly surrounding proposed station areas. This increased redevelopment could indirectly lead to acquisitions and displacements in situations where property ownership is transferred from one party to another.

3.4.3.3 Short-term Acquisitions

Short-term impacts related to acquisitions and displacements generally occur when a temporary property easement is needed for construction activities outside of the permanent right-of-way for the Project.

Temporary property acquisitions could include short-term changes to property access or temporary conversion of land use to transportation use for construction staging and other construction activities throughout all or part of the construction period. Short-term occupancies of parcels would include the use of construction easements or intergovernmental agreements and would change existing land uses in the short term. Although some businesses may experience hardship during construction, this would not affect displacement unless the property or business owner relocated due to hardships faced during construction.

Based on the Project's preliminary engineering plans, temporary property acquisitions (e.g., construction easements) will be needed on approximately 134 acres effecting 178 parcels including those with industrial, commercial, railroad, residential, and public land uses.[25] Refer to Appendix E for a series of maps showing the Project's temporary easements.

In addition, some of the property acquired by the Project, as identified in Table 3.4-1, may not be needed after construction is complete. Those unneeded areas of property would be identified after construction and would be considered as remnant parcels. Remnant parcels could be sold in compliance with FTA Circular 5010.1D (FTA, 2008a) and applicable state regulations, thereby changing acquisition impacts to these parcels from long-term impacts to short-term impacts.

3.4.4 Mitigation Measures

This section describes the measures the Council will implement to mitigate the Project's long-term and short-term acquisition and displacement impacts. For each mitigation measure or set of associated mitigation measures, this section generally notes the anticipated impact or associated impacts that the mitigation measures will address (see Sections 3.4.3.1, 3.4.3.2, and 3.4.3.3 for additional information on the identified acquisition and displacement impacts and avoidance measures).

3.4.4.1 Long-term and Short-term Mitigation Measures

Long-term Impact. The Project will directly result in the partial acquisition of 159 parcels (totaling approximately 133.5 acres) and full acquisition of 36 parcels (totaling approximately 64 acres).

Short-term Impact. Temporary property acquisitions (e.g., construction easements) will be needed on approximately 134 acres effecting approximately 178 parcels.

[25] Includes 0.146 acre of temporary easements on two parcels related to Locally Requested Capital Investments (LRCIs), which are not part of the LPA (see Section 2.1.1). Refer to the Southwest LRT Acquisitions Technical Report (see Appendix C) for more information.

Mitigation. When acquiring property, the Council will provide property owners with monetary compensation in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act (Uniform Relocation Act), FTA's Circular 5010.1D Grants Management, and MN Stat. 117. Any businesses or persons displaced from the property will be compensated in accordance with provisions of the Uniform Relocation Act and MN Stat. 117.

Relocation benefits will be available, under the provisions of the Uniform Relocation Act and MN Stat. 117, for displaced businesses and non-profit organizations including moving costs, tangible personal property loss as a result of relocation or discontinuance of operations, reestablishment expenses, and costs incurred in finding a replacement site.

3.5 Cultural Resources

This section describes long-term direct and indirect and short-term (construction) direct and indirect effects of the Project on cultural resources. The National Environmental Policy Action of 1969 (NEPA) requires federal agencies to consider the impacts of their actions on cultural resources, and Section 306108 (hereinafter referred to as Section 106) of the National Historic Preservation Act of 1966 (NHPA) requires agencies to consider the effects of their undertakings on historic properties.

For the purposes of this section, "cultural resource" means the same as "historic property." Historic properties are buildings, structures, districts, objects, and sites that are listed in or eligible for listing in the National Register of Historic Places (NRHP). The Council on Environmental Quality (CEQ) *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* (40 CFR Parts 1500-1508) encourage integration of the NEPA process with other planning and environmental reviews, such as Section 106. CEQ regulations also clarify that under NEPA, "impact" is synonymous with "effect" under Section 106 (40 CFR 1508.8); therefore, "effect" is used throughout this section, consistent with Section 106 regulations. The regulations implementing Section 106, *Protection of Historic Properties* (36 CFR Part 800), encourage agencies coordinate Section 106 consultations with the requirements of other statutes, as applicable, such as NEPA. As such, this section of the Final EIS includes identification of commitments and mitigation measures included within the Project's Section 106 Memorandum of Agreement (MOA) (see Section 3.5.5 and Appendix H).

This section includes an overview of the regulatory context and methodology used for the analysis; a summary of the Project's Section 106 consultation process; an evaluation of existing historic properties; an assessment of the anticipated effects related to historic properties; and a description of avoidance, minimization, and mitigation measures to implement with the Project (see Section 3.17 for cumulative impacts).

Appendix H includes documentation of the Section 106 consultation process, including copies of the Project's consultation materials (see also Section 3.5.2). A list of reports and studies on historic properties can be found in the *Cultural Resources Evaluation Supporting Documentation Technical Memorandum* (see Appendix C for instructions on how to access the technical memorandum). The reports summarized in this memorandum, combined with the correspondence with the Minnesota Historic Preservation Office (MnHPO) in Appendix N, provide documentation of the FTA's efforts to identify historic properties and the MnHPO's concurrence (see also Section 3.5.3). Appendix H contains the *Section 106 Assessment of Effects for Historic Properties* (Assessment of Effects report), which documents FTA's findings of effect for all identified historic properties and overall determination of effect for the project. Documentation of MnHPO's concurrence with those findings is provided in Appendix N. Appendix H also includes a copy of the Project's Section 106 MOA (see also Section 3.5.4).

3.5.1 Regulatory Context and Methodology

This section describes the regulatory context and methodology for the historic properties assessment under Section 106. After an introduction summarizing the Section 106 process, this section describes the methodologies used to determine the architecture/history and archaeological Areas of Potential Effect (APEs), the methods used to identify historic properties and evaluate them for the NRHP, how effects on historic properties are assessed, and how adverse effects are resolved under Section 106.

The Council will apply for FTA funding for the Project and will seek permits for construction from the United States Army Corps of Engineers (USACE); therefore, this project is a federal undertaking and must comply with Section 106 and with other applicable federal mandates. Section 106 requires federal agencies to consider the effects of their actions on historic properties before undertaking a project. The regulations implementing Section 106 are codified in 36 CFR Part 800. The FTA is the Lead Federal Agency for the Project. The Council is the Project's local lead agency and project sponsor. The USACE is a Federal Cooperating Agency for the Project, responsible for implementing NEPA and related laws and Section 404 of the Clean Water Act. Pursuant to 36 CFR Part 800.2(a)(2), the USACE has also recognized FTA as the Lead Federal Agency for the Section 106 process for the Project.[26]

FTA's Section 106 compliance was achieved through consultation with the MnHPO, Indian tribes, local governments, and other interested parties. Section 106 directs that the responsible Federal agency shall:

- Initiate the Section 106 process by determining the undertaking, notifying the MnHPO and Indian tribes, and developing a plan to involve the public (36 CFR Part 800.3);
- Identify historic properties that are listed, or eligible for listing, in the NRHP by determining an APE, conducting a survey to identify historic properties, and evaluating historic properties under NRHP criteria (36 CFR Part 800.4);
- Assess the effects of the undertaking on historic properties by applying the criteria of adverse effect, and consulting with the MnHPO, Indian tribes, and the public (36 CFR Parts 800.5 and 800.11(e)); and
- Resolve any adverse effect(s) by continuing consultation with Section 106 consulting parties to explore measures that avoid, minimize, or mitigate the adverse effect(s), and develop a Section 106 Agreement to document agreed upon measures (36 CFR Part 800.6).

The FTA has designated the Minnesota Department of Transportation (MnDOT) Cultural Resources Unit (CRU) to carry out many aspects of the Section 106 review for this project. FTA detailed these responsibilities in a letter to MnDOT, included in Appendix N. FTA and MnDOT CRU, in consultation with the MnHPO, defined the Project's architecture/history and archaeological APEs, identified and evaluated historic properties, assessed effects of the Project on historic properties listed in or eligible for inclusion in the NRHP, and resolved adverse effects.

The Project will also use funding from the State of Minnesota and political subdivisions of the State and is seeking permits for construction from several state agencies, including MnDOT, Minnesota Department of Natural Resources, Minnesota Pollution Control Agency, and Minnesota Department of Health. It must also, therefore, comply with Minnesota laws, including the Minnesota Field Archaeology Act (MS 138.31-138.42), the Minnesota Historic Sites Act (MS 138.661-138.669), and the Minnesota Private Cemeteries Act (MS 307.08), as applicable.

3.5.1.1 Area of Potential Effect

This Project has two APEs, one for architecture/history properties (Exhibits 3.5-1 through 3.5-3) and one for archaeological properties (Exhibits 3.5-4 and 3.5-5), which are the geographic areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The rationale for the architecture/history and archaeological APEs can be found in *Southwest Transitway: A Research Design for Cultural Resources* (Hess, Roise and Company, et al., 2010) and *Southwest Light Rail Transit Project Research Design for Cultural Resources: Supplement Number 1* (MnDOT CRU, 2014), which are included in the *Cultural Resources Evaluation Supporting Documentation Technical Memorandum*. Appendix C contains instructions on how to access the technical memorandum.

[26] In a letter dated January 15, 2015, the USACE recognized FTA as the Lead Federal Agency pursuant to 36 CFR 800.2(a)(2), to act on its behalf for meeting the requirements of Section 106. See Appendix N for a copy of USACE's letter.

EXHIBIT 3.5-1
Architecture/History Area of Potential Effect, Properties, and Hopkins Downtown Commercial Historic District: Eden Prairie, Minnetonka, and Hopkins

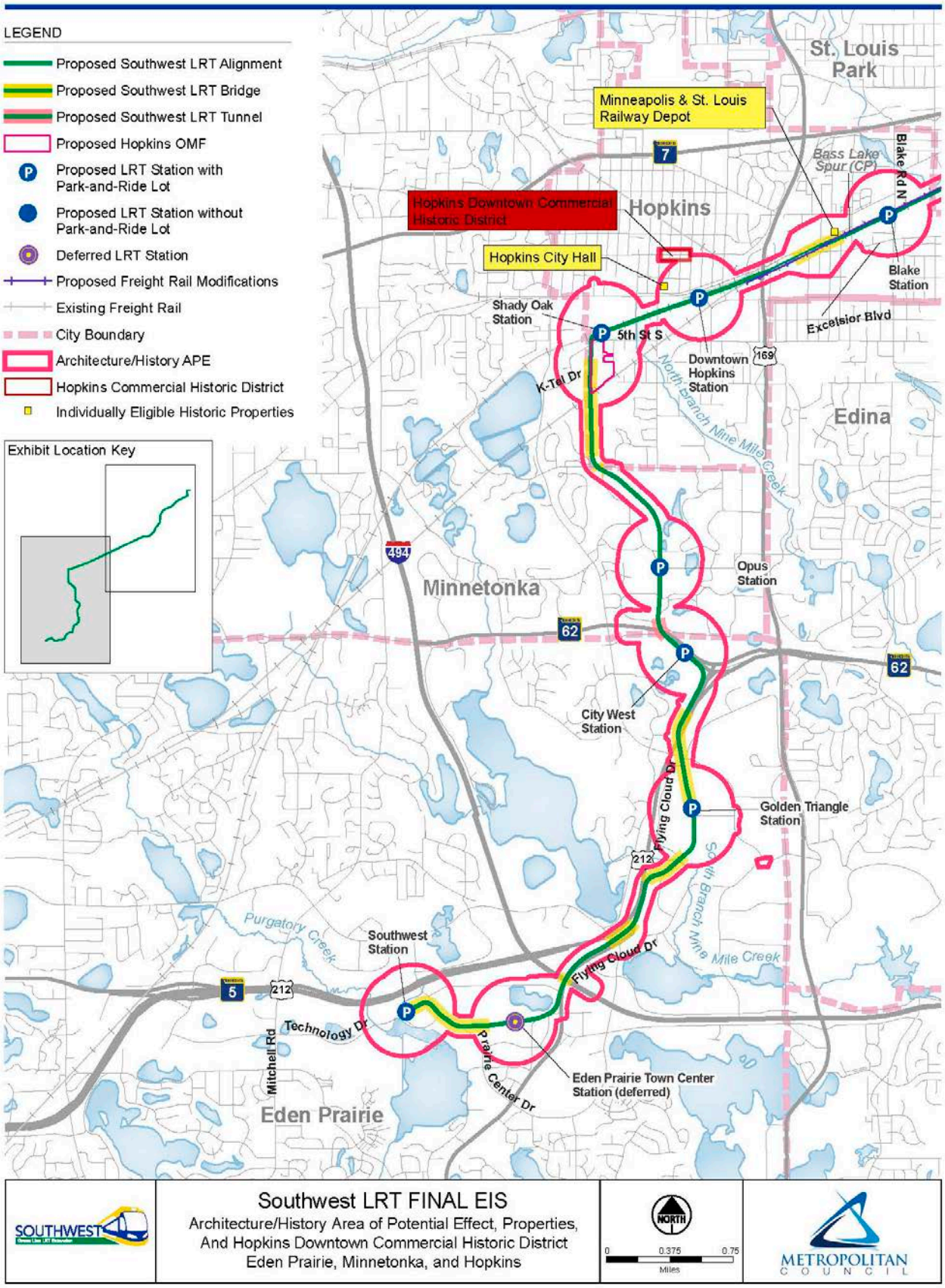


EXHIBIT 3.5-2
Architecture/History Area of Potential Effect and Properties: St. Louis Park and Minneapolis

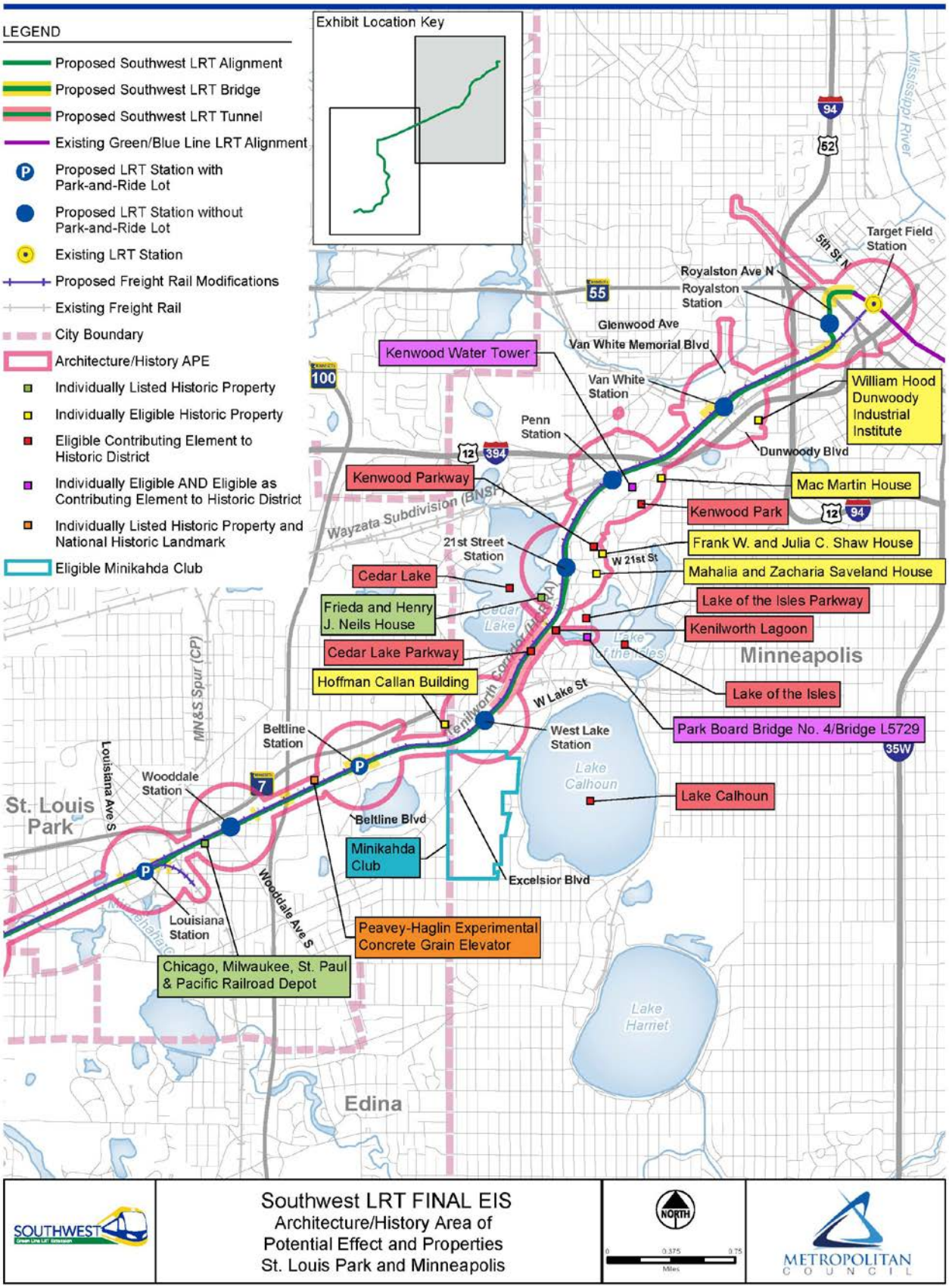


EXHIBIT 3.5-3
Architecture/History Area of Potential Effect and Historic Districts: St. Louis Park and Minneapolis

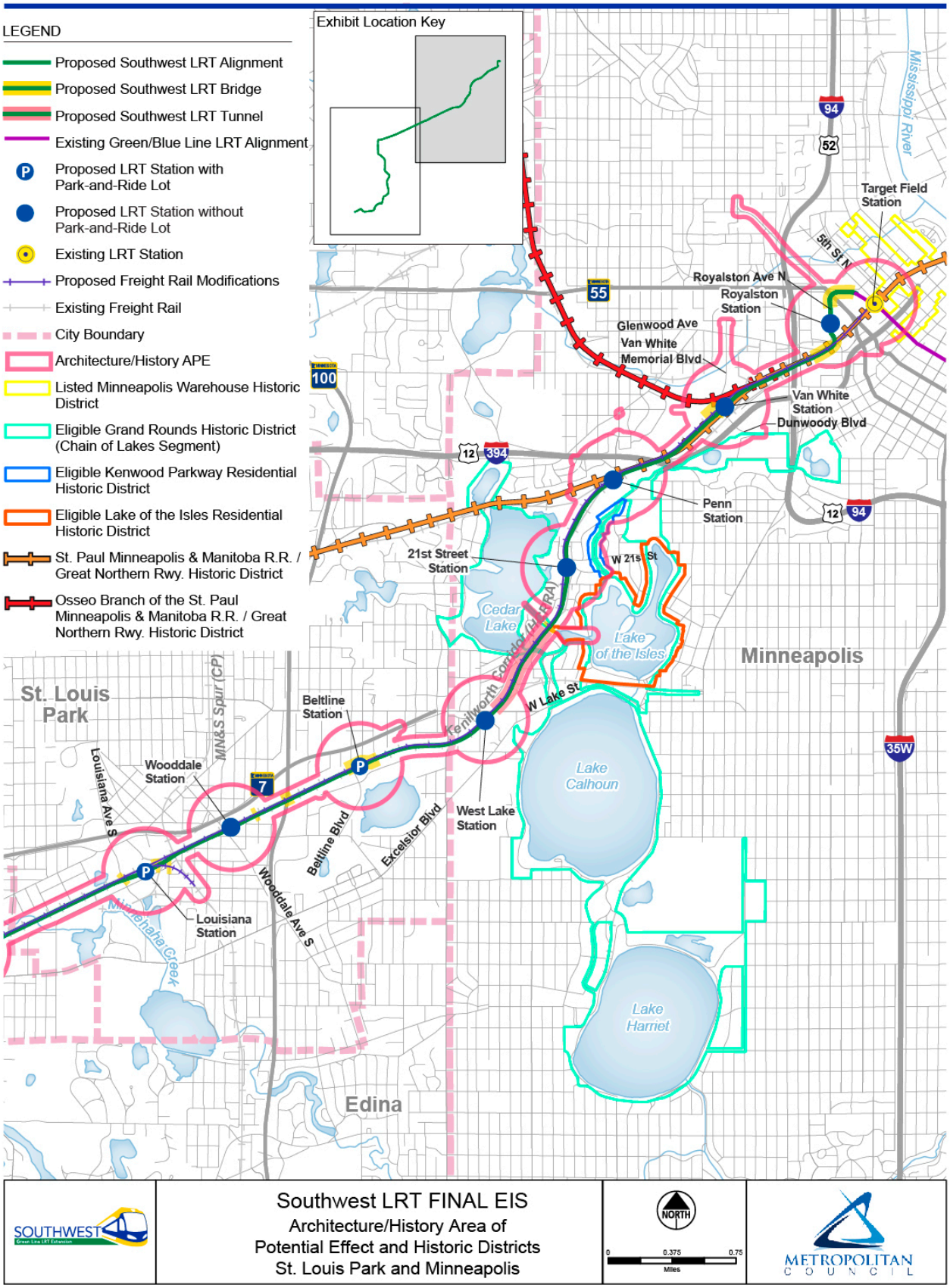


EXHIBIT 3.5-4
Archaeological Area of Potential Effect: Eden Prairie, Minnetonka, and Hopkins

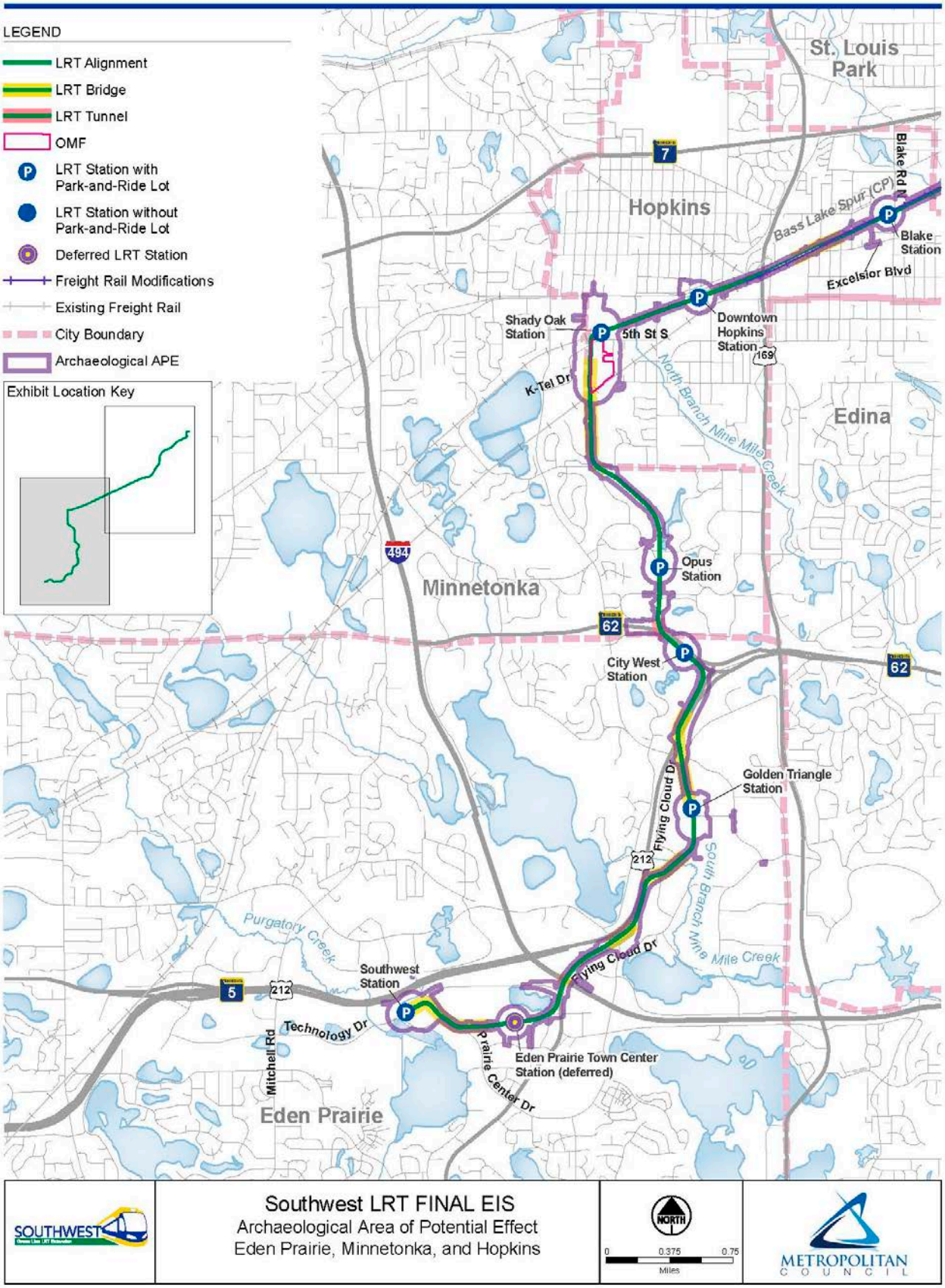
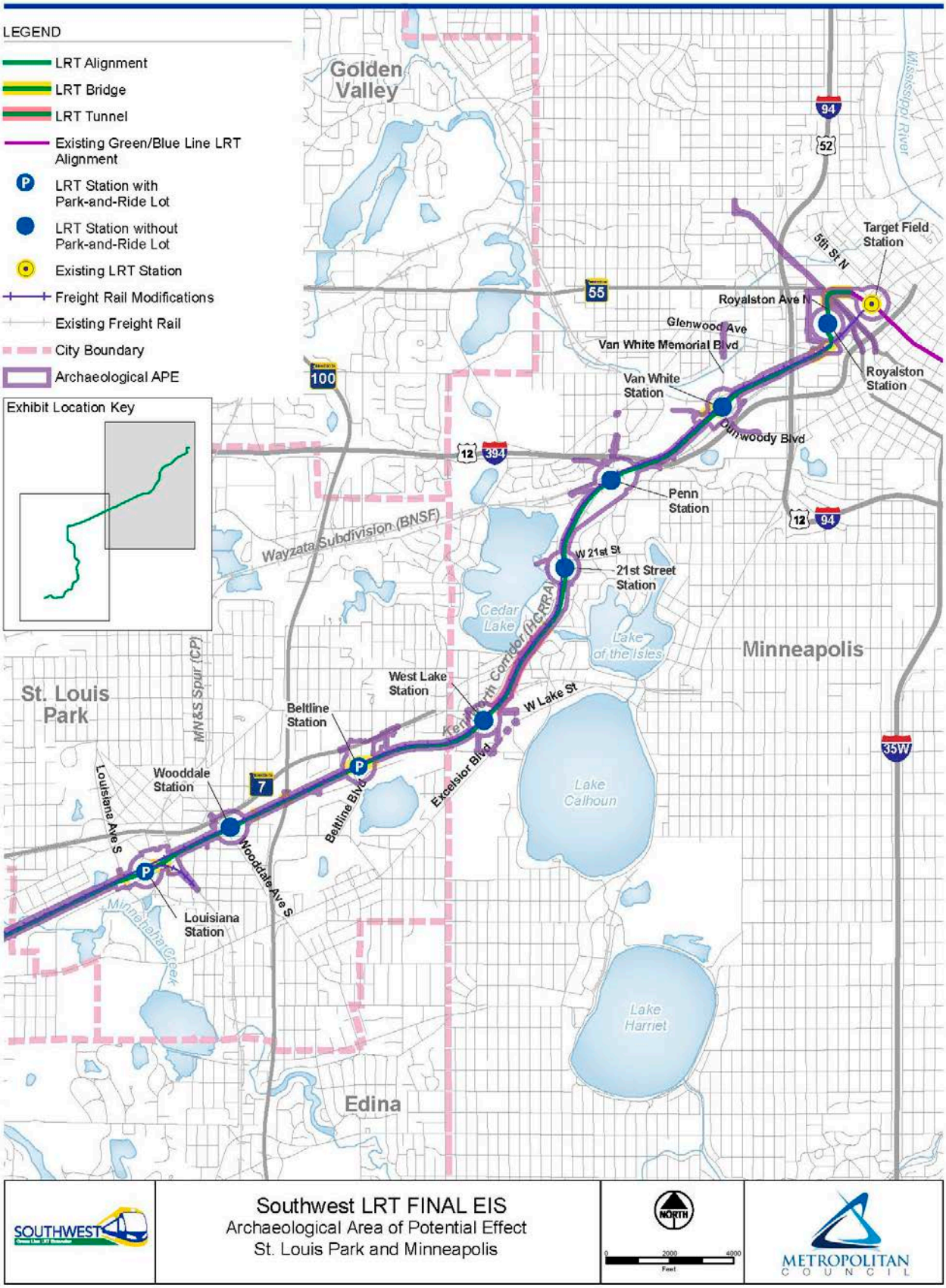


EXHIBIT 3.5-5
Archaeological Area of Potential Effect: St. Louis Park and Minneapolis



3.5.1.2 Identification and Evaluation of Historic Properties

Section 106 gives equal consideration to historic properties listed in or determined eligible for listing in the NRHP. The NRHP Criteria for Evaluation (36 CFR Part 63) are used to evaluate a historic property to determine whether it possesses historic significance, is of sufficient age, and retains sufficient integrity to convey any potential significance. A historic property can be eligible for the NRHP either individually, as part of a historic district, or both.

The significance of each historic property was evaluated in relation to the following NRHP eligibility criteria:

- Criterion A—association with events that have made a significant contribution to broad patterns of history
- Criterion B—association with the life of a historically significant person
- Criterion C—embody the distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction
- Criterion D—has yielded, or is likely to yield, information important in history or prehistory (this generally is understood to refer to archeological significance)

To be eligible for listing in the NRHP, a property must be 50 years old, or, if it is less than 50 years old, possess exceptional significance. A property must also retain sufficient integrity to convey its significance.

To identify historic properties within the Project's architecture/history and archaeological APEs, nine architecture/history and nine archaeological investigations were completed. These investigations identified historic properties (i.e., buildings, objects, structures, districts, or sites previously listed in or eligible for listing in the NRHP) within the Southwest LRT Project's archaeological and architecture/history APEs. Appendix C contains instructions on how to access the *Cultural Resources Evaluation Supporting Documentation Technical Memorandum*, which lists and contains copies of all reports associated with the historic properties studies.

3.5.1.3 Standards Used to Assess and Resolve Adverse Effects

FTA and MnDOT CRU used the criteria of adverse effect described in 36 CFR Part 800.5(a)(1) to assess Project effects on historic properties. Per 36 CFR Part 800.5(a)(1), "an adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association." A full discussion of the Project's effects on each historic property can be found in Appendix H.

3.5.2 Section 106 Coordination

3.5.2.1 Agency Coordination and Public Involvement

Section 106 consultation continued with MnHPO and other Section 106 consulting parties since publication of the Notice of Intent for the Draft EIS and through development of the Section 106 MOA. The Section 106 process tasks conducted to date include identifying the architecture/history and archaeological APEs, identifying historic properties and determining their eligibility for the NRHP, assessing Project effects on historic properties and making findings of effects, including a final determination of effect, and developing a Section 106 MOA that outlines measures to avoid, minimize, and mitigate adverse effects to historic properties. Stipulations in the Section 106 MOA will guide the Project's implementation.

To comply with Section 106 requirements, MnDOT CRU submitted the architecture/history and archaeological APEs, the results of the surveys/investigations completed for the Project, including NRHP eligibility determinations, and preliminary determinations of effect to the MnHPO for concurrence, and to other Section 106 consulting parties for their review and comment. The FTA submitted its final findings of effects of the Project on historic properties and the final determination of effect of the Project on historic properties as a whole to the MnHPO for concurrence, and to other Section 106 consulting parties for their review and comment. MnHPO concurred with the Project's APEs, NRHP eligibility determinations, and final

determination of effect on historic properties (Appendix H). Letters from the MnHPO can be found in Appendix N. Additional consultation with Section 106 consulting parties occurred throughout the Section 106 process. Documentation of these consultation efforts can also be found in Appendix H. The Advisory Council on Historic Preservation (ACHP) was notified of the Section 106 process for this Project at the initiation of the process and chose not to participate in the consultation. Pursuant to the Section 106 regulations (36 CFR Part 800.6(a)(1)), the ACHP was subsequently notified of the final determination of an adverse effect and was provided another opportunity to enter into the consultation process but chose not to participate in the consultation (see Appendix N).

Section 106 consulting parties include the MnHPO; USACE; Hennepin County; the Cities of Eden Prairie, Minnetonka, Hopkins, St. Louis Park, and Minneapolis; the Minneapolis Park and Recreation Board; the Eden Prairie and Minneapolis Heritage Preservation Commissions; St. Louis Park Historical Society; Three Rivers Park District; Cedar-Isles-Dean Neighborhood Association; and Kenwood Isles Area Association. Signatories and invited signatories to the Section 106 MOA include the FTA, MnHPO, MnDOT and the Council.

In accordance with 36 CFR Part 800.8, Section 106 consultation efforts were coordinated with the NEPA process and related outreach activities and events. In particular, opportunities for the public to review information pertaining to and provide comments related to steps in the Section 106 process were incorporated, as appropriate, into public meetings related to the NEPA and design and engineering processes, such as open houses held on station design options near historic properties. At these meetings, information was shared summarizing the steps in the Section 106 process, historic properties identified, and effects to historic properties. A list of meetings related to agency coordination and public involvement efforts is included in Table 3.5-1.

TABLE 3.5-1
Meetings Related to Section 106

Date	Meeting Type	Purpose
October 7, 2008	Public Scoping Meeting/Scoping Hearing	Draft EIS Scoping: Alternatives development and issues to be studied, including cultural resources
October 14, 2008	Public Scoping Meeting/Scoping Hearing	Draft EIS Scoping: Alternatives development and issues to be studied, including cultural resources
October 23, 2008	Public Scoping Meeting/Scoping Hearing	Draft EIS Scoping: Alternatives development and issues to be studied, including cultural resources
May 18, 2010	Public Open House	General project meeting, update on environmental review, including cultural resources
May 19, 2010	Public Open House	General project meeting, update on environmental review, including cultural resources
May 20, 2010	Public Open House	General project meeting, update on environmental review, including cultural resources
April 12, 2012	Section 106 Consulting Parties Meeting	APE development and property identification
April 30, 2014	Section 106 Consulting Parties Meeting	Corridor-wide discussion on effects to historic properties, Kenilworth Lagoon Crossing
November 24, 2014	Section 106 Consulting Parties Meeting	Design and APE adjustments, historic properties update, preliminary effects determinations
February 6, 2015	Section 106 Consulting Parties Meeting	Kenilworth Lagoon Crossing design options and concepts, measures to minimize/mitigate adverse effects
February 24, 2015	Section 106 Consulting Parties Meeting	Corridor-wide discussion on effects to historic properties
April 2, 2015	Station Design Open House: Minneapolis Stations	Review of station design concepts, including overview of historic properties identified
April 8, 2015	Station Design Open House: Minneapolis Stations	Review of station design concepts, including overview of historic properties identified
April 8, 2015	Station Design Open House: St. Louis Park Stations	Review of station design concepts, including overview of historic properties identified

Date	Meeting Type	Purpose
April 9, 2015	Station Design Open House: Eden Prairie Stations	Review of station design concepts, including overview of historic properties identified
April 14, 2015	Station Design Open House: Hopkins Stations	Review of station design concepts, including overview of historic properties identified
April 22, 2015	Section 106 Consulting Parties Meeting	Archaeological sites, Kenilworth Lagoon Crossing, station design open house recap
June 13, 2015	Kenilworth Landscape Design Community Workshop #1	Present information about the Kenilworth corridor landscape design project and process, including Section 106 and Lagoon as a historic property; overview of Kenilworth Lagoon Crossing bridge design concepts
June 16, 2015	Supplemental Draft EIS Public Open House and Hearing	Project overview and public review of materials, opportunity for public comment on Supplemental Draft EIS
June 17, 2015	Section 106 Consulting Parties Meeting	Historic properties and transit noise and vibration effects overview, Kenilworth Lagoon Crossing bridge design
June 17, 2015	Supplemental Draft EIS Public Open House and Hearing	Project overview and public review of materials, opportunity for public comment on Supplemental Draft EIS
June 18, 2015	Supplemental Draft EIS Public Open House and Hearing	Project overview and public review of materials, opportunity for public comment on Supplemental Draft EIS
July 29, 2015	Section 106 Consulting Parties Meeting	Kenilworth Lagoon Crossing bridge and landscape design
September 23, 2015	Section 106 Consulting Parties Meeting	Consultation process update, historic properties and traffic and parking effects, Kenilworth Lagoon Crossing design update
December 3, 2015	Section 106 Consulting Parties Meeting	Review final findings and final determination of effect, and consult to resolve adverse effects
February 25, 2016	Section 106 Consulting Parties Meeting	Consult to complete resolution of adverse effects and review draft MOA

3.5.2.2 Tribal Coordination

In September and November 2009 and February 2010, the FTA sent letters to potentially affected Indian tribes, requesting that they identify any concerns about potential Project effects and inviting them to participate in public scoping meetings and/or schedule a separate meeting to discuss any specific tribal issues and concerns. Letters were sent to the Prairie Island Indian Community, Lower Sioux Indian Community Council, Shakopee Mdewakanton Sioux Community, Fort Peck Tribes, Santee Sioux Nation, Sisseton-Wahpeton Oyate (Tribal Historic Preservation Office), and the Upper Sioux Indian Community. Copies of the letters can be found in Appendix N. Additionally, a meeting opportunity was offered to tribal representatives in 2010; none of these tribes expressed an interest in meeting at that time. The tribes also received copies of the Draft EIS and Supplemental Draft EIS, and were invited to comment on the documents; no comments were received. The Project will have no adverse effects to historic properties that appear to be culturally significant to Indian tribes.

3.5.3 Affected Environment

A total of thirty-one historic properties located within the Southwest LRT Project's architecture/history and archaeological APEs were determined to be eligible for or listed in the NRHP, including one that is a National Historic Landmark (NHL). Tables 3.5-2 and 3.5-3 list these historic properties.

TABLE 3.5-2
Historic Properties Adversely Affected by the Project

Inventory Number	Site Name	Property Address	NRHP Status	NRHP Eligibility Criteria & Area of Significance	Adverse Effect Finding and avoidance/minimization/mitigation measures
Historic Districts					
XX-PRK-001	Grand Rounds Historic District (GRHD)[d]	Minneapolis	Eligible as a historic district	Criteria: A & C[a] Areas of Significance: • Community Planning & Development • Entertainment/ Recreation • Landscape Architecture	• Effects Considered - Direct physical effects, including: o Destruction and alteration of Kenilworth Lagoon features and construction of new crossing over the lagoon o Reconstruction of Cedar Lake Parkway - Changes to setting through introduction of LRT into and adjacent to the district[b] - Noise effects from LRT operations[c] - Station access - Changes to traffic in the district • Adverse Effect Finding: - Within the GRHD there are 10 discrete contributing elements and three non-contributing elements that will be affected by the Project. Discussions of effects to individual contributing elements to the district are presented in the Individual Properties section of this table and Table 3.5-3 - The construction and operation of the Project will result in direct physical and indirect effects to the Kenilworth Lagoon that will alter characteristics of this contributing element of the GRHD that qualify it for the NRHP in a way that will diminish the district's historic integrity of design, materials, workmanship, feeling, and association - Partial destruction of, and alteration to, a portion of the Kenilworth Lagoon - Introduction of visual elements that will alter the visual and aesthetic character of the Kenilworth Lagoon and its setting - Introduction of noise effects that will alter the feeling of the Kenilworth Lagoon • Avoidance/minimization/mitigation measures: - Implement Section 106 MOA[e] measures
Individual Properties					
HE-SLC-008	Chicago, Milwaukee, St. Paul & Pacific Railroad Depot	6210 W 37th St., St. Louis Park	Listed as an individual property	Criterion: A[a] Area of Significance Transportation	• Effects Considered: - Possible development/redevelopment around the depot catalyzed by the Project around the Wooddale Station - Change to the property's setting,[b] including: o Introduction of LRT tracks and catenary to nearby railroad corridor o Placement of a signal bungalow near the depot

Inventory Number	Site Name	Property Address	NRHP Status	NRHP Eligibility Criteria & Area of Significance	Adverse Effect Finding and avoidance/minimization/mitigation measures
					o Construction of noise walls along on the alignment between the depot and railroad corridor with which it is associated • Adverse Effect Finding - The construction of Project infrastructure, specifically the introduction of a solid, approximately eight to 11 foot tall noise wall between the depot and the railroad corridor with which it is associated will sever the direct visual connection and relationship between the depot and the railroad, thereby altering an important characteristic that qualifies the depot for the NRHP in a way that diminishes its integrity of setting, feeling, and association • Avoidance/minimization measures: - Implement Section 106 MOA[e] measures[f]
HE-MPC-1822	Kenilworth Lagoon[d]	Minneapolis	Eligible as a contributing element to the GRHD and the LIRHD	Criteria: A & C[a] Areas of Significance • Community Planning & Development • Entertainment/ Recreation • Landscape Architecture	• Effects Considered - Direct physical effects including: o Removal and replacement of two existing former Minneapolis & St. Louis Railway (M&StL) wood trestles (non-contributing elements to the GRHD) over the lagoon with new freight rail, LRT, and trail bridges over the lagoon o Destruction and/or alteration of portions of the lagoon topography, landscape, vegetation and WPA retaining walls - Change to setting including:[b] o New bridge crossing introducing visual, atmospheric, or audible elements that alter the character and feeling of the Lagoon • Adverse Effect Finding: Based on changes to the property and its setting, including: - Removal of the existing non-contributing railroad and trail bridges (HE-MPC-1850 and HE-MPC-1851 [non-contributing based on association, not age, design or integrity]) across the lagoon[g] - Replacement of the existing railroad and trail bridges with new light rail, freight rail, and trail bridges over the lagoon o Design and visibility of the new bridge structure across the lagoon o Effect of the wider width of the new crossing on the character and feeling of the middle section of the Kenilworth Lagoon and on the experience of using the waterway when passing under the new structure - Partial destruction and/or alterations of contributing WPA retaining walls

Inventory Number	Site Name	Property Address	NRHP Status	NRHP Eligibility Criteria & Area of Significance	Adverse Effect Finding and avoidance/minimization/mitigation measures
					- Destruction and/or replacement of portions of the landscape, including topography and some existing vegetation - Moderate noise impact • Avoidance/minimization/mitigation measures: - Implement Section 106 MOA[e] measures
21HE0436[a]	—[h]	Minneapolis	Eligible	Criterion: D[i]	• Effects considered - Direct physical effects from construction of the Project • Adverse Effect Finding: - This archaeological site will be destroyed[j] for the construction of the Project - Alternative locations for Project elements were explored during Project Development in consultation with the City of Minneapolis and MnHPO, and found not to be feasible due to existing built urban environment, limited right-of-way, engineering constraints that would affect the operational efficiencies of LRT service, and increased project costs. • Avoidance/minimization/mitigation measures: - Implement Section 106 MOA[e] measures
21HE0437[a]	—[h]	Minneapolis	Eligible	Criterion: D[i]	• Effects considered - Direct physical effects from construction of the Project • Adverse Effect Finding: - This archaeological site will be destroyed[j] for the construction of the Project - Alternative locations for Project elements were explored during Project Development in consultation with the City of Minneapolis and MnHPO, and found not to be feasible due to existing built urban environment, limited right-of-way, engineering constraints that would affect the operational efficiencies of LRT service, and increased project costs. • Avoidance/minimization/mitigation measures: - Implement Section 106 MOA[e] measures

[a] Minnesota Historic Preservation Office.
[b] Assessing visual effects under NEPA and potential visual effects to inform a determination of effect under Section 106 are two separate processes that may have similar or different conclusions. The results of an evaluation of effects to visual quality and aesthetics per NEPA can be found in Section 3.7.
[c] Under FTA guidance, historic properties are designated as noise- or vibration-sensitive depending on the land use of the property, not their designation as historic. Properties of national significance with considerable outdoor use required for site interpretation would be in Category 1. Historic properties that are currently used as residences would be in Category 2. Historic buildings with indoor use of an interpretive nature involving meditation and study would be in Category 3, including museums, significant birthplaces, and buildings in which significant historical events occurred. Most downtown areas have buildings which are historically significant because they represent a particular architectural style or are prime examples of the work of a historically significant designer. If the buildings or structures are used for commercial or industrial purposes and are located in busy commercial areas, they are not considered noise or vibration sensitive and the noise and vibration effect criteria do not apply. Similarly, historic transportation structures, such as terminals and railroad depots, are not considered noise- or vibration-sensitive land uses. See Appendix K of this Final EIS for additional information.
[d] Section 6.7.2.15 contains the Section 4(f) evaluation of the Kenilworth Lagoon/GRHD, based on the Section 106 finding of effect for those historic properties and including the Section 4(f) determination that there is no prudent and feasible alternative to the Project and that the Project would result in the Least Overall Harm to Section 4(f)-protected

properties. Chapter 6 provides additional background on the Section 4(f) regulations, process, documentation, and terminology. As the Section 4(f) Official with Jurisdiction, the MnHPO was consulted through the Section 4(f) process for the Section 4(f) use of the Kenilworth Lagoon/GRHD and on other affected historic properties.
[e] A Section 106 MOA is a legally binding document that commits FTA and the Council to implement measures to avoid, minimize and/or mitigate adverse effects on historic properties. For information on avoidance/minimization/mitigations measures specific to a property or district, please see the Section 106 MOA in Appendix H.
[f] Through consultation with Section 106 consulting parties completed as part of the Section 106 process to resolve the adverse effect to the Chicago, Milwaukee, St. Paul & Pacific Railroad Depot, an alternative was identified that avoids the adverse effect to the depot under Section 106. The identified measures for avoiding the adverse effect were incorporated into the Project's design and Section 106 MOA. See Appendix H for the Section 106 MOA.
[g] Two existing wood pile bridges (HE-MPC-1850 and HE-MPC-1851) spanning the Kenilworth Lagoon within the Kenilworth Corridor, and the Burnham Road Bridge (HE-MPC-1832), a two-lane automobile bridge with a steel beam span, were all evaluated for NRHP eligibility as a Section 106 historic property. The three bridges were found to be non-contributing elements of the Grand Rounds Historic District and were found to not be eligible for listing on the NRHP as individual properties.
[h] This property is considered a sensitive historic resource under Section 304 of the NHPA, as amended. In accordance with Section 304, information on this sensitive historic property may cause a significant invasion of privacy and/or put the property at risk to harm and is not included in this document. Names, locations, and areas of significance of archaeological sites are not disclosed to help preserve these sensitive properties.
[i] 10,000 Lakes, 2014.
[j] The term "destroyed" is a term used in applying 36 CFR Part 800.5 and the Secretary of the Interior's (SOI's) Standards for the Treatment of Historic Properties (Standards) (36 CFR Part 68).
Source: MnDOT CRU, 2015.

TABLE 3.5-3
Historic Properties Not Adversely Affected by the Project

Inventory Number	Site Name	Property Address	NRHP Status	NRHP Eligibility Criteria & Area of Significance	Effects Considered for No Adverse Effect Finding and avoidance/minimization/mitigation measures
Historic Districts					
HE-HOC-027	Hopkins Downtown Commercial Historic District	Mainstreet, 8th Ave. to 11th Ave., Hopkins	Eligible as a historic district	Criterion: A[a] Areas of Significance: • Commerce	• Effects Considered: - Possible development/redevelopment adjacent to and within the historic district catalyzed by the Project around the Hopkins Station • No Adverse Effect Finding: - No work proposed in immediate vicinity of the historic district - As stipulated in the MOA, a NRHP nomination will be prepared for the district, which will make financial incentive available to some property owners to encourage rehabilitation rather than replacement of properties in the district in order to avoid potential future adverse effects due to potential development pressure catalyzed by the Project around the Hopkins Station • Avoidance/minimization measures: - Implement Section 106 MOA[b] measures
HE-MPC-9860	Lake of the Isles Residential Historic District (LOIRHD)	Vicinity of E/W Lake of the Isles Parkway, Minneapolis	Eligible as a historic district	Criterion: A[c] Areas of Significance: • Architecture • Community Planning & Development • Landscape Architecture	• Effects considered: - Changes to the historic district's visual character and setting due to the design and visibility of the new bridge structures across the Kenilworth Lagoon, which is partially located in the district[d] - Changes to traffic and access in the district - Noise effects from LRT operations[e] • No Adverse Effect Finding:

Inventory Number	Site Name	Property Address	NRHP Status	NRHP Eligibility Criteria & Area of Significance	Effects Considered for No Adverse Effect Finding and avoidance/minimization/mitigation measures
					- Potential adverse effect of setting change due to new Kenilworth Lagoon Crossing structures avoided by designing the new crossing in accordance with the *SOI's Standards* and design review by MnHPO as stipulated in the MOA - No moderate or severe noise impacts identified for this property, per FTA criteria - • Avoidance/minimization measures: - Implement Section 106 MOA[b] measures
HE-MPC-18059	Kenwood Parkway Residential Historic District (KPRHD)	1805-2216 Kenwood Pkwy. Minneapolis	Eligible as a historic district	Criterion: A[c] Area of Significance: • Community Planning & Development	• Effects Considered: - Changes to traffic and access in the district - Possible development/redevelopment adjacent to and within the historic district catalyzed by the Project around the 21st Street and Penn stations - Noise effects from LRT operations[e] - Construction vibration • No Adverse Effect Finding: - Adverse effects avoided with use of construction monitoring - No substantial changes in traffic and access - No moderate or severe noise impacts or vibration impacts identified for this property, per FTA criteria
HE-RRD-002 (district), HE-MPC-16389 (portion of district in Minneapolis)[g]	Osseo Branch Line of the St. Paul, Minneapolis & Manitoba Railroad/ Great Northern Railway Historic District	Minneapolis	Eligible as a historic district	Criterion: A[h] Area of Significance: • Transportation	• Effects Considered: - Possible development/redevelopment catalyzed by the Project around the Van White Station - Introduction of LRT infrastructure to the corridor • No Adverse Effect Finding: - The continuity of the linear resource will be maintained within the historic corridor - LRT infrastructure is generally compatible with the character of the historic district, but to minimize potential visual effects, Project infrastructure within the adjacent St. Paul, Minneapolis & Manitoba Railroad/ Great Northern Railway Historic District will be designed in accordance with the *SOI's Standards* and undergo design review by MnHPO as stipulated in the MOA
HE-MPC-16387 (portion of district in Minneapolis)	St. Paul, Minneapolis & Manitoba Railroad/ Great Northern Railway Historic District	Minneapolis	Eligible as a historic district	Criterion: A[i] Area of Significance: • Transportation	• Effects Considered: - Alignment shift - Introduction of LRT infrastructure to corridor - Property acquisition • No Adverse Effect Finding:

Inventory Number	Site Name	Property Address	NRHP Status	NRHP Eligibility Criteria & Area of Significance	Effects Considered for No Adverse Effect Finding and avoidance/minimization/mitigation measures
					- Freight rail (BNSF) operations will continue - In one section of the line, from approximately I-94 to approximately Royalston Avenue (total length of 2,543 feet), the tracks will be shifted from 0 to 11 feet northward, but the continuity of the linear resource will be maintained within the historic corridor. - LRT infrastructure is generally compatible with the character of the historic district, but to minimize potential adverse effects, Project infrastructure within the district will be designed in accordance with the *SOI's Standards* and undergo design review by MnHPO as stipulated in the MOA • Avoidance/minimization measures: - Implement Section 106 MOA[b] measures
HE-MPC-0441	Minneapolis Warehouse Historic District	Vicinity of 1st Ave N, N 1st. St, 10th Ave N, and N 6th St, Minneapolis	Listed as a historic district	Criteria: A & C[c] Areas of Significance: • Commerce • Architecture	• Effects Considered: - Possible development/redevelopment adjacent to and within the historic district catalyzed by the Project around the Target Field (Interchange) Station • No Adverse Effect Finding: - Potential effects were addressed as part of the Section 106 review for the Target Field Station[i]
Individual Properties[j]					
HE-HOC-026	Hopkins City Hall	1010 1st St S, Hopkins	Eligible as an individual property	Criterion: A[a] Area of Significance: • Community Planning & Development	• Effects Considered: - Possible development/redevelopment in the vicinity of the City Hall catalyzed by the Project around the Hopkins Station • No Adverse Effect Finding: - No work is proposed in the immediate vicinity of the building - Given the property's use and intensity of development compared to other properties closer to the Hopkins Station, there is low potential for this property to be redeveloped - Development catalyzed by the Project could potentially alter the setting of the property, but not to a degree that would affect its eligibility for the NRHP
HE-HOC-014	Minneapolis & St. Louis Railway Depot	9451 Excelsior Blvd, Hopkins	Eligible as an individual property	Criterion: A[j] Area of Significance: • Transportation	• Effects Considered: - Change to the property's setting from LRT infrastructure, including LRT tracks, catenary, and a new bridge over the Twin Cities & Western (TC&W) rail line and Excelsior Blvd. - Construction vibration • No Adverse Effect Finding:

Inventory Number	Site Name	Property Address	NRHP Status	NRHP Eligibility Criteria & Area of Significance	Effects Considered for No Adverse Effect Finding and avoidance/minimization/mitigation measures
					- The western approach of the LRT bridge over Excelsior Blvd. and the TC&W (originally M&StL) line has been shifted east so it begins 25 feet west of the depot, rather than a couple hundred feet to the west, to avoid blocking views to and from the depot and minimize effects to the depot's setting - To minimize potential visual effects and avoid an adverse visual effect, Project infrastructure within the adjacent depot will be designed in accordance with the *SOI's Standards* and undergo design review by MnHPO as stipulated in the MOA - Recreational trail between LRT tracks and the depot, and the paved plaza area adjacent to the depot, will remain - Not noise or vibration sensitive, per FTA criteria; however, as stipulated in the MOA, a Construction Protection Plan will be prepared and implemented to protect the depot from harm during Project construction • Avoidance/minimization measures: - Implement Section 106 MOA[b] measures
HE-SLC-009	Peavey-Haglin Experimental Concrete Grain Elevator	Hwys 100 and 7, St. Louis Park	Listed as an individual property (also a National Historic Landmark)	Criterion: C[h] Areas of Significance • Economics • Engineering	• Effects Considered: - Change in access to/from the Cedar Lake Trail - Change to the property's setting, including: o Introduction of LRT tracks and catenary to adjacent railroad corridor o Construction of a traction power substation (TPSS) nearby - Noise and vibration from LRT operations[e] - Construction vibration • No Adverse Effect Finding: - The LRT guideway that passes the elevator will be located within the existing railroad corridor, but across the existing railroad tracks from the elevator so it does not infringe on the elevator property or its immediate setting - While a TPSS will be located in the vicinity of the elevator, it will be located over 500 feet to the southwest, across the freight rail and LRT tracks from the elevator and will have a minimal effect on the setting of the elevator and views of it; however, as stipulated in the MOA the location of the TPSS will continue to go through design review to confirm no change in location - The trail and trail access near the elevator are maintained Not noise or vibration sensitive, per FTA criteria; however, per 36 CFR 800.10, to minimize harm to this NHL to the maximum extent possible, as stipulated in the MOA, a Construction

Inventory Number	Site Name	Property Address	NRHP Status	NRHP Eligibility Criteria & Area of Significance	Effects Considered for No Adverse Effect Finding and avoidance/minimization/mitigation measures
					Protection Plan will be prepared and implemented to protect this property from harm during Project construction • Avoidance/minimization measures: - Implement Section 106 MOA[b] measures
HE-SLC-055	Hoffman Callan Building	3907 Hwy 7 St. Louis Park	Eligible as an individual property	Criterion: C[a] Area of Significance • Architecture	• Effects Considered: - Possible development/redevelopment nearby catalyzed by the Project around the West Lake Station • No Adverse Effect Finding: - No work is proposed in the immediate vicinity of the building Given the property's location near the edge of the West Lake Station APE, there are many other properties closer to the station that present better opportunity for redevelopment to take advantage of the station - Development catalyzed by the Project could potentially alter the setting of the property, but not to a degree that would affect its eligibility for the NRHP
HE-MPC-17102	Minikahda Club	3205 Excelsior Blvd Minneapolis	Eligible as an individual property	Criterion: C[l] Area of Significance • Landscape Architecture	• Effects Considered: - Possible development/redevelopment nearby catalyzed by the Project around the West Lake Station - Pedestrian and roadway improvements along north side of the Minikahda Club, near the club entrance - Temporary easement over a small portion of the Minikahda Club driveway to remove existing crosswalk striping and place new striping on adjacent street right-of-way • No Adverse Effect Finding: - Project design revised to avoid adverse effect to the Minikahda Club by reconfiguring pedestrian access in the area to avoid property acquisition and destruction of a portion of the designed landscape o Direct effects now limited to repaving and restriping the intersection at the entrance to the property - Construction activities on the property are temporary, minor, and limited to paved areas, so it will not affect the historic landscaping; however, as stipulated in the MOA, a Construction Protection Plan will be prepared and implemented to protect this property from harm during Project construction - Development catalyzed by the Project could potentially alter the setting of the club, but not to a degree that would affect its eligibility for the NRHP • Avoidance/minimization measures:

Inventory Number	Site Name	Property Address	NRHP Status	NRHP Eligibility Criteria & Area of Significance	Effects Considered for No Adverse Effect Finding and avoidance/minimization/mitigation measures
					- Implement Section 106 MOA[b] measures
HE-MPC-1811	Lake Calhoun	Minneapolis	Eligible as a contributing element to the GRHD	Criteria: A & C[h] Areas of Significance • Community Planning & Development • Entertainment/Recreation • Landscape Architecture	• Effects Considered: - Possible development/redevelopment nearby catalyzed by the Project around the West Lake Station - Minor pedestrian and roadway improvements near the Lake Calhoun Playing Fields - Changes in traffic and parking patterns around the Lake Calhoun Playing Fields related to West Lake Station access • No Adverse Effect Finding: - No changes to ability to use the park, or to landscaping - Development catalyzed by the Project could potentially alter the setting of the playing fields, but not to a degree that would affect its contributions to the GRHD or its eligibility for the NRHP - Project improvements in the vicinity of the park are minor in scale and in keeping with the design of existing public infrastructure (traffic signals, signage, pedestrian ramps, and lighting) and will have a negligible visual effect; however, as stipulated in the MOA, the design of street improvements will continue to go through design review to confirm no change in design or effect - Traffic analysis indicates no change in access to this property and no significant changes in traffic and parking patterns or volumes in the vicinity of this property resulting from operation of the Project • Avoidance/minimization measures: - Implement Section 106 MOA[c] measures
HE-MPC-1833	Cedar Lake Parkway	Minneapolis	Eligible as a contributing element to the GRHD	Criteria: A & C[h] Areas of Significance • Community Planning & Development • Entertainment/Recreation • Landscape Architecture	• Effects Considered: - Reconstruction of approximately 320 feet of the roadway and raising it approximately 8 inches or less to construct the shallow LRT tunnel and reconstruct the at-grade trail and freight crossing - Change to the parkway's setting from the introduction of the following:[d] o LRT tracks and catenary to the railroad corridor that crosses the parkway o Introduction of LRT tunnel portal and signal bungalow to railroad corridor north of the parkway o Introduction of a TPSS to the railroad corridor south of the parkway o Noise effects from operations related to LRT entering and exiting the tunnel[e] • No Adverse Effect Finding:

Inventory Number	Site Name	Property Address	NRHP Status	NRHP Eligibility Criteria & Area of Significance	Effects Considered for No Adverse Effect Finding and avoidance/minimization/mitigation measures
					- Cedar Lake Parkway will be reconstructed in its existing configuration with slight increase in elevation (less than 8 inches) and the railroad crossing will be shifted approximately 3 feet within rail corridor, which will result in a minimal, non-adverse change to the design and feeling of the parkway where it crosses the existing railroad corridor; however, the crossing, and all Project infrastructure within the parkway's setting, will be designed in accordance with the *SOI's Standards* and undergo design review by MnHPO as stipulated in the MOA - The parkway is not noise or vibration sensitive, per FTA criteria; however, as stipulated in the MOA, a Construction Protection Plan will be prepared and implemented to protect this property from harm during Project construction • Avoidance/minimization measures: - Implement Section 106 MOA[b] measures
HE-MPC-1820	Cedar Lake	Minneapolis	Eligible as a contributing element to the GRHD	Criteria: A & C[h] Areas of Significance • Community Planning & Development • Entertainment/Recreation • Landscape Architecture	• Effects Considered: - Change in the lake's setting due to the new Kenilworth Lagoon crossing - Potential modifications to a trail between 21st Street station and East Cedar Beach on Cedar Lake[b] - Noise effects from LRT operations[e] • No Adverse Effect Finding: - No direct effects to the lake; however, as stipulated in the MOA, a Construction Protection Plan will be prepared and implemented to protect this property from harm during Project construction - Design and visibility of the new bridge structures across the Kenilworth Lagoon will be minimized by their distance from the lake, the narrowness of the corridor in which they are visible, and by the intervening Burnham Road Bridge that further blocks them from view;[d] however, the crossing, and all Project infrastructure within the parkway's setting, will be designed in accordance with the *SOI's Standards* and undergo design review by MnHPO as stipulated in the MOA - No moderate or severe noise effects identified for this property, per FTA criteria • Avoidance/minimization measures: - Implement Section 106 MOA[b] measures

Inventory Number	Site Name	Property Address	NRHP Status	NRHP Eligibility Criteria & Area of Significance	Effects Considered for No Adverse Effect Finding and avoidance/minimization/mitigation measures
HE-MPC-6901	Park Board Bridge No. 4 / Bridge L5729	W. Lake of the Isles Pkwy over Kenilworth Lagoon Minneapolis	Eligible individually and as a contributing element to the GRHD and the LIRHD	Criterion: C (individual)[c] Area of Significance • Engineering Criteria: A & C (historic districts)[c] Areas of Significance • Community Planning & Development • Entertainment/ Recreation • Landscape Architecture	• Effects considered: - Changes to the bridge's setting due to the design and visibility of the new bridges across the Kenilworth Lagoon[d] • No Adverse Effect Finding: - No direct effects to the bridge - Potential adverse visual effect from the introduction of new Kenilworth Lagoon crossing into the setting of the bridge avoided by designing the new crossing in accordance with the *SOI's Standards* and design review by MnHPO as stipulated in the MOA • Avoidance/minimization measures: - Implement Section 106 MOA[b] measures
HE-MPC-1825	Lake of the Isles Parkway	Minneapolis	Eligible as a contributing element to the GRHD and the LIRHD	Criteria: A & C[c] Areas of Significance • Community Planning & Development • Entertainment/ Recreation • Landscape Architecture	• Effects considered: - Changes to the parkway's setting due to the design and visibility of the new bridges across the Kenilworth Lagoon[d] • No Adverse Effect Finding: - No direct effects to the parkway - Potential adverse visual effect from the introduction of new Kenilworth Lagoon crossing into the setting of the parkway avoided by designing the new crossing in accordance with the *SOI's Standards* and design review by MnHPO as stipulated in the MOA • Avoidance/minimization measures: - Implement Section 106 MOA[b] measures
HE-MPC-1824	Lake of the Isles	Minneapolis	Eligible as a contributing element to the GRHD and the LIRHD	Criteria A & C[c] • Areas of Significance • Community Planning & Development • Entertainment/ Recreation • Landscape Architecture	• Effects considered: - Changes to the lakes setting due to the design and visibility of the new bridges across the Kenilworth Lagoon[d] • No Adverse Effect Finding: - No direct effects to the lake; however, as stipulated in the MOA, a Construction Protection Plan will be prepared and implemented to protect this property from harm during Project construction - Potential adverse visual effect from the introduction of new Kenilworth Lagoon crossing into the setting of the lake avoided by designing the new crossing in accordance with the *SOI's Standards* and design review by MnHPO as stipulated in the MOA • Avoidance/minimization measures: - Implement Section 106 MOA[b] measures

Inventory Number	Site Name	Property Address	NRHP Status	NRHP Eligibility Criteria & Area of Significance	Effects Considered for No Adverse Effect Finding and avoidance/minimization/mitigation measures
HE-MPC-6068	Frieda and Henry J. Neils House	2801 Burnham Blvd Minneapolis	Listed as an individual property	Criteria: C^h Area of Significance • Architecture	• Effects Considered: - Possible development/redevelopment catalyzed by the Project around the 21st Street Station - Changes in access (traffic and parking) - Construction vibration • No Adverse Effect Finding: - The house is located more than a city block from the Project alignment and no work is proposed in the immediate vicinity of this property that could result in vibration effects Redevelopment potential around the 21st Street Station is limited by existing zoning and station area plans indicate low potential for redevelopment - Traffic analysis indicates no change in access to this property and no significant changes in traffic patterns or volumes in the vicinity of this property resulting from operation of the Project
HE-MPC-6766	Mahalia and Zacharia Saveland House	2405 W 22nd St Minneapolis	Eligible as an individual property	Criteria: C^c Area of Significance • Architecture	• Effects Considered: - Possible development/redevelopment catalyzed by the Project around the 21st Street Station - Changes in access (traffic and parking) - Construction vibration • No Adverse Effect Finding: - The house is located more than a city block from the Project alignment and no work is proposed in the immediate vicinity of this property that could result in vibration effects - Redevelopment potential around the 21st Street Station is limited by existing zoning and station area plans indicate low potential for redevelopment - Traffic analysis indicates no change in access to this property and no significant changes in traffic patterns or volumes in the vicinity of this property resulting from operation of the Project
HE-MPC-1796	Kenwood Parkway	Minneapolis	Eligible as a contributing element to the GRHD and the KPRHD	Criteria A & $C^{c,h}$ Areas of Significance: • Community Planning & Development • Entertainment/ Recreation • Landscape Architecture	• Effects Considered: - Possible development/redevelopment catalyzed by the Project around the Penn and 21st Street stations - Changes in access (traffic and parking) • No Adverse Effect Finding: - The Parkway is located more than a block from the Project alignment and traffic analysis indicates no significant changes in traffic patterns or volumes along the parkway resulting from operation of the Project

Inventory Number	Site Name	Property Address	NRHP Status	NRHP Eligibility Criteria & Area of Significance	Effects Considered for No Adverse Effect Finding and avoidance/minimization/mitigation measures
					- Redevelopment potential around stations in the vicinity of the parkway is limited by existing zoning and other land use constraints, and station area plans indicate low potential for redevelopment that could affect the setting of the parkway
HE-MPC-6603	Frank W. and Julia C. Shaw House	2036 Queen Ave S Minneapolis	Eligible as an individual property	Criterion: C[c] Area of Significance • Architecture	• Effects Considered: - Possible development/redevelopment catalyzed by the Project around the 21st Street Station - Changes in access (traffic and parking) - Construction vibration • No Adverse Effect Finding: - The house is located more than a city block from the Project alignment and no work proposed in the immediate vicinity of the property that could result in vibration effects - Redevelopment potential around the 21st Street Station is limited by existing zoning and station area plans indicate low potential for redevelopment - Traffic analysis indicates no change in access to this property and no significant changes in traffic patterns or volumes in the vicinity of this property resulting from operation of the Project
HE-MPC-1797	Kenwood Park	Minneapolis	Eligible as a contributing element to the GRHD	Criteria: A & C[h] Area of Significance • Community Planning & Development • Entertainment/ Recreation • Landscape Architecture	• Effects Considered: - Possible development/redevelopment catalyzed by the Project around the Penn and 21st Street stations - Changes to the park's setting from visibility of the Project - Station access (traffic and parking) • No Adverse Effect Finding: - No changes in the ability to use the park - Redevelopment potential around the Project stations in the vicinity of the park is limited by existing zoning and station area plans indicate low potential for redevelopment - Traffic analysis indicates no change in access to this property, no direct access from the Penn Station, and no significant changes in traffic patterns or volumes along Kenwood Parkway resulting from operation of the Project
HE-MPC-06475	Kenwood Water Tower	1724 Kenwood Pkwy Minneapolis	Eligible individually and as a contributing element to the GRHD	Criterion: C (individual)[h] Area of Significance • Engineering or Architecture Criteria: A & C (historic districts)[h]	• Effects Considered: - Possible development/redevelopment catalyzed by the Project around the Penn Station - Change to the tower's setting from visibility of the Project - Station access (traffic and parking) - Construction vibration

Inventory Number	Site Name	Property Address	NRHP Status	NRHP Eligibility Criteria & Area of Significance	Effects Considered for No Adverse Effect Finding and avoidance/minimization/mitigation measures
				Areas of Significance • Community Planning & Development • Entertainment/ Recreation • Landscape Architecture	• No Adverse Effect Finding: - Redevelopment potential from the Penn Station in the vicinity of the water tower is limited by existing zoning and station area plans indicate low potential for redevelopment - Project elements will be located in the vicinity of a former rail yard below the bluff on which the water tower is situated; therefore, Project elements will not affect the immediate setting of the water tower and minimally effect views from it. - Traffic analysis indicates no change in access to this property, no direct access from the Penn Station, and no significant changes in traffic patterns or volumes along Kenwood Parkway resulting from operation of the Project - The water tower is not a vibration sensitive property, per FTA criteria (operations), and, given its distance from Project elements, will not be subjected to vibration from construction
HE-MPC-8763	Mac and Helen Martin House	1828 Mt. Curve Ave Minneapolis	Eligible as an individual property	Criterion: B[a] Area of Significance • Commerce	• Effects Considered: - Change to the property's setting o Seasonal views of lighting and signage improvements along a connection between Cedar Lake Trail and Kenwood Parkway • No Adverse Effect Finding: - Project elements (lights and signs) are small in scale and consistent with existing neighborhood elements, are located a half block from the Martin House and at the bottom of a hill, and will only be visible during non-leaf out periods in one viewshed from the property, so they will not change the setting of the house or cause any distinct changes to views from it
21HE0409[h]	—[m]	Minneapolis	Eligible as an individual property	Criterion: D[n]	• Effects Considered: - Direct effects from Project construction • No Adverse Effect Finding: - Project avoids this archaeological site; however, as stipulated in the MOA, a Construction Protection Plan will be prepared and implemented to protect this property from harm during Project construction • Avoidance/minimization measures: - Implement Section 106 MOA[b] measures
HE-MPC-6641	William Hood Dunwoody Industrial Institute	818 Dunwoody Blvd., Minneapolis	Eligible as an individual property	Criterion: A[l] Area of Significance: • Education	• Effects Considered: - Changes to the property's setting o Views of pedestrian lights and ramps added to sidewalks along a portion Dunwoody Blvd. on the south side of the

Inventory Number	Site Name	Property Address	NRHP Status	NRHP Eligibility Criteria & Area of Significance	Effects Considered for No Adverse Effect Finding and avoidance/minimization/mitigation measures
					Institute's parking lot and its driveway. The center median (island) in the street in front of the building will be modified o The curb cut for the Institute's driveway along Dunwoody Blvd. will be reconstructed • No Adverse Effect Finding: - Construction activities on the site are limited to reconstructing a curb cut that provides access to the driveway that is part of the eligible property, which will result in no change to property itself; to avoid an adverse visual effect Project infrastructure within the adjacent historic property will be designed in accordance with the *SOI's Standards* and design review by MnHPO as stipulated in the MOA • Avoidance/minimization measures: - Implement Section 106 MOA[b] measures

[a] Mead & Hunt, 2010.

[b] A Section 106 MOA is a legally binding document that commits FTA and the Council to implement measures to avoid, minimize and/or mitigate adverse effects on historic properties. For information on avoidance/minimization/mitigations measures specific to an individual historic property or district, please see the Section 106 MOA in Appendix H.

[c] Mead & Hunt, 2014.

[d] Assessing visual impacts under NEPA and potential visual impacts to inform a determination of effect under Section 106 are two separate processes that may have similar or different conclusions. The results of an evaluation of impacts to visual quality and aesthetics per NEPA can be found in Section 3.7.

[e] Under FTA guidance, historic properties are designated as noise or vibration sensitive depending on the land use of the property, not their designation as historic. Properties of national significance with considerable outdoor use required for site interpretation would be in Category 1. Historic properties that are currently used as residences would be in Category 2. Historic buildings with indoor use of an interpretive nature involving meditation and study would be in Category 3, including museums, significant birthplaces and buildings in which significant historical events occurred. Most downtown areas have buildings which are historically significant because they represent a particular architectural style or are prime examples of the work of a historically significant designer. If the buildings or structures are used for commercial or industrial purposes and are located in busy commercial areas, they are not considered noise or vibration sensitive and the noise and vibration impact criteria do not apply. Similarly, historic transportation structures, such as terminals and railroad depots, are not considered noise or vibration sensitive land uses. See Appendix K of this Final EIS for additional information.

[f] The SOI's Standards (36 CFR Part 68) are a series of standards for maintaining, repairing, and replacing historic materials, as well as designing new additions or making alterations. The SOI's Standards offer four distinct approaches to the treatment of historic properties including preservation, rehabilitation, restoration, and reconstruction, with guidelines for each. Federal agencies use the SOI's Standards and appropriate Guidelines to facilitate their preservation responsibilities. More specific information about the SOI's Standards can be found at: http://www.nps.gov/tps/standards.htm.

[g] This inventory number replaces inventory number XX-RRD-010 used in previous documentation and encompasses previously inventoried segments covering the line within Hennepin County, including HE-OSC-048; HE-BPC-0084; HE-CRC-0238; HE-RBC-0304; HE-MPC-16389.

[h] NR-SHPO

[i] FTA and MnHPO. 2012. *Section 106 Programmatic Agreement Between the Federal Transit Administration and The Minnesota State Historic Preservation Office Regarding the Construction of the Interchange Project Minneapolis, Minnesota.* This agreement documents the stipulations with which the Interchange Project will be implemented in order to take into account the effects of the undertaking on historic properties.

[j] Summit Envirosolutions, 2010.

[k] This table also includes contributing properties to the Grand Rounds Historic District because they are discrete units, each with unique attributes and characteristics, which will be affected differently by the Southwest LRT Project.

[l] Hess, Roise and Company, 2012.

[m] This property is considered a sensitive historic property under Section 304 of the National Historic Preservation Act of 1966, as amended. In accordance with Section 304, information on this sensitive historic property may cause a significant invasion of privacy and/or put the property at risk to harm and is not included in this document. Names, locations, and areas of significance of archaeological sites are not disclosed to help preserve the property.

[n] 10,000 Lakes Archaeology, LLC, Archaeological Research Services, Archaeo-Physics, LLC, and Merjent, Inc., 2014.

3.5.3.1 Architecture/History Properties

The 28 architecture/history properties identified within the Project's architecture/history APE include seven historic districts; 11 properties that are individually eligible for or listed in the NRHP, one of which is also an NHL; two properties that are both individually eligible for the NRHP and are also eligible as contributing properties to historic districts; and eight properties that are eligible as contributing elements to NRHP eligible historic districts.[27] Exhibits 3.5-1 through 3.5-3 illustrate the locations of these properties.

3.5.3.2 Archaeological Properties

Studies identified three NRHP-eligible archaeological sites within the Project's archaeological APE. Due to the sensitive nature of archaeological properties, Exhibits 3.5-4 and 3.5-5 illustrate the archaeological APE but do not depict the exact location of any archaeological sites or materials.[28]

3.5.4 Environmental Consequences

This section identifies the long-term and short-term direct and indirect effects to historic properties from the Project. Direct effects are those that physically alter, damage, or destroy all or part of the historic property, as well as ownership changes. Indirect effects include changes in a property's use or of physical features within the property's setting that contribute to its historic significance; the introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features; or neglect of the property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization (36 CFR Part 800.5).

In accordance with 36 CFR Part 800.5, FTA, in consultation with the MnHPO and other consulting parties, reviewed Project elements and applied the criteria for an adverse effect under Section 106 to determine if the Project would result in any adverse effects to historic properties within the Project's APEs. This consultation considered anticipated long-term or short-term direct and indirect effects on the identified architecture/history and archaeological properties from construction and operation of the Project. See Section 3.5.1.3 for a description of the criteria and process used to reach a determination of effect. Tables 3.5-2 and 3.5-3 summarize potential effects on architecture/history and archaeological properties considered; the rationale for the finding of effect for each property, as determined through the Section 106 process; and measures that have been, or will be, integrated into the Project's design to avoid and minimize effects, as well as mitigate adverse effects, on historic properties. These measures are documented in the Project's Section 106 MOA. A detailed discussion of the Project's effects on each historic property, including the rationale and final finding of effect for each property, and the final Section 106 determination of effect of the Project on historic properties as a whole are contained in the Assessment of Effects report in Appendix H.

3.5.5 Mitigation Measures

This section describes the measures the Project will implement to resolve the Project's adverse effects, including measures to avoid, minimize, or mitigate adverse effects. These measures were developed by FTA and the Council in consultation with the MnHPO and other consulting parties. The Project's measures to resolve adverse effects, including avoidance, minimization, and mitigation measures, are specified in the Project's Section 106 MOA (Appendix H) and summarized in Tables 3.5-2 and 3.5-3.

Based on results of the effects assessments and implementation of the measures included in the Section 106 MOA, FTA has determined, in consultation with the MnHPO and other consulting parties, that the Project will

[27] The "Kenilworth Corridor" is not a historic or federally protected property unto itself, but rather is a geographical area reference that contains portions of Section 106 historic and Section 4(f) properties (e.g., Kenilworth Channel/Lagoon and Cedar Lake Parkway).

[28] These properties are considered sensitive historic resources under Section 304 of the NHPA, as amended. In accordance with Section 304, information on these sensitive historic resources may cause a significant invasion of privacy and/or put the resources at risk to harm and is not included in this document. Names, locations, and areas of significance of archaeological sites are not disclosed to help preserve these sensitive resources.

have No Adverse Effect on 26 historic properties and an Adverse Effect on five properties, including two archaeological sites, one historic district, one contributing property to that historic district, and one property individually listed in the NRHP. Due to the Project's adverse effect on these five properties—Sites 21HE0436 and 21HE0437; the Grand Rounds Historic District; the Kenilworth Lagoon as a contributing property to the Grand Rounds Historic District; and the Chicago, Milwaukee, St. Paul & Pacific Railroad Depot—it has been determined that the undertaking will have an Adverse Effect on historic properties.

3.5.5.1 Architecture/History Properties

Following is a summary of the measures specified in the Project's Section 106 MOA that the Project will implement to mitigate the Project's effects on architecture/history properties.

Adverse Effect. The Project will have an adverse effect on the Kenilworth Lagoon and the Grand Rounds Historic District, of which the Kenilworth Lagoon is a contributing element. Measures to avoid, minimize, and mitigate the adverse effect on the Lagoon and the historic district are included in the Section 106 MOA (Appendix H) and summarized below.

> ***Mitigation.*** Install a parapet wall and rail damper on the LRT bridge over the waterway to mitigate the moderate noise impact at the Kenilworth Lagoon (see Section 3.12).
>
> ***Mitigation.*** Rehabilitate/Reconstruct WPA Rustic Style Retaining walls to minimize and mitigate the direct physical and indirect visual adverse effects on the Grand Rounds Historic District, including the Kenilworth Lagoon, from the construction of the Project's crossing of the Kenilworth Lagoon.
>
> ***Mitigation.*** Design Project elements within and adjacent to the Grand Rounds Historic District, including the Kenilworth Lagoon, in accordance with the *SOI's Standards* (36 CRF Part 68), to be reviewed by the MnHPO and consulting parties, to further minimize the direct physical and indirect visual adverse effects from the construction of the Project's crossing of the Kenilworth Lagoon and introduction of additional Project elements into and adjacent to the district.
>
> ***Mitigation.*** Develop a Construction Protection Plan detailing the measures to be implemented during Project construction to avoid direct physical and indirect adverse effects from Project construction on the Grand Rounds Historic District, including the Kenilworth Lagoon.
>
> ***Mitigation.*** Prepare guidance for future preservation activities within the portion of the Grand Rounds Historic District: Canal System, including adjacent parkland, extending from the north end of Lake Calhoun to the east end of Cedar Lake, and including the entirety of the Lake of the Isles Park and Kenilworth Lagoon elements to mitigate the direct physical and indirect visual adverse effects to the Grand Rounds Historic District. This guidance will take the form of two plans: (1) a preservation plan will include an overall vision for historic preservation of this portion of the historic district, strategies to guide historic preservation efforts to achieve the overall vision, and objectives for implementing each strategy and (2) a treatment plan will be prepared to guide preservation activities for up to twelve different historic features, or feature types within the planning area. The plans shall be prepared in accordance with the *SOI's Standards* (36 CFR Part 68); the *SOI's Standards for Preservation Planning* (NPS, 1983); and the NPS's *Guidelines for the Treatment of Cultural Landscapes* (NPS, 2016a), Preservation Briefs (NPS, 2016b), and Preservation Tech Notes (NPS, 2016c).

Adverse Effect. The Project will have an adverse effect on the Chicago, Milwaukee, St. Paul & Pacific Railroad Depot. Measures to avoid, minimize, and mitigate the adverse effect on the depot are included in the Section 106 MOA (Appendix H) and summarized below.

> ***Mitigation.*** Revised the Project design to relocate the crossover location 3,420 feet west along the alignment to allow the noise wall to shift at least 240 feet west, and avoid the adverse visual effect.
>
> ***Mitigation.*** Revised the Project design to relocate the signal bungalow to the alternate crossover location to further avoid adverse visual effects from a partial blockage of views between the Chicago, Milwaukee, St. Paul & Pacific Railroad Depot and railroad line that would diminish the setting of the depot and its visual connection and association with the railroad line. For most historic properties,

there will be no adverse effects as a result of Project construction activities. For architecture/history properties where effects from construction are possible, Construction Protection Plans will be developed and implemented to avoid short-term adverse effects to those properties (see Tables 3.5-2 and 3.5-3). Based on the effects assessment and implementation of the Construction Protection Plans, there will be no adverse effects from Project construction activities.

3.5.5.2 Archaeological Properties

Following is a summary of the measures specified in the Project's Section 106 MOA that the Project will implement to mitigate the Project's effects on archaeological properties.

Adverse Effect. The Project will have an adverse effect on two archaeological sites, Sites 21HE0436 and 21HE0437, due to destruction of the sites from construction. Mitigation for these adverse effects is included in the Section 106 MOA (Appendix H) and summarized below.

> ***Mitigation***. Conduct a Phase III Archaeological Data Recovery of Sites 21HE0436 and 21HE0437.
>
> ***Mitigation.*** Design of the Royalston Station will incorporate interpretation of the sites, based on the results of the Phase II investigations and allowing for the incorporation of any additional information from the Phase III data recovery.
>
> ***Mitigation.*** Develop an interpretative plan for the interpretation in conformance with the *Standards and Practices for Interpretive Planning* from the National Association for Interpretation (NAI) (NAI, 2008) and *Creating Outdoor Trail Signage* technical leaflets (Miller and Novodorsky, 2008a and 2008b).

To avoid possible effects from Project construction on Site 21HE0409, a Construction Protection Plan will be developed and implemented to avoid short-term adverse effects to that archaeological site. Based on the effects assessment and implementation of the Construction Protection Plan for Site 21HE0409, there will be no adverse effects from Project construction activities (see Tables 3.5-2 and 3.5-3).

3.6 Parks, Recreation Areas, and Open Spaces

This section describes the long-term direct and indirect and short-term (construction) direct and indirect effects of the Project on parks, recreation areas, and open spaces (see Section 3.17 for cumulative impacts). This section includes an overview of the regulatory context and methodology used for the analysis; an assessment of existing parks, recreation areas, and open spaces potentially affected by the Project; a description of the anticipated impacts related to parks, recreation areas, and opens spaces; and a description of mitigation measures to implement with the Project.

3.6.1 Regulatory Context and Methodology

This section describes regulatory context and methodology for the evaluation of parks, recreation, and open space and includes a summary of relevant regulations, an overview of the methodology, and a description of the study area utilized for the analyses completed as part of the parks, recreation, and open space evaluation. Publicly owned and publicly accessible parks and recreation areas of local significance are protected under Section 4(f) of the Department of Transportation Act of 1966, 49 U.S.C. 303(c). Chapter 6 documents the Project's compliance with Section 4(f). The park and recreation properties that are protected under Section 4(f) and addressed in Chapter 6 are identified in Section 3.6.2.

Section 6(f) of the Land and Water Conservation Fund Act of 1965 stipulates that any land or facility planned, developed, or improved with the Land and Water Conservation Fund Act of 1965 funds cannot be converted to uses other than parks, recreation, or open space unless land of at least equal fair market value and reasonably equivalent usefulness is provided. Anytime a transportation project would cause such a conversion, regardless of funding sources, such replacement land must be provided.

The parks, recreation areas, and open spaces study area (hereafter described in this section as "parks study area") is defined as the area within 350 feet of the proposed light rail alignment centerline. The 350-foot distance was used because 350 feet is the unobstructed screening distance for FTA noise impact assessments and will allow identification of potential noise impacts to park resources. Identification of the parks,

recreation areas, and open spaces was based on a review of electronic data (both planning documents and maps) from the cities of Minneapolis, St. Louis Park, Hopkins, Minnetonka, and Eden Prairie.

The assessment of impacts to parks, recreation areas, and open spaces described in this section is based on field observations and the current layouts of the park and recreational properties. Long-term direct impacts are defined as those that will result in a physical modification to existing parks, recreation areas, and open spaces. Long-term indirect impacts are those impacts that would occur later in time or are farther removed in distance than long-term direct impacts (40 CFR 1508.8). For this analysis, long-term indirect impacts are those that will result from the proximity of proposed light rail facilities to parks, recreation areas, and open spaces, including visual, noise, and access impacts (see Sections 3.7 and 3.12 and Chapter 4, respectively). In addition, long-term indirect impacts include potential impacts resulting from increased or accelerated development and redevelopment that could occur in proposed light rail station areas.

3.6.2 Affected Environment

This section describes the parks and recreation areas and open spaces located partially or fully within the parks, recreation areas, and open spaces study area. Table 3.6-1 briefly describes the parks, recreation areas, and open spaces in the study area (see Exhibits 3.6-1 and 3.6-2 for an illustration of the location of those properties). Table 3.6-1 also notes properties for which Section 4(f) regulations are applicable.[29] Section 4(f) properties and impacts to those properties are discussed and illustrated in Chapter 6. Bicycle and pedestrian facilities are discussed in Section 4.5.

TABLE 3.6-1
Summary Information about Parks, Recreation Areas, and Open Spaces in the Parks, Recreation Areas, and Open Spaces Study Area[a]

Property Name	Property Size	Owner	Location and Description	Section 4(f) Property[b]
Purgatory Creek Park	5.2 acres	City of Eden Prairie	Located at 13001 Technology Drive in Eden Prairie; includes a 125-person-capacity pavilion, bicycle and walking trails, the Mayor Jean Harris Gathering Bridge, gardens, a dock, a fountain, the Eden Prairie Veterans' Memorial, the Lambert Pavilion, a 54-space parking lot, and restrooms.	Yes
Nine Mile Creek Conservation Area	61.8 acres	City of Eden Prairie	Composed of several properties in Eden Prairie, designated as a "Conservation Area" in the City of Eden Prairie Comprehensive Plan, which defines conservation areas as those areas that consist of large floodplain preservation areas, wetlands, bluffs, and sensitive woodland areas. One of the properties is located just east of Highway 212 and Flying Cloud Drive in Eden Prairie and one is just east of Flying Cloud Drive, north of Valley View Road.[d, e] As per the City's Comprehensive Plan, the primary purpose of the Nine Mile Creek Conservation Area is wetland and floodplain preservation, and it does not have a primary park/recreation use nor is it a designated wildlife/waterfowl refuge—if recreation use occurs on this property it is a secondary or incidental use (see Appendix I). Because the Nine Mile Creek Conservation Area does not primarily function as a recreational resource or wildlife/waterfowl refuge, nor is it officially designated as such by the City of Eden Prairie, FTA has determined Section 4(f) does not apply to this property.[f]	No[c]
Flying Cloud Dog Park	9.3 acres	City of Eden Prairie	Located at 7171 Flying Cloud Drive in Eden Prairie; includes an approximate one-acre fenced park that provides year-round use for off-leash dog exercise, a small parking lot, obstacle equipment for dogs, benches, and a portable toilet.	Yes

[29] All Section 4(f)-protected properties described in Table 3.6-1 are also addressed within Chapter 6.

Property Name	Property Size	Owner	Location and Description	Section 4(f) Property[b]
Unnamed open space A	2.95 acres	City of Minnetonka	Composed of one generally naturally vegetated parcel located immediately east of Bren Road E. The City of Minnetonka's 2030 Comprehensive Plan (Figure IV-1) shows that the existing use of this parcel as "Open Space." However, this parcel's official plan designation in the City Minnetonka 2030 Comprehensive Plan (Figure IV-15) is "Mixed Use" (and not "Parks" or "Open Space"). A paved trail, which is part of a trail network that serves the Opus development site,[g] crosses the parcel in an east-west manner at a point approximately 830 feet north of the intersection of Bren Road East and Red Circle Drive. The property also contains an easement owned by Hennepin County for drainage purposes. Based on deed/title information on this property there are no park/recreation-related easements or other park/recreational legal agreements attached to this property. Because Unnamed Open Space A does not primarily function as a recreational resource or wildlife/waterfowl refuge, nor is it officially designated as such by the City of Minnetonka, FTA has determined Section 4(f) does not apply to this property.[f] (As noted, the trail network is considered a separate Section 4(f) resource).[d, f, h, g]	No
Unnamed open space B	49.1 acres	City of Minnetonka	Composed of one predominantly wooded and wetland parcel, generally located between Bren Road W on the south, Smetana Road on the north, Green Circle Drive on the east, and private residential and commercial properties on the west. This parcel is designated as "Open Space," in the City Minnetonka 2030 Comprehensive Plan (Figure IV-5), which notes that the purpose of "open spaces" is to preserve as many of the natural features of the land as possible. While this open space parcel doesn't contain a park/recreation-related easement, there is a covenant restricting the future use of this parcel to "parkland" or "open space," therefore FTA has made a conservative determination that Section 4(f) may apply to this parcel.[d, i] This open space contains segments of paved trails that are part of a network of trails that serve the Opus development site.[g] Those trail segments cross the south part of the parcel just north of Bren Road W and traverse the eastern boundary of the parcel between Bren Road W and Smetana Rd. The primary recreational activities occurring on this parcel are associated with the trails, including walking, running, bicycling, cross country skiing, nature and wildlife observation, and the like. There may be ancillary passive and active recreation activities occurring on the open space areas, where trail users stop to use the open space areas for other activities. In summary, because recreation is a primary purpose and function of this open space, FTA has determined Section 4(f) applies to this property.	Yes
Overpass Skate Park	0.4 acre	City of Hopkins	Located at 100 Washington Avenue South in Hopkins under the Highway 169 bypass; includes a variety of features for skateboarders, inline skaters, and BMX bikers. The park is seasonal and operates as weather permits, generally extending from May through October.	Yes
Minnehaha Creek Open Space	4.8 acres	City of St. Louis Park	Composed of two non-contiguous parcels located south of the HCRRA rail corridor and adjacent to Minnehaha Creek, east and west of Meadowbrook Road, that have a conservation easement owned by the Minnehaha Creek Watershed District. The parcels are 1.9 and 2.9 acres, respectively. The eastern parcel abuts Isaak Walton Creekside Park, which has a boat ramp onto Minnehaha Creek. The conservation easement is to the Minnehaha Creek Watershed District, which was created exclusively for the purposes of water resource protection, conservation, and management, including the protection, conservation, and management of related lands. The purpose of the conservation easement is to protect the following conservation values: protect water quality and provide habitat; and protect and enhance water quality and flood control.[d] In summary, because this open space conservation easement does not primarily function as a recreational resource or as a wildlife/waterfowl refuge, nor is it designated as such within the easement owned by the Minnehaha Creek Watershed District, FTA has determined Section 4(f) does not apply to this property.[f]	No
Edgebrook Park	1.3 acres	City of St. Louis Park	Located at 3920 Pennsylvania Avenue South in St. Louis Park, immediately north of and paralleling the Cedar Lake Regional Trail, generally between Brookview Drive and Taft Avenue South; includes a play structure, basketball courts, and access to Cedar Lake Regional Trail. During the winter, the park houses a lighted skating rink.	Yes
Isaak Walton League Creekside Park	1.8 acres	City of St. Louis Park	Located at 7341 Oxford Street in St. Louis Park, immediately north of Minnehaha Creek; includes a canoe landing, an off-street parking lot, trail access, and outdoor cooking grills.	Yes

Property Name	Property Size	Owner	Location and Description	Section 4(f) Property[b]
Jorvig Park	0.6 acre	City of St. Louis Park	Located at 6100 West 37th Street in St. Louis Park, northwest of the intersection of Brunswick Avenue South and West 37th Street and immediately south of the Bass Lake Spur; includes a play structure, horseshoe pits, picnic tables, and outdoor cooking grills. The park also houses a relocated historic train depot (the Chicago, Milwaukee, St. Paul and Pacific Railroad Depot).	Yes
Lilac Park	2.7 acres	City of St. Louis Park	Located immediately north of the Bass Lake Spur and east of Highway 100; accessible via a service road that connects to Beltline Boulevard and via a connecting bicycle path; includes a relocated and restored "Beehive" stone structure that houses three non-functional fireplaces, limestone picnic tables, "council ring" and fire pit, bicycle racks, trash receptacles, and an information kiosk.	Yes
Alcott Triangle	0.3 acre	MPRB	Located at the junction of St. Louis Avenue and West 29th Street in Minneapolis; includes a bench, picnic table, and waste can.	Yes
Park Siding Park	1.4 acres	MPRB	Located between the Kenilworth Corridor, Dean Court, and West 28th Street in Minneapolis; includes a playground, picnic area, benches, bicycle parking, ornamental lighting and fencing, and a pergola seating area.	Yes
Kenilworth Channel/Lagoon	10.3 acres	MPRB	Located in Minneapolis; is an element of the Minneapolis Chain of Lakes Regional Park and Grand Rounds Scenic Byway; the channel connects Cedar Lake and Lake of the Isles and is utilized by non-motorized watercraft.	Yes
Cedar Lake Park	208.4 acres	MPRB	Located at Cedar Lake Parkway and Basswood Road in Minneapolis and is part of the Chain of Lakes Regional Park and Grand Rounds Scenic Byway. Cedar Lake makes up approximately 173 acres of Cedar Lake Park. The Cedar Lake Regional Trail traverses the northernmost portion of the park, crossing the existing freight rail tracks at-grade and then connecting to the Kenilworth Trail. Recreational activities within the park include boating, fishing, cross country skiing, skating, picnicking, hiking, running, and bicycling.	Yes
Bryn Mawr Meadows Park	51.6 acres	MPRB	Located at 601 Morgan Avenue South in Minneapolis; includes two baseball fields, two broomball rinks, cricket field, ice rink, 10-table picnic area, restroom facilities, soccer field, eleven softball fields, biking path, sports facility, tennis court, tot lot/playground, wading pool, and walking path.	Yes

[a] All listed parks are of local significance, and are publicly owned and publicly accessible.

[b] Section 4(f) applies to publicly owned, publicly accessible parks and recreation areas, as well as to Section 106 historic resources (regardless of ownership) and publicly owned wildlife and waterfowl refuges. Open spaces are not protected under Section 4(f), unless the primary purpose of the open space is recreation or to provide wildlife/waterfowl habitat; or the open space is an eligible historic resource. See Chapter 6 for a description of the criteria for protection of properties under Section 4(f) and a full description of anticipated impacts to Section 4(f) properties.

[c] Nine Mile Creek Conservation Area was noted as a Section 4(f) resource in the Draft EIS, but there was a subsequent determination made by FTA in the Supplemental Draft EIS that Section 4(f) does **not** apply to the Nine Mile Creek Conservation Area because its primary purpose is not a park or recreation area but rather as a conservation area that is not a designated wildlife or waterfowl refuge (see 23 CFR 774.17 and *Section 4(f) Policy Paper* (Page 23, Question 1A)).

[d] Property legal documents for the open spaces noted in Table 3.6-1 are provided in Appendix I.

[e] The City of Eden Prairie owns a permanent easement for the purpose of scenic preservation on a private parcel in the vicinity of Flying Cloud Drive, north of Valley View Road, that is mapped by the City of Eden Prairie as part of the Nine Mile Creek Conservation Area (see Section 3.4 and PID No. 1211622240008).

[f] Per 23 CFR 774.17 and the *Section 4(f) Policy Paper,* which states on Page 23 (Question 1A): Publicly owned land is considered to be a park, recreation area or wildlife and waterfowl refuge when: (1) the land has been officially designated as such by a federal, state, or local agency; **and** (2) the officials with jurisdiction over the land determine that its primary purpose is as a park, recreation area, or refuge. Primary purpose is related to a property's primary function and how it is intended to be managed. Further, recreation use that is secondary, incidental, dispersed, or not authorized does not qualify a property for Section 4(f) protection (FHWA, 2012c).

[g] FTA has determined that the referenced trail network within the Opus commercial development area is a Section 4(f) property; see Section 4.5 and Chapter 6 for additional information on that trail network.

[h] The City owns a perpetual easement for public right-of-way purposes over, under, and across the property.

[i] The certificate of title for this property states, among other conditions, that the City of Minnetonka is the fee simple owner of the land, "subject to the condition that above land shall be used solely for parkland and open space purposes and if such property shall not be used for any purpose other than parkland or open space purposes, said property shall revert to party first part, its successors and assigns" (Deed Document #1260614, with reversionary clause).

Notes: MPRB = Minneapolis Park and Recreation Board. See Exhibits 3.6-1 and 3.6-2 for an illustration of the location of the resources listed in this table.

EXHIBIT 3.6-1
Parks, Recreation Areas, and Open Spaces

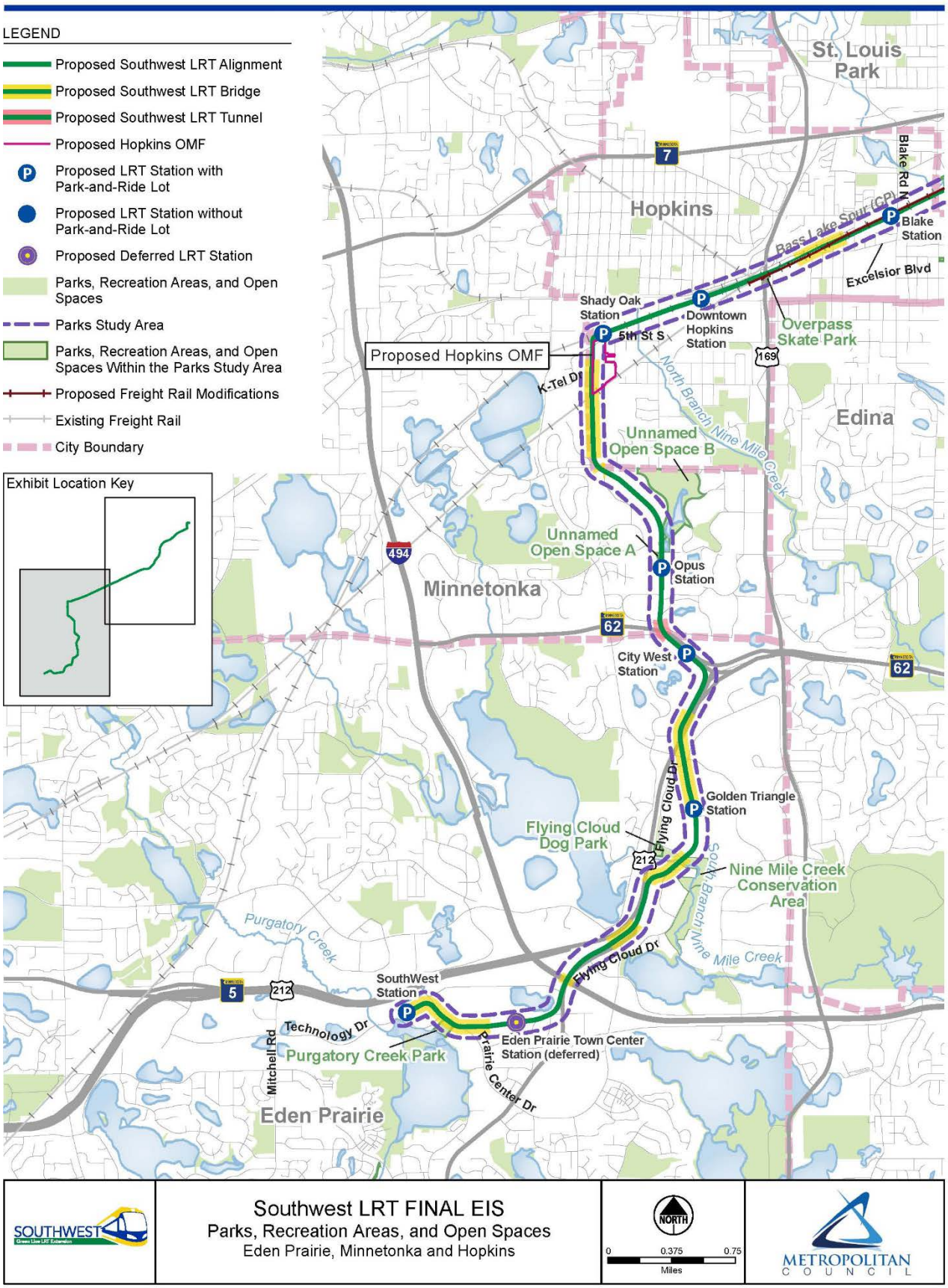
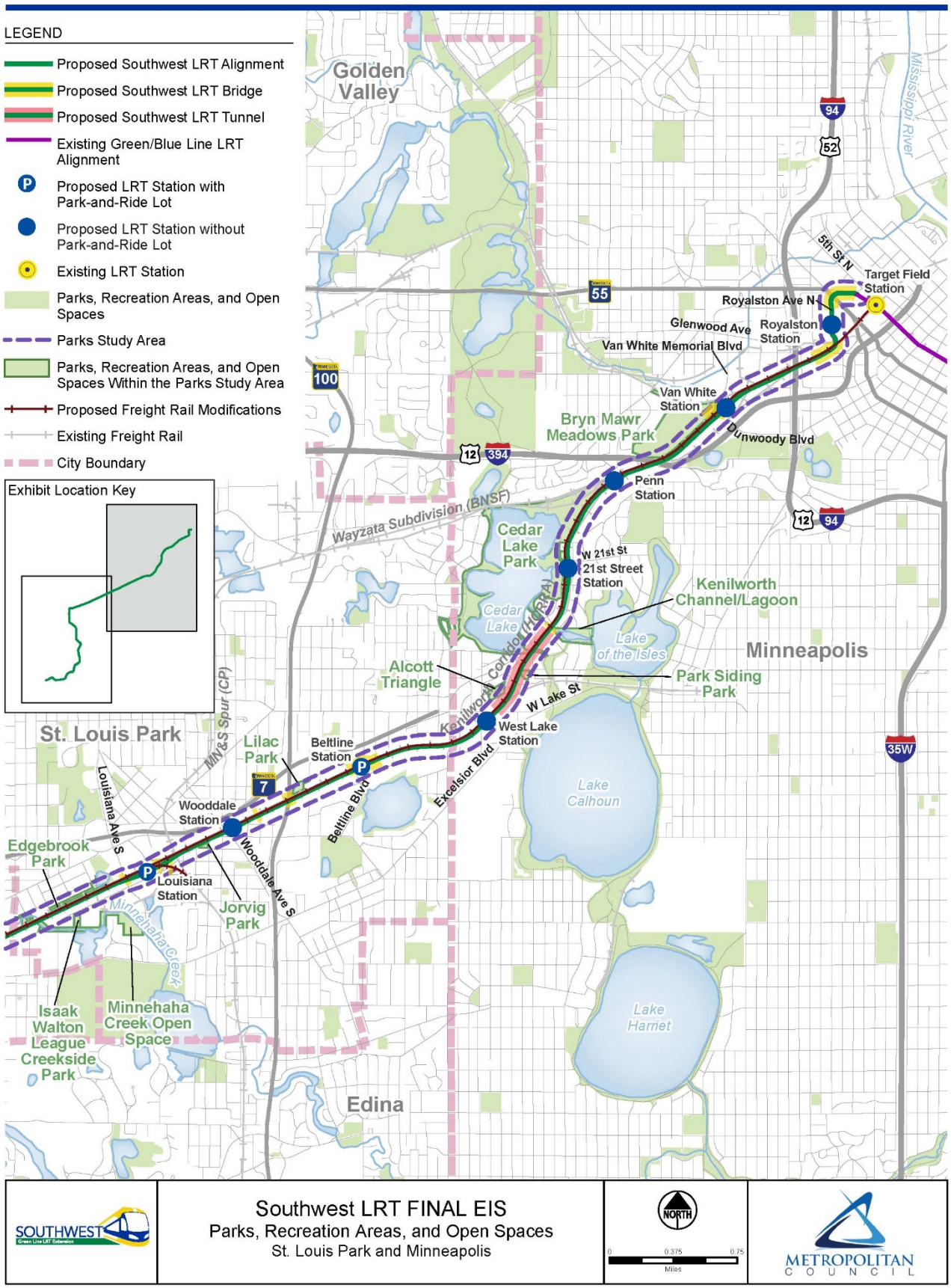


EXHIBIT 3.6-2
Parks, Recreation Areas, and Open Spaces



3.6.3 Environmental Consequences

Table 3.6-2 identifies the long-term and short-term direct and indirect impacts on parks, recreation areas, and open spaces from the Project; only those properties where impacts are anticipated are included in Table 3.6-2.

Under the Project, no long-term right-of-way will be acquired from Section 6(f) resources within the parks, recreation areas, and open spaces study area. Therefore, no properties planned, developed, or improved with funds from the Land and Water Conservation Fund Act of 1965 will be converted by the Project to non-outdoor recreation use, and this issue is not discussed further in this Final EIS (see Section 6(f) Technical Memorandum listed in Appendix C).

TABLE 3.6-2
Summary of Impacts to Parks, Recreation Areas, and Open Spaces in the Study Area[a]

Property Name	Long-Term Direct Impacts	Long-Term Indirect Impacts	Short-Term Impacts
Purgatory Creek Park	No long-term direct impacts	Changes to visual setting due to installation of elevated LRT line adjacent to park; no related long-term adverse effects to the park	Acquisition of temporary construction easement; temporary changes to access, noise, and visual setting conditions during construction
Nine Mile Creek Conservation Area	No long-term direct impacts[b]	Changes to visual setting due to installation of LRT line adjacent to the property	Temporary changes to visual setting and noise conditions during construction; potential for construction activities within the parcel
Unnamed open space A	Acquisition of entire 2.95-acre open space parcel to accommodate installation of LRT tracks and station platform; trail realignment	No long-term indirect impacts	No short-term impacts outside of the area to be acquired
Unnamed open space B	Acquisition of 2.5 acres to accommodate installation of LRT tracks; trail realignment	No long-term indirect impacts	No short-term impacts outside of the area to be acquired
Overpass Skate Park	No long-term direct impacts	Changes to visual setting and noise conditions due to installation of LRT line adjacent to park; no related long-term adverse effects to the park	Temporary changes to visual setting and noise conditions during construction
Minnehaha Creek Open Space	No long-term direct impacts	Changes to visual setting and noise conditions due to installation of LRT line adjacent to park; no related long-term adverse effects to the park	Temporary changes to visual setting and noise conditions during construction
Edgebrook Park	No long-term direct impacts	Changes to visual setting and noise conditions due to installation of LRT line adjacent to park; no related long-term adverse effects to the park	Temporary changes to visual setting and noise conditions during construction
Jorvig Park	No long-term direct impacts	Changes to visual setting and noise conditions due to installation of LRT line adjacent to park; no related long-term adverse effects to the park	Temporary changes to visual setting and noise conditions during construction
Lilac Park	No long-term direct impacts	Changes to visual setting and noise conditions due to installation of LRT line adjacent to park; no related long-term adverse effects to the park	Temporary changes to visual setting and noise conditions during construction
Park Siding Park	No long-term direct impacts	Changes to visual setting and noise conditions due to installation of LRT line adjacent to park; no related long-term adverse effects to the park.	Temporary changes to visual setting and noise conditions during construction
Kenilworth Channel/Lagoon	LRT improvements and modifications to the freight rail and trail alignments will occur on approximately 0.3 acre; no long-term adverse effect to recreational features of the park; the Council will conclude consultation on the design of the proposed bridges prior to construction	Changes to visual setting and noise conditions due to installation of LRT line across the channel; no related long-term adverse effects to the park	Temporary closure of channel/user detour during construction; temporary changes to access, visual setting and noise conditions during construction. BMP will be developed and implemented during removal of the existing bridges and construction of the new bridges

Property Name	Long-Term Direct Impacts	Long-Term Indirect Impacts	Short-Term Impacts
Cedar Lake Park	New segment of sidewalk to be constructed within the park near East Cedar Beach; realignment of a portion of North Cedar Lake Regional Trail in park; no long-term adverse effect to recreational features of the park	No long-term indirect impacts	Acquisition of temporary construction easement to accommodate trail reconstruction within the park
Bryn Mawr Meadows Park	Acquisition of 0.4-acre permanent maintenance easement to accommodate replacement trail bridge; modification of trail alignments in the park; no long-term adverse effect to recreational features of the park; the Council will continue consultation with MPRB to determine realignment of trails within the park, and conclude consultation with MPRB on the design of the proposed new bridge prior to construction	Modification to the park's visual setting due to the replacement trail bridge; improved transit and trail access; no related long-term adverse effects to the park	Acquisition of temporary construction easement and temporary project activities within the park related to construction of replacement bridge and realignment of trails; temporary trails will maintain connectivity during construction

[a] Only those properties where impacts are anticipated are included in Table 3.6-2. The visual quality analysis and mitigation measures for visual quality impacts are described in Section 3.7.4, and the detailed noise analysis and mitigation measures for noise impacts are described in Section 3.12.4.
[b] Approximately 0.23 acre of a private parcel in the vicinity of Flying Cloud Drive, north of Valley View Drive will be acquired by the Council for the proposed light rail alignment (see Section 3.4 and PID No. 1211622240008).

3.6.4 Mitigation Measures

This section describes the measures the Council will implement to mitigate the Project's long-term and short-term parks, recreation areas, and open spaces impacts. For each mitigation measure or set of associated mitigation measures, this section generally notes the anticipated impact or associated impacts that the mitigation measures will address (see Section 3.6.3 for additional information on the identified parks, recreation areas, and open spaces impacts, avoidance measures and BMPs). Mitigation measures for indirect impacts to park, recreation areas, and open spaces (visual, noise, access) are addressed in Sections 3.7 and 3.12 and in Chapter 4.

Mitigation actions proposed for parks and recreation properties that are protected under Section 4(f) are specified in the Final Section 4(f) Evaluation located in Chapter 6 of this Final EIS.

3.6.4.1 Long-term Mitigation Measures

Impact. Permanent acquisition of parks and open space property.

> ***Mitigation***. When permanently acquiring property at Bryn Mawr Meadows Park and two open spaces in Minnetonka, the Council will provide property owners with compensation in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act (Uniform Act).

3.6.4.2 Short-term Mitigation Measures

Impact. Temporary acquisition of park and opens space property.

> ***Mitigation***. When acquiring property for temporary construction purposes (i.e. temporary easement) at Purgatory Creek Park, Cedar Lake Park, and Bryn Mawr Meadows Park, the Council will provide property owners with compensation in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act (Uniform Act).

Impact. Construction-related disturbances.

> ***Mitigation***. FTA, the property owners, and the Council have initiated efforts to help avoid, minimize, and mitigate impacts to Purgatory Creek Park, Nine Mile Creek Conservation Area, two unnamed open spaces in Minnetonka, Overpass Skate Park, Minnehaha Creek Open Space, Edgebrook Park, Jorvig Park, Lilac Park, Park Siding Park, Kenilworth Channel/Lagoon, and Bryn Mawr Meadows

Park, including participation in coordination meetings. A Construction Communication Plan will be developed that will include coordination with the park owners, advance notice of construction activities, and highlighting road, sidewalk, and trail closures and detour routes.

Mitigation. Areas and features of parks and recreation areas that are altered or disturbed due to construction activities will be restored to original conditions or better in coordination with the jurisdictional owner. This mitigation measure applies to potential short-term direct impacts associated with construction-related disturbances at Purgatory Creek Park, Nine Mile Creek Conservation Area, Minnehaha Creek Open Space, Kenilworth Channel/Lagoon, Cedar Lake Park, and Bryn Mawr Meadows Park, as well as regional and local trails.

3.7 Visual Quality and Aesthetics

This section describes the long-term direct and indirect and short-term (construction) direct and indirect effects of the Project on visual quality and aesthetics (see Section 3.17 for cumulative impacts). The visual environment is the setting of an area, including the resources that affect an observer's visual experience of an area. Visual character is a composite description of the visual resources, considering the form, scale, and diversity of man-made and natural landscape components. Visual quality is the value placed on the visual environment according to viewer observation and preference. This section includes an overview of the regulatory context and methodology used for the analysis; an assessment of existing built environment; a description of the anticipated impacts related to visual quality and aesthetics; and a description of mitigation measures to implement with the Project. The analysis presented in this section is a summary of the detailed analysis of visual quality and aesthetic impacts presented in Appendix J. The exhibits referred to in this section are located in Appendix J, Attachment J-1, Visual Resources Exhibits.

3.7.1 Regulatory Context and Methodology

This visual resources analysis was prepared using the standardized approach for visual impact assessment documented in the FHWA's *Visual Impact Assessment of Highway Projects* (FHWA, 1988). The FTA does not have specific visual assessment guidelines, and defers to the FHWA guidance on visual impact assessment. Federal regulations require visual impacts to be addressed for Section 106 of the National Historic Preservation Act of 1966 (Section 106) for those resources where setting is a qualifying characteristic of protected historic resources (see Section 3.5 and Appendix J for further discussion of visual impacts on historic properties). Visual impacts to a protected Section 106 resource where setting is a qualifying characteristic of the protected resource are also required to be addressed under Section 4(f) of the Department of Transportation Act of 1966 (Section 4(f)) (see Appendix I, Final Section 4(f) Evaluation, for additional information on the Section 4(f) process and analysis).

Implementation of the FHWA visual impact assessment methodology includes the following steps, which are described in more detail below (see Section 2 of Appendix J for additional information on this methodology):

- Define the Project setting and the vicinity within which the Project is likely to be visible
- Determine who has views of the Project
- Divide the Project area into "visual assessment units" (VAUs)
- Identify key viewpoints for visual assessment
- Determine and document the existing visual quality of the views from the viewpoints (this is where visual sensitivity is determined)
- Prepare simulations depicting the views from the viewpoints as they appear with the Project in place
- Based on a review of the design files, plan sheets, team evaluations and consultation, and simulations, assess the changes to existing visual resources
- Assess the Project's level of impact at each viewpoint, taking into account the visual changes and viewer sensitivity

- Identify methods to mitigate adverse visual impacts

A visually sensitive area is one upon which a human value has been placed for reasons of historic importance, natural beauty, or other reasons. Examples of visually sensitive areas in the study area are:

- Parks and other recreational areas, such as Purgatory Creek Park and the Kenilworth Channel/Lagoon
- The wooded hillside on the west side of the Claremont Apartments in the City of Minnetonka
- The Minnesota River Bluffs, Cedar Lake, and Kenilworth Regional Trails
- Segments of the Kenilworth corridor visible from nearby residential areas

The Project's visual quality study area extends up to one-half mile on either side of the alignment. The visual quality study area was divided into VAUs, according to the cohesiveness of land use and development patterns, while also taking into account the local city's jurisdictional boundaries. The six VAUs and the exhibits on which they are mapped include Eden Prairie (Exhibit J-1), North Eden Prairie/Minnetonka/South Hopkins (Exhibit J-6), Hopkins (Exhibit J-9), St. Louis Park (Exhibit J-12), Kenilworth Corridor (Exhibit J-17), and Minneapolis Downtown Fringe (Exhibit J-24). A total of 19 viewpoints were selected for assessment. The locations of these viewpoints are indicated on Exhibits J-1, J-6, J-9, J-12, J-17, and J-24.

Viewers are the people who are likely to observe the visual environment. The major groups of viewers who would be affected by the new visual elements of the Project have been identified for each of the visual quality study area's six VAUs, which are described below. Such groups might include residents, workers who are employed in the VAU, visitors who come to the area, transit riders, pedestrians, cyclists, or roadway users (including motorists, transit riders, pedestrians, and cyclists) who travel in or through the VAU.

Following is a description of the key elements of the analysis used to determine how the Project will directly affect its visual environment—the results of that analysis are summarized in Section 3.7.3.1:

- **Visual Quality.** The existing *visual quality* of each view was evaluated for the existing conditions and for the view as it would appear with the Project in place. The *visual quality* of the views were assessed in terms of their vividness, intactness, and unity, which are further defined in Appendix J. Each of these dimensions was scored using a scale from 1 to 7, where the lowest score (i.e., "1") represents very low visual quality and the highest score (i.e., "7") represents very high visual quality. The overall level of visual quality for each view was characterized in terms of this seven level scale. The terms used to describe the existing visual quality within this seven-level scale included Very Low, Low, Moderately Low, Medium, Moderately High, High, and Very High. Based on the evaluation conducted, all of the views in the Project area fell into the middle zone of this scale, with no views having a level of visual quality lower than Moderately Low or higher than Moderately High. The detailed assessments are provided in Appendix J.
- **Degree of Visual Change.** Comparison of the *visual quality* ratings for the existing and with-Project conditions for each view provided a basis for determining the *degree of visual change* resulting from the Project, which are summarized for each viewpoint within Table 3.7-1. The process of determining the *degree of visual change* employed the following evaluation methods:
  - The *degrees of visual change* were classified as low, moderate, and high:
    - **Low degree of visual change** is assigned where the visual quality will decrease in the range of 0.1 through 0.5 points
    - **Moderate degree of visual change** would occur where the visual quality will decrease in the range of 0.6 and 1.0 points
    - **High degree of visual change** would occur where the decline in visual quality has been assessed as greater than 1.0

    In the situations where the Project's *degree of visual change* would be positive, that change was classified as a low *degree of visual change*, with a note that it was a positive visual change (only adverse changes are assigned to moderate and high *degrees of visual change*)

- **Level of Visual Sensitivity.** The *level of visual sensitivity* of each view was also classified based on the following factors:
  - The number and types of people who see the view.
  - The length of time the view is observed. This factor was based on residents and recreational users having views of long duration, whereas motorists often experience views in short durations.
  - Potential levels of viewer concern about the visual character and quality of the view. Level of concern is a subjective response that includes factors such as the visual character of the surrounding landscape, the activity a viewer is engaged in, and the viewer's values, expectations, and interests. This factor was based on residents and recreational users being more sensitive viewers and with commuters and employees in industrial areas being less sensitive viewers.

  For situations where there are few viewers who experience a defined view, or when they may not be concerned with the view, a low level of sensitivity classification was applied. Situations in which there are many viewers who have high frequency or long duration views, as well as viewers who are likely to be very aware of and concerned with the view, such as viewers on trails, in recreational areas, or in residential neighborhoods, were classified as having a high level of sensitivity. Situations in between these two sets of conditions were classified as having a moderate level of sensitivity.

- **Level of Visual Impact.** The final determination of the Project's *level of visual impact* on the visual environment entailed taking both the *degree of visual change* and the *degree of visual sensitivity* of the view into account. The levels of visual impact are described as low, moderate, and substantial, as defined below:
  - **Low.** The Project will have a low *level of visual impact* where it will result in a slight change in visual character or quality, with no substantive effect on a visually sensitive area. New visual elements would be generally compatible with existing visual character, and little to no viewer response to visual changes is expected. A low level of visual impact usually results from low degree of visual change to views that have low to high degrees of visual sensitivity. Situations in which the Project would have a positive impact on visual quality were also classified as having a "low" degree of visual impact.
  - **Moderate.** The Project will have a either (1) a slight change in visual character or quality, resulting in a high level of viewer response, or (2) an extensive change in visual character or quality with only a minimal viewer response. New visual elements would be somewhat compatible with existing visual character and quality. A moderate level of visual impact results where there will be a moderate degree of visual change in areas that have a low to high degree of visual sensitivity, or where there will be a high degree of visual change in areas with a moderate degree of visual sensitivity.
  - **Substantial.** The Project will have a substantial level of impact where there will be an extensive change to visual character or quality, or substantial effect on a visually sensitive area. New visual elements would be generally incompatible with existing visual character and quality, resulting in a high level of viewer response. A high degree visual impact results where there will be a high degree of visual change in areas with a high degree of visual sensitivity.

3.7.2 Affected Environment

This section describes the visual quality within the VAU, and takes into account visual resources along the proposed light rail alignment. Generally, working southwest to northeast along the proposed light rail alignment, this section defines the Project's six VAU: (1) Eden Prairie, (2) North Eden Prairie/Minnetonka/South Hopkins, (3) Hopkins, (4) St. Louis Park, (5) Kenilworth Corridor, and (6) Minneapolis Downtown Fringe; identifies the viewer groups for the 19 viewpoints selected for

assessment; and documents the visual quality. Additional detail on the VAUs and viewpoints can be found in Appendix J.

3.7.2.1 Eden Prairie

The visual environment in the Eden Prairie VAU is characterized by suburban development. Prominent features include wide roadways, mid- to low-rise office building campuses, multifamily residential buildings, commercial buildings, water retention ponds, and Purgatory Creek Park. Many of the commercial developments and office parks in this VAU have landscaping, including lawns and trees. Gently rolling hills toward the north of the segment provide topographical relief. Individual areas of development in the VAU have architectural treatments on their façades and other specific design elements, but there are no consistent visual or design elements that link the developments together.

Four viewpoints have been identified within the Eden Prairie VAU and represent areas where changes to the visual environment occur because of the Project. The locations of these viewpoints are indicated on Exhibit J-1. Photographs depicting the existing conditions seen from the viewpoints, as well as simulations that depict the views as they would appear with the Project in place, are presented in Appendix J, Attachment J-1. The ratings of the visual quality of each of these views indicated in the following viewpoints were determined through the FHWA visual quality evaluation analysis documented in Table J-1 in Appendix J.

- **Viewpoint 1** is looking east from Technology Drive toward the SouthWest Transit Center (Exhibit J-2). Existing visual quality level: Medium.
- **Viewpoint 2** is looking south along Prairie Center Drive at Technology Drive. Purgatory Creek Park is visible in the foreground of the view, on the far side of Technology Drive (Exhibit J-3). Existing visual quality level: Moderately Low.
- **Viewpoint 3** is from the parking area in front of the picnic pavilion in Purgatory Creek Park, looking east toward Prairie Center Drive (Exhibit J-4). Existing visual quality level: Medium.
- **Viewpoint 4** is from Eden Road toward the undeveloped area just north of the Town Center Market Place (Exhibit J-5). Existing visual quality level: Medium.

Viewer groups in the Eden Prairie VAU include park users, drivers, pedestrians, workers, shoppers, and cyclists on the existing street network. Residential and park users are more sensitive to change than the other viewer groups; this is particularly true for any visual changes that might affect their enjoyment of Purgatory Creek Park.

3.7.2.2 North Eden Prairie/Minnetonka/South Hopkins

This VAU has a heavily developed suburban character. The proposed light rail alignment in this area will be located in a new right-of-way that will, along part of its route, parallel limited access highways (Highways 212 and 62). Along most of the rest of its route in this VAU, the light rail alignment will thread through areas developed with a mix of low-rise suburban office, commercial, warehouse, and industrial facilities. In Minnetonka and Hopkins, near Smetana Road the proposed light rail alignment will pass along the edges of two multifamily residential complexes.

Two viewpoints represent areas where changes to the visual environment occur as a result of the Project. The locations of these viewpoints are indicated on Exhibit J-6 in Appendix J. Photographs depicting the existing condition views from these locations, as well as simulations that depict the views as they would appear with the Project in place are presented in Appendix J, Attachment J-1. Table J-2 in Appendix J documents the visual quality ratings for each of these views, which are indicated in the following list:

- **Viewpoint 5** is from Flying Cloud Drive looking northeast toward Nine Mile Creek (Exhibit J-7). Existing visual quality level: Medium.
- **Viewpoint 6** is from the trail on the west side of the Claremont Apartments looking southeast along the proposed LRT right-of-way (Exhibit J-8). Existing visual quality level: Medium.

Viewer groups in the Eden Prairie/Minnetonka/South Hopkins VAU include drivers on local roads and Highways 212 and 62, pedestrians along local streets and on trails, workers employed at the commercial, warehouse, and industrial facilities in the area and residents in the two large apartment complexes at the area's northern end. Most viewers in the area are motorists and are less sensitive to visual change. Residents and trail users experience a higher degree of sensitivity to visual change than motorists.

3.7.2.3 Hopkins

In this VAU, the proposed light rail alignment is located in a rail corridor that contains a freight rail line and trails, and is currently owned by Canadian Pacific Railway and HCRRA, respectively. The trail segment in this VAU is part of the Cedar Lake LRT Regional Trail east of the Shady Oak Station and the Minnesota River Bluffs LRT Regional Trail to the west of Shady Oak Station. Land uses adjacent to the corridor in this area are primarily industrial, retail/commercial, and office, with some multifamily and single-family residential land uses. The visual setting is a built environment with industrial and utility uses typical in a freight corridor.

Various levels of vegetation buffers predominantly screens the views to and from surrounding land uses in this VAU.

Two viewpoints represent areas where changes to the visual environment occur as a result of the Project. The locations of these viewpoints are indicated on Exhibit J-10. Photographs depicting the existing conditions seen in the views from these locations, as well as simulations that depict the views as they would appear with the project in place are presented in Attachment J-1. Table J-3 in Appendix J documents the ratings of the visual quality of each of these views, which are indicated in the following list:

- **Viewpoint 7** is the view from the Minnesota River Bluffs LRT Regional Trail looking east toward the site of the proposed Shady Oak Station (Exhibit J-10). Existing visual quality level: Medium.
- **Viewpoint 8** is the view from the area south of Excelsior Boulevard looking east toward The Depot, which is a converted 1903 train station, coffee house, and gathering place for users of the adjacent bike trail (Exhibit J-11). Existing visual quality level: Moderately Low.

Viewer groups in the Hopkins VAU include pedestrians and bicyclists using the Cedar Lake LRT Regional Trails, people working in the industrial areas along the HCRRA/Canadian Pacific Railway-owned corridor, motorists on Excelsior Boulevard, and residents of the area to the southeast of the point where the rail corridor crosses Excelsior Boulevard. Motorists and workers within the industrial areas of this VAU will generally be less sensitive to visual changes caused by the Project, while residents and trail users will be more sensitive.

3.7.2.4 St. Louis Park

In this VAU, the proposed light rail alignment will be located adjacent to the HCRRA rail corridor that contains a freight rail line, and Cedar Lake LRT Regional Trail. Land uses adjacent to the corridor in this area consist of a mix of industrial, retail/commercial, office, and single- and multifamily housing. Much of the visual setting is a built environment with industrial and utility uses typical in a freight corridor.

Four viewpoints represent areas where changes to the visual environment occur as a result of the Project. The locations of these viewpoints are indicated on Exhibit J-12. Photographs depicting the existing conditions viewed from these locations, as well as simulations that depict with-project conditions are presented in Appendix J, Attachment J-1. Table J-4 in Appendix J documents the ratings of the visual quality of each of these views, which are indicated in the following list:

- **Viewpoint 9** is the view from the Cedar Lake LRT Regional Trail, looking east toward the site of the Louisiana Station (Exhibit J-13). Existing visual quality level: Medium.
- **Viewpoint 10** is the view from 36th Street at Brunswick Avenue looking west toward Jorvig Park, (Exhibit J-14). Existing visual quality level: Moderately Low.
- **Viewpoint 11** is the view from Beltline Boulevard at Minnesota Highway 7, looking south southeast toward the site of the Beltline Station (Exhibit J-15). Existing visual quality level: Moderately Low.

- **Viewpoint 12** is the view from the Cedar Lake LRT Regional Trail near France Avenue, looking west (Exhibit J-16). Existing visual quality level: Medium.

Pedestrians and bicyclists using the Cedar Lake LRT Regional Trail, which parallels the proposed LRT alignment, and users of several parks and neighborhoods of single-family residences and multifamily complexes that that lie adjacent to the freight rail and trail corridor in this area will be highly sensitive to visual changes brought about by the Project. Motorists using the roadway that cross the freight rail and trail corridor and viewers in the several industrial areas located along this segment will be less sensitive.

3.7.2.5 Minneapolis Kenilworth Corridor

In this VAU, the light rail alignment will be located in a corridor currently owned by HCRRA, and contains a freight line and a trail. The Cedar Lake LRT Regional Trail and Kenilworth Trail parallel this freight line in this area. Although the westernmost end of this corridor passes through an area characterized by multifamily housing complexes and shopping centers, most of the corridor is bordered by neighborhoods of single- and multifamily homes and parklands. The freight rail and trail corridor are predominantly fringed by overstory and understory deciduous vegetation, which, in the summer, screens views into the corridor. During the leaf-off season, the degree to which the vegetation screens views from the surrounding area into the corridor is reduced. Some areas of clearing at several locations along the right-of-way open up the bicycle and pedestrian trail to views to and from the surrounding urban environment. For example, at locations where the trail crosses roads, cleared areas are adjacent to residential developments, and cleared areas exist at the open, maintained trail corridor north of Burnham Road. Within the corridor, views from the trail include the trail itself, the freight rail line, the freight trains of varying length that travel in the corridor, and the thick bands of bordering vegetation. The views from the trail also include occasional views of adjacent residential development and the distant Minneapolis skyline in the background. One of the areas of visual interest along this segment is the location where the Kenilworth Corridor crosses the Kenilworth Channel, providing a connection between Cedar Lake and Lake of the Isles. Views from the trail toward the channel are limited because of the thick vegetation that surrounds the trail (Exhibit J-20). For users of the channel (e.g., boaters and cross-country skiers), the wood-pile trestle bridge that carries the trail and the freight rail line across the channel is a visually distinctive and a dominant element of the view.

Six viewpoints provide representative views along the corridor where the Project has the potential to change the visual environment. The locations of these viewpoints are indicated on Exhibit J-17. Photographs depicting the existing conditions seen in the views from these locations, as well as simulations that depict with-project conditions are presented in Appendix J, Attachment J-1. Table J-5 in Appendix J documents the ratings of the visual quality of each of these views, which are indicated in the following list:

- **Viewpoint 13** (Exhibit J-18) is on Chowen Avenue South and provides a view looking northeast toward the Kenilworth Corridor. In this view, a walker is visible on the Cedar Lake LRT Regional Trail. The freight line is screened by intervening vegetation. Existing visual quality level: Medium.
- **Viewpoint 14** (Exhibit J-19) is on the Kenilworth Trail at a point just north of West Lake Street. The view looks north along the bike and pedestrian trails. The freight rail line is located behind the intervening vegetation that borders the left side of the trail. Existing visual quality level: Medium.
- **Viewpoint 15** (Exhibit J-20) is on the Kenilworth Trail at the southern edge of the crossing over the channel that connects Cedar Lake with Lake of the Isles. The view looks north along the combined bike and pedestrian trail. The freight rail line is visible to the left of the trail. The railing of the bridge over the channel is visible along the left and right sides of the trail. Existing visual quality level: Moderately High.
- **Viewpoint 16** (Exhibit J-21) is from the channel that connects Cedar Lake with Lake of the Isles via the Kenilworth Lagoon. The view was taken from the channel at a point east of where the freight rail line and parallel bike and pedestrian trail cross the channel. Existing visual quality level: Moderately High.
- **Viewpoint 17** (Exhibit J-22) is from the Burnham Road Bridge over the channel that connects Cedar Lake with Lake of the Isles via the Kenilworth Lagoon. The view looks southeast down the channel toward the existing freight rail bridge. Existing visual quality level: Moderately High.

- **Viewpoint 18** (Exhibit J-23) is from West 21st Street at Thomas Avenue South. The view looks northwest toward Kenilworth Corridor. Although the corridor is mostly hidden behind the thick tree cover, the freight rail line and Kenilworth Trail are glimpsed at the point at which they cross West 21st Street. Existing visual quality level: Medium.

The sensitive viewer groups present in the Kenilworth Corridor VAU include adjacent residents and recreational users of the trail and the channel connecting the lakes. Those viewer groups have a high level of visual sensitivity.

3.7.2.6 Minneapolis Downtown Fringe

Land uses in this VAU consist of a mixture of rail lines, roadways, industrial uses, and, to the north of the corridor, Bryn Mawr Meadows Park. At Glenwood Avenue, the route will leave the below grade rail corridor and travel north along Royalston Avenue and then curve east through an industrial area to arrive at Target Field Station.

One viewpoint has been selected to represent areas where changes to the visual environment could potentially occur because of the Project. This viewpoint (Viewpoint 19) is located on Royalston Avenue at Holden Street North, and provides a view looking north along Royalston Avenue toward the proposed site of the Royalston Station. The location of this viewpoint is indicated on Exhibit J-24. Images documenting the existing view and the simulated with-project view are provided on Exhibit J-25. Table J-6 in Appendix J documents the rating of the visual quality of this view, which is indicated as follows:

- **Viewpoint 19** is from Royalston Avenue North and Holden Street North, looking north toward the proposed Royalston Station location (Exhibit J-25). Existing visual quality level: Moderately Low.

People hiking and biking on the Cedar Lake LRT Regional Trail will be most sensitive to the visual changes brought about by the Project, while those traveling and working in the industrial area between Royalston Avenue North and the Target Field Station will be less sensitive.

3.7.3 Environmental Consequences

This section identifies the long-term and short-term direct and indirect visual quality and aesthetics impacts from the Project (see Section 2.1.1.2 for a description of construction activities).

3.7.3.1 Long-term Direct Visual Quality and Aesthetic Impacts

The Project would result in changes to the visual environment from the introduction of new visual elements, or the removal or replacement of existing elements. In all VAUs, the transitway would add the linear elements of the tracks and overhead wire system, which includes the poles supporting the wires. These new visual elements cannot be avoided, and in most locations, these elements would not be anticipated to result in an adverse effect. The tracks in or adjacent to a roadway would not be a high visual impact in an area of low or moderate sensitivity for viewers. Stations and power substations would also be new visual elements in the corridor. The at-grade stations have been designed to have a minimal impact on the surrounding environs. Each of the stations has been designed to be compatible or attractive additions to the surrounding community. In areas of moderate or high visual sensitivity, the power substations would be screened or landscaped to be compatible with the surrounding neighborhood character.

The Project has the potential to cause light spill and glare effects at certain points along the alignment. To minimize the Project's lighting contribution to sky-glow and glare, Project lighting fixtures (e.g., LRV, stations) will have designs to prevent light from shining directly into the sky. The full-shielding designs, which provide directional control to the lighting fixtures and which will also ensure that the light source will not be visible in the horizontal direction, will minimize the potential for the lighting to create sky-glow and glare effects. Preventing the horizontal radiation of light from the fixtures will also eliminate light spill and the potential for Project lighting to affect ambient lighting levels in the surrounding area. A further consideration is that light energy or illumination decreases at a rate equal to the square of the distance. Therefore, even if the fixtures permitted horizontal radiation of light, the potential for it to create light trespass and changes in ambient lighting conditions would be limited to areas that are very close to the light sources. This has the potential to change the nighttime character of these areas, and this change could have

adverse effects for the residences along the streets where the light trespass will occur. However, the impacts on these areas will be attenuated by use of lighting fixtures with full shielding that direct the light only to the areas where it is required and which prevent light spill and glare effects at nearby residences. Additionally, the headlights on the fronts of LRT vehicles have highly focused beams that direct the light downward onto the track straight ahead and do not project light out into the surrounding environment.

There are, however, visually sensitive areas and other features that characterize the corridor's visual environment that may be affected by the Project. The effects of the Project on each of the 19 viewpoints used for analysis are summarized in Table 3.7-1. This table is followed by a brief review of the visual changes in each of the VAUs and the impacts to each of the viewpoints analyzed. This review of the impacts by VAU and viewpoint is followed by a set of measures to mitigate the visual impacts identified.

TABLE 3.7-1
Summary of Visual Quality and Aesthetics Impacts

VAU	Viewpoint	Ratings		
		Degree of Visual Change	Level of Visual Sensitivity	Level of Impact
Eden Prairie	Viewpoint 1 View Looking East from Technology Drive Toward the SouthWest Transit Center	Low	High	Low
	Viewpoint 2 View Looking South along Prairie Center Drive at Technology Drive Toward Purgatory Creek Park	High	Moderate	Moderate
	Viewpoint 3 View from the Parking Area in Front of the Picnic Pavilion in Purgatory Creek Park	Moderate	High	Moderate
	Viewpoint 4 Eden Road at Glen Road, Looking West	Moderate	High	Moderate
North Eden Prairie/Minnetonka/South Hopkins	Viewpoint 5 Flying Cloud Drive Looking Northeast Toward Nine Mile Creek[b]	High	Moderate	Moderate
	Viewpoint 6 Trail on the West Side of the Claremont Apartments, View Looking Southeast	High	High	Substantial
Hopkins	Viewpoint 7 Minnesota Bluffs LRT Regional Trail Looking East Toward Proposed Site of the Shady Oak Station	High	High	Substantial
	Viewpoint 8 View from the area south of Excelsior Boulevard Looking East Toward The Depot	Low[a]	Moderate to High	Low
St. Louis Park	Viewpoint 9 Cedar Lake LRT Regional Trail, View Looking East Toward Site of the Proposed Louisiana Station	High	High	Substantial
	Viewpoint 10 View From 36th Street at Brunswick Avenue, Looking West Toward Jorvig Park	Moderate	Moderate to High	Moderate
	Viewpoint 11 Beltline Boulevard at Minnesota Highway 7, Looking South-Southeast Toward the Site of the Beltline Station	Low [a]	Moderate	Low

VAU	Viewpoint	Ratings		
		Degree of Visual Change	Level of Visual Sensitivity	Level of Impact
	Viewpoint 12 Cedar Lake LRT Regional Trail, View Looking West	High	High	Substantial
Kenilworth Corridor	Viewpoint 13 View from Chowen Avenue South Southwest of the West Lake Station	Low	High	Low
	Viewpoint 14 Kenilworth Trail North of West Lake Street, Looking North toward the Site of the South Tunnel Portal	High	High	Substantial
	Viewpoint 15 Kenilworth Trail at Southern Edge of the Kenilworth Lagoon Crossing	Moderate	High	Moderate
	Viewpoint 16 View from the Channel Between Cedar Lake and Lake of the Isles, View from the East toward the Kenilworth Corridor Bridges	Low	High	Low
	Viewpoint 17 View from the Burnham Road Bridge Looking Southeast down the Channel toward the Kenilworth Corridor Bridges	High	High	Substantial
	Viewpoint 18 View Toward the Kenilworth Corridor Crossing of West 21st Street	Low[a]	High	Low
Minneapolis Downtown Fringe	Viewpoint 19 Royalston Avenue North at Holden Street, Looking North Toward the Site of the Proposed Royalston Station	Low[a]	Low to Moderate	Low

[a] The degree of visual change for these four viewpoints (Viewpoints 8, 11, 18, and 19) would result in a positive change, as described in Section 3.7.1.

[b] The project includes both a partial property acquisition and temporary construction easement with the Nine Mile Creek Conservation Area. The conservation area also includes an easement for scenic preservation purposes over and above land. The partial acquisition associated with the project and within the Nine Mile Creek Conservation Area will require a permanent boundary adjustment to the limits of this conservation area, including the limits of the easement for scenic preservation purposes.

Eden Prairie

This summary of the impacts in this VAU is supported by Exhibits J-2 through J-5, which present existing conditions photographs from each of the viewpoints selected, and simulations that depict the with-project conditions. Table J-7 in Appendix J evaluates the anticipated visual changes that will occur in the views from each of the viewpoints. The brief narratives that follow summarize the visual changes and the nature and degree of visual impact on each of the views.

Viewpoint 1 – View Looking East from Technology Drive Toward the SouthWest Transit Center (Exhibit J-2)

Level of Impact: Low

A structured park-and-ride lot will extend out from the western side of the SouthWest Station. The area between this structured parking facility and Technology Drive will be converted into access drives and landscaped areas. Based on these Project features the view will appear more intensively developed. The view's level of vividness will decrease slightly from the removal of landscaping in front of the station and the removal of the bus station's curved roof, which currently provides a measure of visual interest. The intactness of this view will be reduced slightly by the removal of some of the landscaping currently visible in front of the Transit Center and by the additional structural mass added by the expansion of the parking

structure. The level of visual unity will remain about the same, Although the LRT facilities would add more built elements to the view, their forms and arrangement would be consistent with the view's other built features.

The change in the level of visual quality of this view will be low. Given the use of the trail along the southern side of Technology Drive, and the presence of residential viewers in the apartment buildings on the northern side of Technology Drive, the viewers in this area include those with high levels of sensitivity. The combination of a low degree of visual change and a high level of visual sensitivity results in a level of impact that is low.

Viewpoint 2 – View Looking South Along Prairie Center Drive at Technology Drive Toward Purgatory Creek Park (Exhibit J-3)

Level of Impact: Moderate

A concrete elevated light rail guideway will be built along the western edge of the roadway, adding a visually prominent structure to the setting that will split this view. With the addition of the overhead structure, the visual character will be changed by the enclosed view and the increased level of development. The level of vividness, which is currently moderately low, will remain the same. The intactness will be substantially reduced by addition of the large, visually dominant LRT structure in the immediate foreground. The level of visual unity will decrease because the elevated LRT structure will split the view.

The change to the level of visual quality will be high. Given the high degree of change to the visual quality of this view and the moderate sensitivity of the roadway users in this area, the overall level of impact is moderate.

Viewpoint 3 – View From the Parking Area in Front of the Picnic Pavilion in Purgatory Creek Park, Looking East Toward Prairie Center Drive (Exhibit J-4)

Level of Impact: Moderate

Under the Project, an elevated concrete light rail guideway will be built along the eastern boundary of the park, adding a visually dominant linear element to the setting, which will frame the park's eastern edge. Landscape trees between the park's primary use areas and the elevated structure will both partially reduce the structure's visibility and integrate it into the view. The overhead structure will intrude on the view and contrast with the visual character of the other elements in it. Consequently, there will be a reduction in the view's levels of intactness and unity. The reduction in visual quality will be moderate. This view, based on the recreational viewers in the park, is highly sensitive. The moderate degree of visual change, combined with the high level of visual sensitivity will result in a moderate level of impact.

Viewpoint 4 – Eden Road at Glen Lane Looking West (Exhibit J-5)

Level of Impact: Moderate

The light rail alignment will be located along the northern edge of Eden Road. This will require removing the trees along Eden Road that now screen the views into the Market Place Shopping Center and installing at-grade tracks, OCS, and perimeter fences. In addition, Eden Road will be modified, including a new access road into Eden Prairie Town Center Station at the top of the hill to the right of the water tower. The station's features will not be visible in this view. With these changes, the view's level of vividness will remain essentially the same. The intactness will be reduced by removing the trees that now line the northern and southern edges of Eden Road, by building the visually intrusive tracks and OCS, and by revealing the shopping center structures that are now hidden. The level of visual unity will remain about the same because the LRT facilities will create linear features that will parallel Eden Road and lead the eye toward the water tower, which is the focal point of the view. The degree of change in visual quality will be moderate. The viewers in this area include motorists on Eden Road and employees and customers of the commercial land uses. Because of the pedestrian amenities the City of Eden Prairie has been installing in this area, the viewers also include substantial numbers of pedestrians. Because of their presence, the visual sensitivity of the viewers in this area is high. When the moderate degree of visual change is considered in the context of the high sensitivity of the viewers, the level of visual impact is moderate.

North Eden Prairie/Minnetonka/South Hopkins

This summary of the impacts in this VAU is supported by Exhibits J-7 through J-8, which present existing conditions photographs from each of the viewpoints selected, and simulations that depict the Project conditions. Table J-8 in Appendix J evaluates the anticipated visual changes that will occur in the views from each of the viewpoints. The brief narratives that follow summarize the visual changes and the nature and degree of visual impact on each of the views.

Viewpoint 5 – Flying Cloud Drive, View Looking Northeast Toward Nine Mile Creek (Exhibit J-7)

Level of Impact: Moderate

In the area encompassed in this view, the light rail alignment will travel on an overhead structure that will parallel the western side of Flying Cloud Drive, pass over it, and then travel into the wooded area on the eastern side of the road. The predominant visual resources in this area include a bucolic natural setting surrounding the immediate area with mature trees. Tree clearing will be required to accommodate the right-of-way. The presence of the elevated light rail alignment structure will have a mixed effect on the vividness of this view. The intactness will be reduced by the addition of the visually dominant elevated light rail structure and OCS and the creation of a cleared corridor through the wooded area on the eastern side of the road. The addition of the visually dominant light rail alignment overhead structure will change the visual composition. The light rail structure will add a new element that extends across the entire view, while reducing the visual unity of the current view of the landscape. Consequently, the visual unity of the current view will be altered substantially. Although the immediate context of this view appears to be an undeveloped, forested area, the reality is that this area part of a district of Eden Prairie that is primarily devoted to large office parks. Thus, the overall visual character of this district is that of a highly developed suburban office park landscape. Given the utilitarian function of this district, the visual sensitivity of motorists and pedestrians in the area along Flying Cloud Drive is moderate. When the high degree of visual change is considered in the context of the moderate sensitivity of the viewers in the area, the level of visual impact will be moderate.

Viewpoint 6 – Trail on the West Side of the Claremont Apartments, View Looking Southeast (Exhibit J-8)

Level of Impact: Substantial

In the area seen in this view, development of the light rail alignment will require removing existing trees that currently cover a slope bordering the western side of the trail near a small building to the east of the trail. A 9-foot to 20-foot concrete retaining wall will be built to create a relatively flat, elevated right-of-way for the light rail tracks and a noise wall will be added to address noise impacts. Removal of the thick tree cover that lines the trail will remove an important element that contributes to the existing level of vividness of this view. The retaining and noise walls, which will extend up to approximately 28 feet in height, and which will be located immediately adjacent to the trail, will intrude on this view, reducing its level of visual intactness. Disruption of the continuous band of trees along the trail will reduce the view's level of visual unity. The impact of these changes will be a substantial decrease in the level of visual quality. This view is seen by residents of the apartment complex to the east, and by those using the trail that lies at the base of the slope on which the light rail alignment will be located. Given the high sensitivity of the viewers in this area, the high degree of impact on visual quality will result in a level of impact that is substantial.

Hopkins

This summary of the impacts in this VAU is supported by Exhibits J-10 through J-11, which present existing conditions photographs from each of the viewpoints selected and simulations that depict the Project conditions. Table J-9 in Appendix J evaluates the anticipated visual changes that will occur in the views from each of the viewpoints. The brief narratives that follow summarize the visual changes and the nature and degree of visual impact on each of the views.

Viewpoint 7 – Minnesota River Bluffs LRT Regional Trail Looking East Toward the Proposed Site of the Shady Oak Station (Exhibit J-10)

Level of Impact: Substantial

The vegetation that lines the trail will be removed, opening up a view toward the extension of 17th Avenue, the LRT tracks and OCS, and the proposed Shady Oak Station. In addition, the removal of the trees along the trail will open up the view toward the one-story industrial and warehouse buildings located in the area to the east of the 17th Avenue extension. The removal of the trees that frame the trail will substantially reduce the vividness of the view. The visual intactness of the view will be substantially reduced by the visibility of a large collection of built features. The disparate elements that will become visible in this view will create a composition with a low degree of visual cohesion. The overall degree of visual change will be high. Given the high level of visual sensitivity of the users of the Minnesota River Bluffs LRT Regional Trail and the high degree of visual change, the overall level of visual impact will be substantial.

Viewpoint 8 – View From the Area South of Excelsior Boulevard Looking East Toward The Depot (Exhibit J-11)

Level of Impact: Low

The addition of the light rail tracks and OCS adjacent to the existing freight rail line will entail removal of the trees and wooden utility poles that now line the corridor. An elevated segment of the light rail tracks will be visible at the left side of the view. Because the visual changes associated with construction of the light rail alignment into this view are relatively slight, the vividness of this view will not change. The visual intactness will be slightly improved by removal of the wooden utility poles that currently line the freight rail corridor, which will have the effect of reducing the visual clutter. Removal of the wooden utility poles with their complex forms will lead to a slight improvement of the visual unity of this view. The viewers in this area include the patrons of The Depot coffee shop, who have a moderate level of visual sensitivity, and walkers and bicyclists using the Cedar Lake LRT Regional Trail, who have a high level of sensitivity to visual change. Because the degree of visual change will be low, the level of visual impact will also be low.

St. Louis Park

This summary of the impacts in this VAU is supported by Exhibits J-13 through J-16, which present existing conditions photographs from each of the viewpoints selected, and simulations that depict the Project conditions. Table J-10 in Appendix J evaluates the anticipated visual changes that will occur in the views from each of the viewpoints. The brief narratives that follow summarize the visual changes and the nature and degree of visual impact on each of the views.

Viewpoint 9 – Cedar Lake LRT Regional Trail, View Looking East toward the Site of the Proposed Louisiana Station (Exhibit J-13)

Level of Impact: Substantial

This view will be substantially altered with shifting of the trail to the north, and shifting of the freight rail tracks into the center of the corridor between the existing trail and existing freight rail tracks. The trees that currently line the south side of the trail corridor will be cleared, opening up the view of a utility transmission line and elevated rail line to the east and to the proposed Louisiana Station that will be at a lower elevation to the south. The view will become more open, and built elements will play a larger role in the view. Because of these changes, the level of vividness will decrease. Removal of the trees will also reduce the level of intactness. The substantial alteration of this view will result in a view that is more complex with a moderately low degree of visual order. The change in the level of visual quality will be moderate. This view is seen by users of the Cedar Lake LRT Regional Trail, who have a high level of sensitivity to visual change. When the high degree of change to visual quality is considered in the context of the high level of visual sensitivity of this view, the level of impact is substantial.

Viewpoint 10 – View From 36th Street at Brunswick Avenue, Looking West toward Jorvig Park (Exhibit J-14)

Level of Impact: Moderate

In this view, the Project-related visual changes will include removal of trees along the edge of the rail right-of-way bordering Jorvig Park and addition of at-grade LRT tracks, OCS, a pedestrian trail, noise walls, and a small switching station equipment box. Although some of the trees along the southern edge of the rail corridor that currently contribute to the vividness of this view will be removed, the overall level of vividness will remain the same because the removal of the trees and the addition of the trail add a new dimension of vividness by opening up the view and creating a feature that will lead the eye into the distance along the rail corridor. The addition of the OCS and noise walls and the removal of some of the tree cover that now screens the bridge structure and transmission tower in the background will lead to a moderate decrease in the intactness of this view. The addition of the linear LRT facilities, trail, noise walls, and equipment box to this view will introduce elements that will contrast with the prevailing landscape pattern, creating a moderate decrease in the existing level of visual unity. The combined effect of these factors on the overall level of visual quality will be moderate. There will be no effects on views from the park or from the historic station because of the thick band of trees that lies between the park and the freight rail corridor. The visual sensitivity of views in this area ranges from moderate for travelers on 36th Street to high for users of Jorvig Park. Given the moderate to high sensitivity of the views and the moderate degree of change to the visual quality, the overall level of visual impact will be moderate.

Viewpoint 11 – Beltline Boulevard at Minnesota Highway 7, Looking South-Southeast Toward the Site of the Beltline Station (Exhibit J-15)

Level of Impact: Low

The Project will require removal of the commercial structure and trees currently located on the east side of Beltline Boulevard and north of the freight rail track and trail. This area will be converted to a landscaped parking lot, which will have an open appearance. The most prominently visible project feature will be the pedestrian bridge that will parallel the north side of the LRT corridor and extend across the view. The Beltline Station will be visible behind the pedestrian bridge structure. The addition of the pedestrian bridge, particularly the section over Beltline Boulevard that is bordered by steel trusses, will add a human-made element that will somewhat increase the vividness of the view. The Project will remove the commercial building on the east side of the boulevard and add features including the landscaping in the parking area, the pedestrian bridge, and the station that are well designed and contribute to enhanced visual intactness of the view. The Project will greatly improve the visual intactness of the view by removing the visually discordant commercial structure and adding the pedestrian bridge and station structures that will create strong horizontal forms across the view and help to tie the visually disparate element of the existing view together. The impact on the level of visual quality will be low, and the impact on the viewers on Beltline Boulevard, whose level of visual sensitivity is moderate, will be low as well.

Viewpoint 12 – Cedar Lake LRT Regional Trail, View Looking West (Exhibit J-16)

Level of Impact: Substantial

The Project will require shifting the trail farther to the south and removing the existing tree cover located in the area between the existing trail and the freight rail tracks. The view in the area along the north side of the trail will be completely open, providing a close-up view of the light rail tracks and OCS. In addition, the apartment buildings on the north side of the corridor will become more visible. The removal of the line of trees along the trail will eliminate one of the elements important in establishing the current level of vividness. The addition of the close-up views of the light rail tracks and OCS and the increased visibility of the freight rail tracks and nearby multifamily housing will substantially reduce the level of visual intactness. Although there will be a substantial change in the composition of this view, because the major elements of the view will align with each other, they will create a visual composition with a moderate level of visual unity. The change in the degree of visual quality will be high. The users of the Cedar Lake LRT Regional Trail

will have a high level of sensitivity to visual change. When the high degree of change to visual quality is considered in the context of the high level of visual sensitivity, the level of impact will be substantial.

Kenilworth Corridor

This summary of the impacts in this VAU is supported by Exhibits J-18 through J-23, which present existing conditions photographs from each of the viewpoints selected, and simulations that depict the Project conditions. Table J-11 in Appendix J evaluates the anticipated visual changes that will occur in the views from each of the viewpoints. The brief narratives that follow summarize the visual changes and the nature and degree of visual impact on each of the views.

Viewpoint 13 – View from Chowen Avenue South Southwest of the West Lake Station (Exhibit J-18)

Level of Impact: Low

Clearance of trees and other vegetation along the left side of the street will open up the views into the rail/trail/transit corridor. The corridor will have a more developed appearance, with the addition of the light rail alignment, its OCS, and perimeter fences; the addition of the West Lake Station, its waiting platform, OCS, fencing, and surrounding paved circulation area will also contribute to a more developed appearance. The existing pedestrian and bike trails will be shifted closer to the street and will be more visible, especially where the existing street profile will be raised. However, the visual impacts of the Project will be low. The removal of the existing trees along Chowen Avenue South will make the view more expansive, and the West Lake Station will provide a visual focal point, making the view more interesting and memorable. The linear features in the rail/trail/transit corridor will be consistent with each other and with the lines of the street, contributing to the creation of a visually unified composition. This view has a high visual sensitivity because it is seen by the residents of the high-density buildings along Chowen Avenue South and Abbott Avenue. While the Project's visual impacts, described above, will be low, careful design of the Project, consistent with the Visual Quality Guide (Metro Transit, 2015), in this area will still be required based on this high level of visual sensitivity.

Viewpoint 14 – Kenilworth Trail North of West Lake Street, Looking North toward the Site of the South Tunnel Portal (Exhibit J-19)

Level of Impact: Substantial

The rail freight line will be shifted further to the west requiring removal of trees that will partially open up views to apartment buildings that also border the west side of the corridor. The transition of the light tracks from at-grade down into the south tunnel portal will require a trench in the middle of the corridor. The corridor's retaining walls and fencing will dominate views from the trail. Widening the corridor to accommodate the light rail alignment will also require removal of existing trees located along the corridor's eastern edge. Removal of these trees will open up views toward the tall apartment buildings that border the corridor to the east.

Vividness of this view will be reduced, particularly through the removal of existing vegetation that now characterizes this segment of the corridor. The intactness of this view will be reduced by decreases in the tree canopy, which will expose the apartment buildings located adjacent to the corridor, and by addition of a below-grade LRT track defined by retaining walls, fencing, and OCS. The visual unity of the view will be reduced by introduction of the highly contrasting features of the trenched section of the light rail alignment and the exposure of the vertical and bulky forms of the apartment structures that will intrude on the views from the corridor. The level of visual change will be high. This high degree of change, combined with the high level of visual sensitivity of the trail users, will result in a substantial level of impact.

Viewpoint 15 – Kenilworth Trail at the Southern Edge of the Kenilworth Lagoon Crossing (Exhibit J-20)

Level of Impact: Moderate

The existing vegetation that is immediately adjacent to the trail in this area will be removed. The vegetation removal is necessary to accommodate the above ground segment of the light rail alignment as it approaches

the lagoon crossing. The freight rail track will also be shifted to the north. Fencing will be installed on both sides of the bike/pedestrian trail corridor. Reduction in the tree masses, immediately adjacent to the trail and elimination of the existing split rail fencing along the trail will reduce the vividness of the view. There will be a slight reduction in visual intactness and a limited reduction in visual unity. The reduction in the visual quality of this view will be moderate, but the level of visual sensitivity is high. Therefore, the level of visual impact will be moderate.

Viewpoint 16 – View from the Channel Between Cedar Lake and Lake of the Isles, View from the East toward the Kenilworth Corridor Bridges (Exhibit J-21)

Level of Impact: Low

The Project will require demolition of the existing wood trestle bridge that carries the existing freight rail line and the trail across the channel and construction of three new concrete bridges for freight rail, LRT and the trail. The easternmost and most visible of these bridges will be a single arch bridge for the pedestrian and bike trail. The other two bridges will be hidden behind the pedestrian bridge, except for the concrete supporting piers located in the middle of the channel for the freight bridge. There will be little change to the vegetation, the primary element contributing to the vividness of the view. Although visually quite different from the existing bridge, the new bridges will be neutral in terms of their contribution to vividness. As a consequence, the level of vividness will remain the same. The intactness of the view will be reduced by replacement of the wood trestle bridges with the concrete bridges that will have the mass, light color, and curving form to provide a higher level of contrast with the setting. The increased clearance and openness under the bridges will create a visual connection between the segments of the lagoon north/south of the new bridges. However, the overall unity of the view will be reduced slightly by the mass and curved lines of the bridge for the trail crossing. The overall degree of change to the visual quality of the view will be low. Because of the recreational activity in the channel, this view is visually sensitive. However, because the potential degree of change to visual quality will be low, the potential visual impact will be low.

Viewpoint 17 – View from the Burnham Road Bridge Looking Southeast down the Channel toward the Kenilworth Corridor Bridges (Exhibit J-22)

Level of Impact: Substantial

As noted above, the existing wood trestle bridge will be replaced by three new concrete bridges. Construction of these bridges will require noticeable clearing of trees and other vegetation on the west side of the right-of-way. The vividness of this view will be decreased somewhat by the removal of vegetation in the area along the channel at the right-of-way and the replacement of the rustic-appearing wooden trestle bridge with a less distinctive structure. The cleared areas along the right-of-way, and the heavy forms and light color of the new concrete bridges, as well as the catenaries, will contrast substantially with the setting, reducing the level of visual intactness. The visual unity of this view will be reduced by the break created in the formerly continuous tree cover along the channel, and the addition of the three concrete bridges will create a strong vertical form across the view and interfere with views down the channel. The overall degree of visual change will be high. This high degree of change, combined with the high level of visual sensitivity of residents within the surrounding residential area who use the bridge, will result in an overall level of impact that is substantial.

Viewpoint 18 – View Toward the Kenilworth Corridor Crossing of West 21st Street (Exhibit J-23)

Level of Impact: Low

Development of the proposed light rail alignment and 21st Street Station will have a limited impact on this view. The associated station and support facilities will be hidden behind the thick band of trees between the Kenilworth Corridor and West 22nd Street, which is visible at the left side of the view. The light rail tracks will be at-grade; from this vantage point, where they can be seen crossing 21st Street, they will appear to be generally similar to the existing freight trail. Some limited removal and thinning of the vegetation on the left side of the view will partially expand the view.

Removal of trees on the left side of the view will slightly decrease the vividness of the view. However, the addition of the street trees, the widened sidewalk, and the plantings depicted in the simulation in the area along the tracks will make a positive contribution. Therefore, the level of vividness will remain the same. The level of intactness of the view will also remain approximately the same. Visual unity will increase slightly because the light rail facilities will be consistent with the alignment of the existing trail and freight rail tracks, and the removal of the utility pole and the addition of the sidewalks along the west side of 21st Street will enhance the composition of the view. The visual impact of the Project will be a slight improvement in the quality of the view. Because this view is seen by the occupants of homes in the nearby residential areas and those using the trail, the level of visual sensitivity is high. Although the sensitivity of the viewers in this area is high, because the degree of change to visual quality will be low, the level of visual impact will be low.

Minneapolis Downtown Fringe

This summary of the impacts in this VAU is supported by Exhibit J-25, which presents the existing conditions photograph from the only analysis viewpoint in this area selected, and a simulation that depicts the Project conditions. Table J-12 in Appendix J evaluates the anticipated visual changes that will occur in the view from this viewpoint. The brief narrative that follows summarizes the visual changes and the nature and degree of visual impact on each of the views.

Viewpoint 19 – Royalston Avenue North at Holden Street North, View Looking North Toward the Site of the Proposed Royalston Station (Exhibit J-25)

Level of Impact: Low

Development of the light rail alignment will remove the current northbound street lanes, the street center, and the large trees within it. The light rail tracks, perimeter fencing, and OCS will be visually prominent in the foreground of the view. In addition, the station will be readily visible. There will be little change in vividness. The street center and trees that provide moderately vivid elements of the existing view will be removed, but this loss will be compensated for by the station, which will become the focal point. The level of visual intactness will be similar to existing conditions. The tall utility poles currently within the view will be removed, but the OCS will appear as new intrusive elements in the view. The visual unity will be increased based on implementation of the light rail features, and these new features will add a system of visually connected components to the view that will lead to an increase in the level of visual unity. In this view, development of the light rail alignment will create a slight improvement in the view's degree of visual quality. Because the degree of change to visual quality will be low, the level of visual impact will low.

3.7.3.2 Long-term Indirect Visual Quality and Aesthetic Impacts

Some indirect visual impacts are possible in the long-term, because the improved accessibility of the areas around the stations will create potential opportunities for new development, including higher residential densities and, in some cases, new or expanded commercial activities. In areas where this occurs, the built environment is likely to appear more intensively developed and possibly more urbanized in character than what exists at present. The extent to which this development will have visual effects will depend upon the effectiveness of planning, development control, and urban design policies and regulations of the communities in which the development takes place.

3.7.3.3 Short-term Visual Quality and Aesthetic Impacts

In each of the VAU, the potential short-term impacts that will occur on the viewpoints evaluated while constructing the Project will be associated with construction staging areas; concrete and form installation; lights and glare from construction areas; and dust and debris.

3.7.4 Mitigation Measures

This section describes the measures the Council will implement to mitigate the Project's long-term and short-term visual quality and aesthetic impacts.

This analysis determined that of the 19 views evaluated, substantial visual impacts will occur in six of the views, moderate impacts will occur in six of the views, and low visual impacts will occur in seven of the

views. To reduce the substantial and moderate visual impacts to levels that are less than substantial, mitigation measures will be incorporated into the Project.

3.7.4.1 Long-term Mitigation Measures (Substantial and Moderate Impacts)

Impact. Introduction of light rail structures including overhead features, retaining walls, tunnel portals, and noise walls and increased level of development.

Mitigation. Council has prepared design guidelines for key structures throughout the proposed light rail alignment, focusing on bridges and retaining walls. Those guidelines are included within the *Visual Quality Guidelines for Key Structures* (Council, 2015 – refer to Appendix C to access the Guidelines). These guidelines were developed by the Council, reflecting various coordinating efforts with affected local jurisdictions. The guidelines have been used by the Council in the advancement of the Project's design and development of final design plans. The guidelines have and will help to ensure a consistent aesthetic element for key structures throughout the proposed light rail alignment, while allowing for some flexibility in wall treatments. The guidelines include the following design elements for key structures:

- Universal parameters for structures aesthetic elements
- Utilization of special treatments/aesthetic finishes
- Uniform pier and abutment pilaster forms
- Open concept pedestrian underpasses

Some structures that are a part of other relatively large facilities have been designed to reflect the context of these other large facilities to allow for continuity of design with these facilities. These exceptions to the guidelines where context sensitive designs have and will be prepared include the proposed light rail structures over Highway 212, I-394 and Highway 100, as well as individual retaining wall and bridge designs at 5th Avenue South and 7th Avenue South, Hopkins.

Impact. Removal of existing vegetation and introduction of built features

Mitigation. Design and implement landscaping into the Project design at appropriate locations to address identified visual impacts, within available landscape budget and balancing other priorities for landscaping (e.g., surface water quality, habitat preservation, species of concern), which could include the following:

- Retain as much of existing vegetation as appropriate to provide shielding for sensitive viewpoints, including techniques such as chaining and mowing without removal of the root systems, and/or tying back large shrubs and trees to provide adequate areas for construction activities.
- Restore and replant cleared areas in a timely manner, where appropriate, considering such factors as species type, seasonal growing conditions, and other construction-related activities.
- Place new and replacement trees based on such factors as helping to provide the maximum screening of views to and from sensitive viewpoints (e.g., adjacent residential areas) or providing street ornamentation, where appropriate.
- Develop landscape plans for areas adjacent to elevated structures, retaining walls, noise walls, and TPSS sites[30] to achieve such effects as providing partial screening from sensitive viewpoints.
- Incorporate visual mitigation measures for Section 106-protected resources and Section 4(f)-protected properties as specified in the Section 106 Memorandum of Agreement and the Final Section 4(f) Evaluation, respectively (see Appendix H and Appendix I, respectively).

[30] A traction power substation (TPSS) is an electrical substation that converts electric power from the form provided by the electrical power industry for public utility service to an appropriate voltage, current type, and frequency to supply railways, trams (streetcars), or trolleybuses with traction current.

3.7.4.2 Short-term Mitigation Measures

Impact. Temporary introduction of construction activities, including staging and storage areas, and temporary removal of vegetation and trees.

Mitigation. The design guidelines prepared by the Council also include provisions for mitigation of the short-term impacts associated with the Project's construction phase. Measures to address short-term construction impacts include the following, where appropriate and practical:

- Locate staging areas in places where their visibility will be minimal and, to the extent required, provide temporary visual screening to limit views into them from nearby residential areas, trails, streets, or other places from which they will be seen by visually sensitive viewers.
- Use construction methods that minimize the need to remove vegetation to accommodate construction activities.
- Minimize and shield lighting needed for staging areas or for nighttime construction activities.
- Restore areas disturbed during construction.

3.8 Geology and Groundwater Resources

This section describes long-term direct and indirect effects and short-term (construction) direct and indirect effects of the Project on geology and groundwater conditions (see Sections 3.17 for cumulative impacts). This section includes an overview of the regulatory context and methodology used for the analysis; a description of existing soils, bedrock geology, groundwater resources, the sensitivity of groundwater to pollution, and potable water supply conditions; anticipated environmental consequences related to geology and groundwater; and a description of mitigation measures to implement with the Project.

3.8.1 Regulatory Context and Methodology

This section includes a summary of relevant laws and regulations and an overview of the methodology FTA and the Council used to evaluate geology and groundwater resources within the Project's limits of disturbance.

In Minnesota, geologic resources are rarely regulated, aside from groundwater pumping. The Minnesota Department of Natural Resources (MnDNR) requires a permit to pump groundwater in excess of 1.0 million gallons per year or 10,000 gallons per day. A National Pollutant Discharge Elimination System (NPDES) permit regulates the discharge from groundwater pumping and is required for construction activities. If the pumped groundwater is contaminated, an individual NPDES permit from the Minnesota Pollution Control Agency (MPCA) is required or the groundwater can be discharged to the sanitary sewer system, if approved by Metropolitan Council Environmental Services.

Wellhead protection is a way to prevent groundwater used as drinking water from becoming polluted by managing potential sources of contamination that could adversely affect groundwater quality. The cities of Eden Prairie, Minnetonka, Hopkins, and St. Louis Park have completed the second part of their respective Wellhead Protection Plan (WHPP), in accordance with Minnesota Rules Chapter 4720.5200. The purpose of the WHPP is to assure that the water supply for the cities is adequately protected through existing and new land use ordinances, in association with Hennepin County oversight. The WHPP includes the Wellhead Protection Area and the Drinking Water Supply Management Area.[31] The location of the Drinking Water Supply Management Areas and Wellhead Protection Areas along the LRT alignment are shown in

[31] A Wellhead Protection Area is the recharge area to a public well and is the area managed by the public water supplier, as identified in the Wellhead Protection Plan, to prevent contaminants from entering public wells. A Drinking Water Supply Management Area is the Minnesota Department of Health (MDH)-approved surface and subsurface area surrounding a public water supply well that contains the entire scientifically calculated Wellhead Protection Area and is managed by the entity identified in a Wellhead Protection Plan. The boundaries of Drinking Water Supply Management Areas are delineated by identifiable physical features, landmarks, or political and administrative boundaries.

Exhibit 3.8-1. The City of Minneapolis has a Source Water Protection Plan, which addresses data elements and their assessments; impacts of changes on the public water supply; issues, problems, and opportunities; source water protection goals, objectives, and action plans; program evaluation; and an alternative water supply/contingency strategy. Before beginning construction of the Project, the Council will coordinate with the host cities to confirm that constructing and operating the Project will meet the provisions of the individual WHPPs and the Source Water Protection Plan.

The Council reviewed published maps, professional publications, and reports pertaining to the local geology and geological hazards (e.g., karst[32] formations, near-surface bedrock), soils, and groundwater in the project vicinity to describe existing conditions and the project's potential impacts. The information reviewed includes United States Geological Survey (USGS) geologic maps; Natural Resources Conservation Service (NRCS) soils maps, the *Geologic Atlas of Hennepin County* (Minnesota Geological Survey, 1989), and the County Well Index (Minnesota Department of Health [MDH, 2007). See Appendix D for a list of referenced documents.

In addition to the literature search, the Council conducted soil and groundwater investigations to obtain more-specific data along the proposed Project limits of disturbance. The reports documenting the findings of the Council's field investigations are located in *Southwest LRT Project Geology and Groundwater Evaluation Supporting Documentation* (see Appendix C for instructions on how to access supporting documentation).

3.8.2 Affected Environment

This section describes the existing geology and groundwater resources within the Project's limits of disturbance. Geology and groundwater conditions are important considerations to the Southwest LRT Project because they can affect construction methods used for the Project.

3.8.2.1 Geology

The following sections describe existing soils and bedrock geology within the Project's limits of disturbance.

A. Soils

For the purposes of this section, all material between the ground surface and the top of bedrock is referred to as soil. Nearest the ground surface is a layer of topsoil. Between the topsoil and bedrock are layers of material including sand and silt, clay and mineral deposits, and finally slightly broken up bedrock. There is less organic material in the material closest to bedrock than in topsoil.

Along the Project's limits of disturbance, the depth of the soil zone varies notably. Based on information obtained from soil borings, surface soil depths generally vary between four to 20 feet, but some borings have surface soil depths to about 50 feet. Soil in portions of the Project's limits of disturbance in the railroad corridor and urban areas contain debris, organic soils, roots, and ashes/cinders.

Exhibit 3.8-2 illustrates the location of various sediment deposits beneath the topsoil zone along the proposed light rail alignment. Plate 3, Surficial Geology, from the *Geologic Survey of Hennepin County* (Minnesota Geological Survey, 1989), includes a description of deposits listed in Exhibit 3.8-2, and several cross sections showing the variability of soil layers beneath the surficial soils shown in Exhibit 3.8-2.

This section first describes the soil condition in the corridor that tend to accommodate construction of facilities included within the Project (coarse-grained soils), followed by a discussion of compressible soils that may require remediation to accommodate construction of elements of the Project (e.g., soil removal and replacement, deep foundations).

Coarse-Grained Soils

Most of the geology and groundwater study area is made up of coarse-grained soils. Coarse-grained soils are made up of silts, sands, and gravels. These soils are typically resistant to settlement and would provide good

[32] Karst is a geological formation that results from portions of a layer or layers of soluble bedrock being dissolved by water. The dissolution of rock can lead to features such as caves, sinkholes, and springs.

EXHIBIT 3.8-1
Drinking Water Supply Management Areas, Wellhead Protection Areas, and Known Private Wells

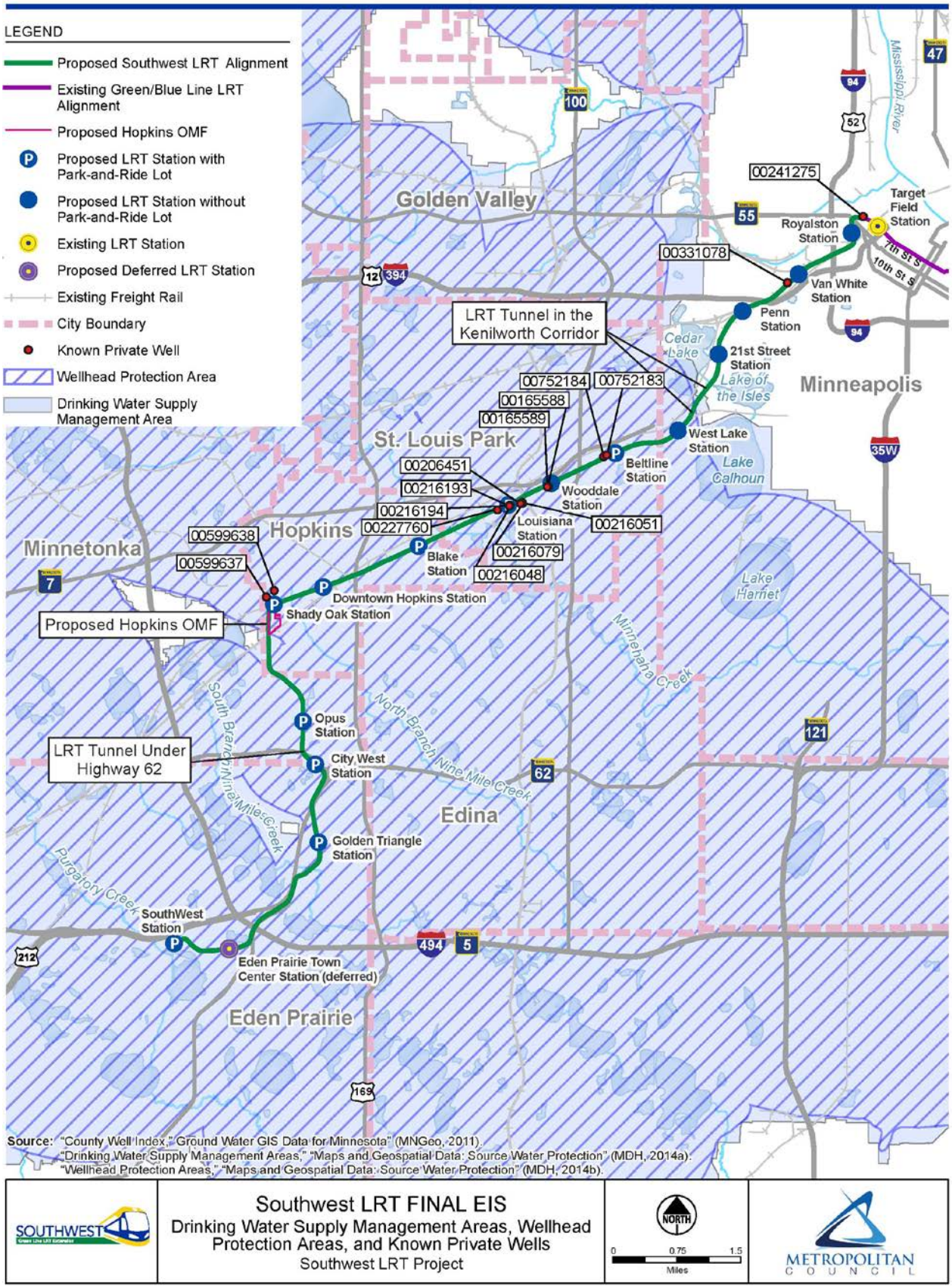
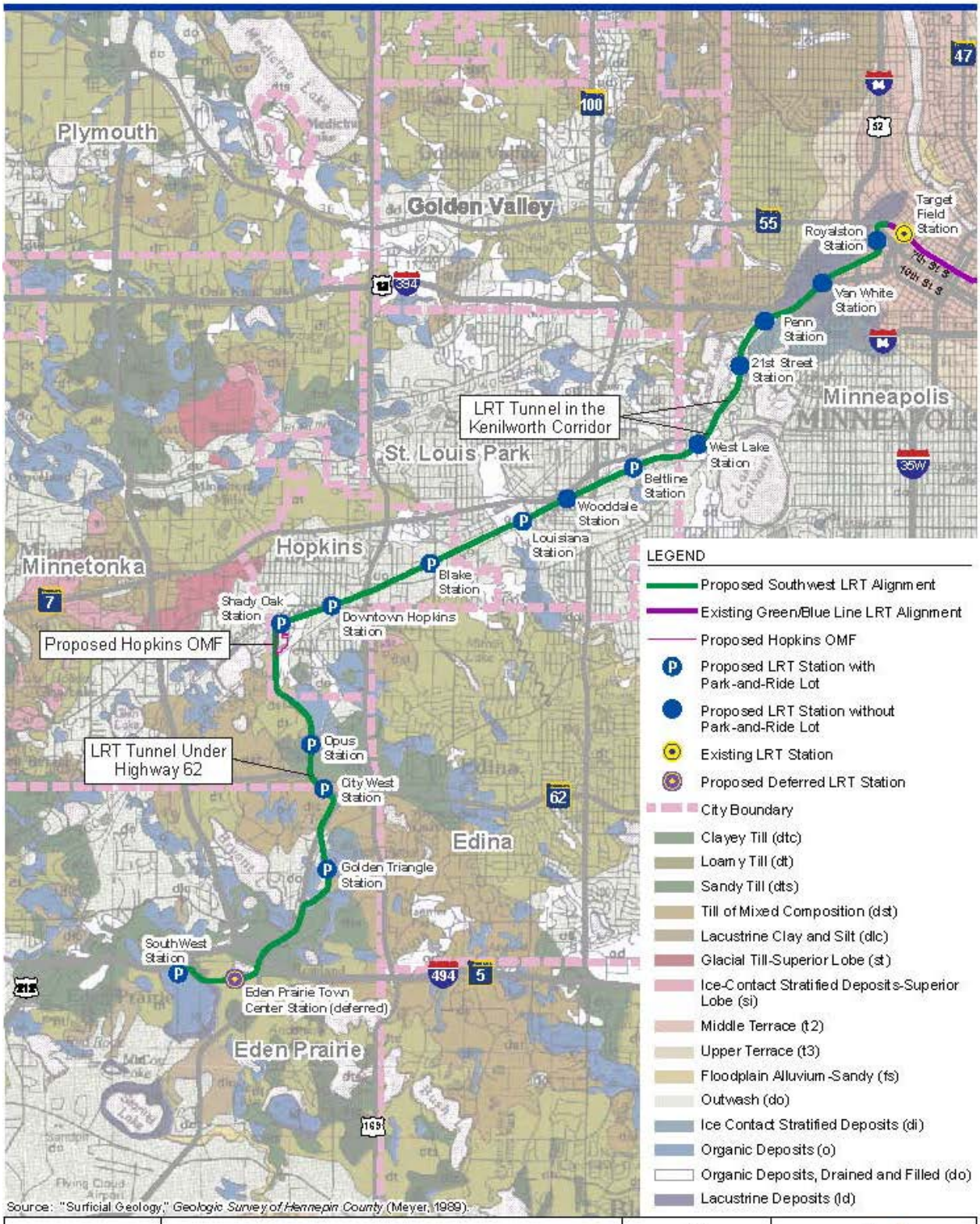


EXHIBIT 3.8-2
Soil Geology



bearing support for light rail structures, including stations and track sections. Exhibit 3.8-2 illustrates the location of various sediment deposits beneath the topsoil zone along the proposed light rail alignment.

Compressible Soils

The organic deposits within the limits of disturbance show compressibility, which is the degree to which a soil mass decreases in volume when supporting a load. Peat, organic silts, and fat clays are examples of soils that exhibit a high degree of compressibility. These soils are referred to as compressible soils. From a construction standpoint, the problem with compressible soils is that they settle unevenly under the weight of heavy features, such as LRT stations and parking structures. The uneven settling and depth of settling can exceed tolerances that buildings such as LRT stations and parking structures and surface parking areas can bear and potentially create structural problems. For construction associated with the Project, it is expected that areas of compressible soils will require remediation, such as soil replacement and/or pile foundations. Exhibit 3.8-3 illustrates only the compressible soils. The soils located along the proposed light rail alignment in Exhibit 3.8-3 that are not categorized as "compressible soils" are generally considered to be coarse-grained soils. Soil investigations conducted by the Council generally confirmed the locations of compressible soils identified in the *Geologic Atlas of Hennepin County* (Minnesota Geological Survey, 1989). *Southwest LRT Project Geology and Groundwater Evaluation Supporting Documentation* contains the soil investigation reports (see Appendix C for instructions on how to access supporting documentation).

B. Bedrock

Bedrock is a deposit of consolidated rock that is typically buried beneath soil and other broken or unconsolidated material and it often serves as the parent material (the source of rock and mineral fragments) for subsoil and topsoil. Bedrock's function as a groundwater-bearing unit is discussed in Section 3.8.2.2 "Potable Water Supply."

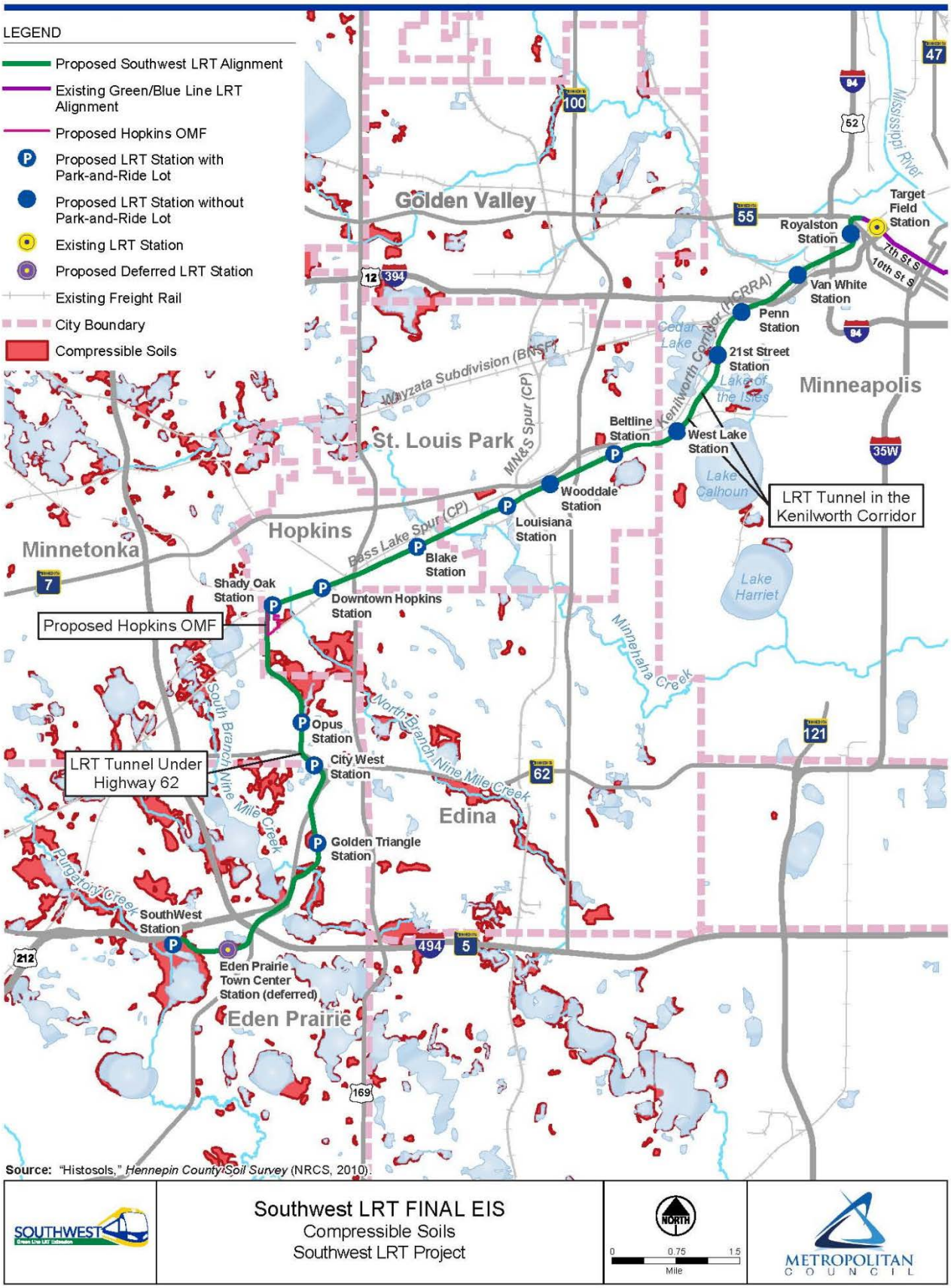
The uppermost bedrock along the proposed light rail alignment consists of (from youngest to oldest) the Platteville (limestone) and Glenwood (shale) formations, St. Peter Sandstone (sandstone), and Prairie du Chien Group (dolostone). According to the Minnesota Pollution Control Agency's publication *Groundwater Investigations in Karst Areas* (Guidance Document 4-09), a large area of southeastern Minnesota, including the area surrounding the light rail alignment, is underlain by soluble carbonate bedrock of the Prairie du Chien Group and stratigraphically higher carbonate formations. This area is subject to karst processes. Exhibit 3.8-4 illustrates the uppermost bedrock units along the proposed light rail alignment (Olsen, 1989).

3.8.2.2 Groundwater Resources

The water table is the boundary below which geologic materials are completely saturated with groundwater. The interval between the land surface and the water table is called the unsaturated zone. The depth from the surface to the water table depends on a variety of factors, including the elevation of nearby surface water features, the permeability of the geologic materials (a quality that allows fluids to flow through it), and surface topography.

The soil investigations the Council conducted included measurements of groundwater elevation. In general, the distance of groundwater from the surface within the Project's limits of disturbance west of the OMF is more variable than east of the OMF. West of the OMF, groundwater was generally observed 5 to 40 feet from the surface; however, in some cases groundwater was observed 60 to 75 feet from the surface or not observed. At the OMF, groundwater was observed 2 to 14 feet from the surface. Between the OMF and West Lake Station, groundwater was observed 4 to 32 feet from the surface. Within the Kenilworth Corridor (approximately between West Lake Station and Penn Station), groundwater was generally observed 15 to 25 feet from the surface, with some areas near West Lake Street Station where groundwater was observed approximately 10 feet from the surface. More detailed information about groundwater elevations can be found in *Southwest LRT Project Geology and Groundwater Evaluation Supporting Documentation* (see Appendix C for instructions on how to access supporting documentation) and in Burns and McDonnell, 2014 (Appendix D).

EXHIBIT 3.8-3
Compressible Soils



Source: "Histosols," *Hennepin County Soil Survey* (NRCS, 2010).

Southwest LRT FINAL EIS
Compressible Soils
Southwest LRT Project

NORTH
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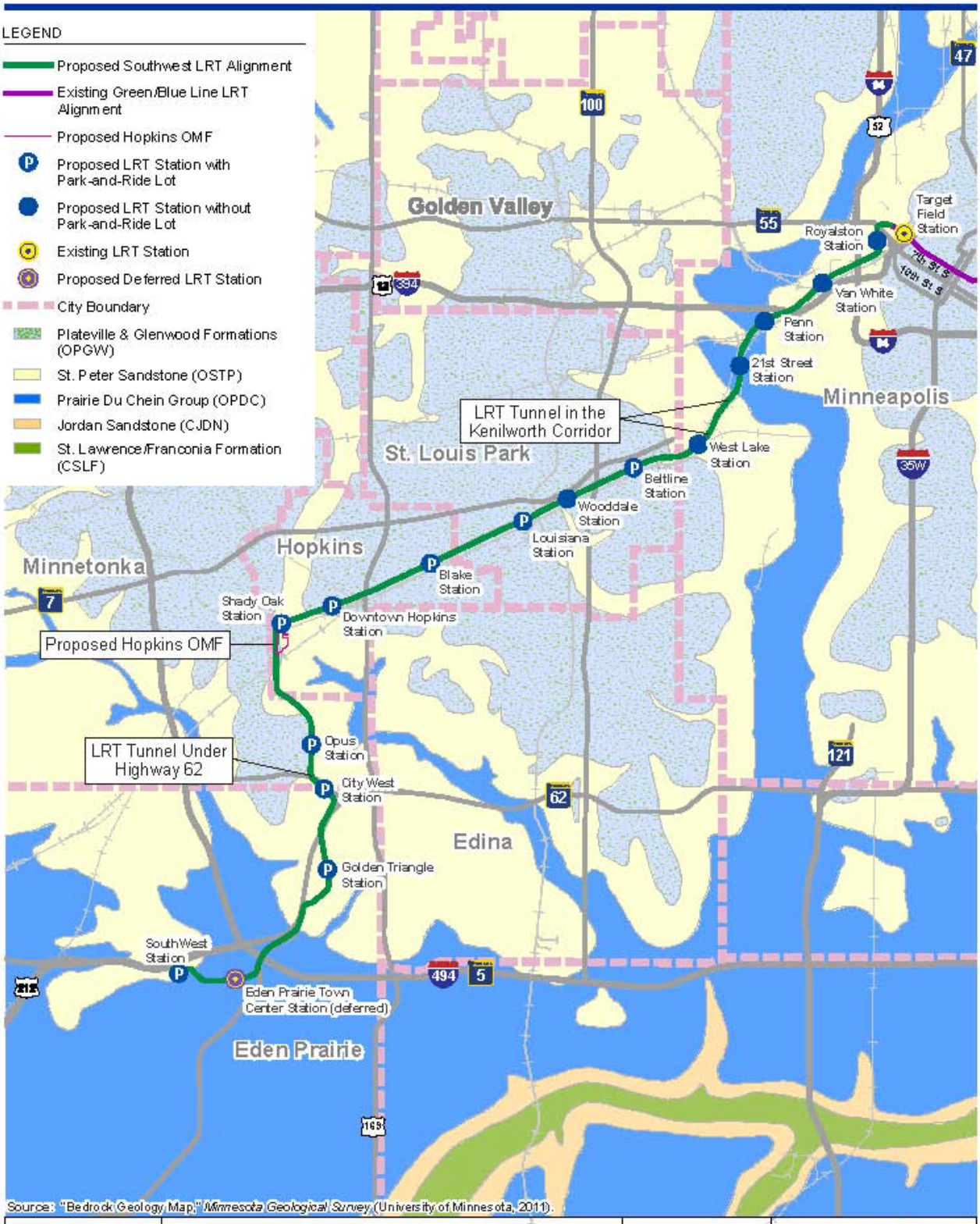
Mile

METROPOLITAN COUNCIL

EXHIBIT 3.8-4
Bedrock Geology



Additionally, within the Kenilworth Corridor Cedar Lake and Lake of the Isles are connected by the Kenilworth Lagoon. Prior to construction of the lagoon in the early 1900s, the water level in Cedar Lake was several feet higher than in Lake of the Isles, causing an eastward groundwater flow from Cedar Lake east toward Lake of the Isles. Construction of the lagoon allowed stabilization of water levels in the two lakes to a common level, and the groundwater gradient between the two lakes was minimized or eliminated. The *Kenilworth Shallow LRT Tunnels Water Resources Evaluation* (Burns and McDonnell, 2014) noted that the lagoon may be feeding the groundwater aquifer rather than the aquifer feeding the lagoon.

The remainder of this section addresses the sensitivity of groundwater to surface and sub-surface pollutants.

A. Groundwater Sensitivity

The sensitivity of an aquifer to surface pollutants is based on the degree of protection provided by geologic materials overlying it. This is dependent on the vertical travel time required for a waterborne contaminant release at or near the land surface to enter the groundwater. Vertical travel time is primarily controlled by the permeability of the sediments and their thickness. This subsection discusses the sensitivity to pollution of the water table system, the uppermost groundwater resource that is not used as a source of drinking water. Information about the sensitivity to pollution of the Drinking Water Supply Management Areas, which draw from the Prairie du Chien-Jordan aquifer, the most heavily used source of groundwater in Hennepin County, is found in the following subsection.

Exhibit 3.8-5 illustrates zones of high or very high sensitivity to pollution of the water table (shallow groundwater) along the proposed light rail alignment and related facilities (*Geologic Atlas of Hennepin County,* Piegat [1989]). The legend of the exhibit defines zones of sensitivity. See Section 3.14 for information on hazardous and contaminated materials.

B. Potable Water Supply

Shallow groundwater in the unconsolidated geologic materials below the topsoil zone is not used as a source of potable (drinking) water by municipalities along the proposed light rail alignment. Groundwater found in the deeper bedrock aquifers beneath the unconsolidated sediments and the Mississippi River are used as sources of potable water by municipalities along the proposed light rail alignment. Not all properties within Eden Prairie use municipal drinking water; some are served by private wells. These wells are outside of the Project's limits of disturbance.

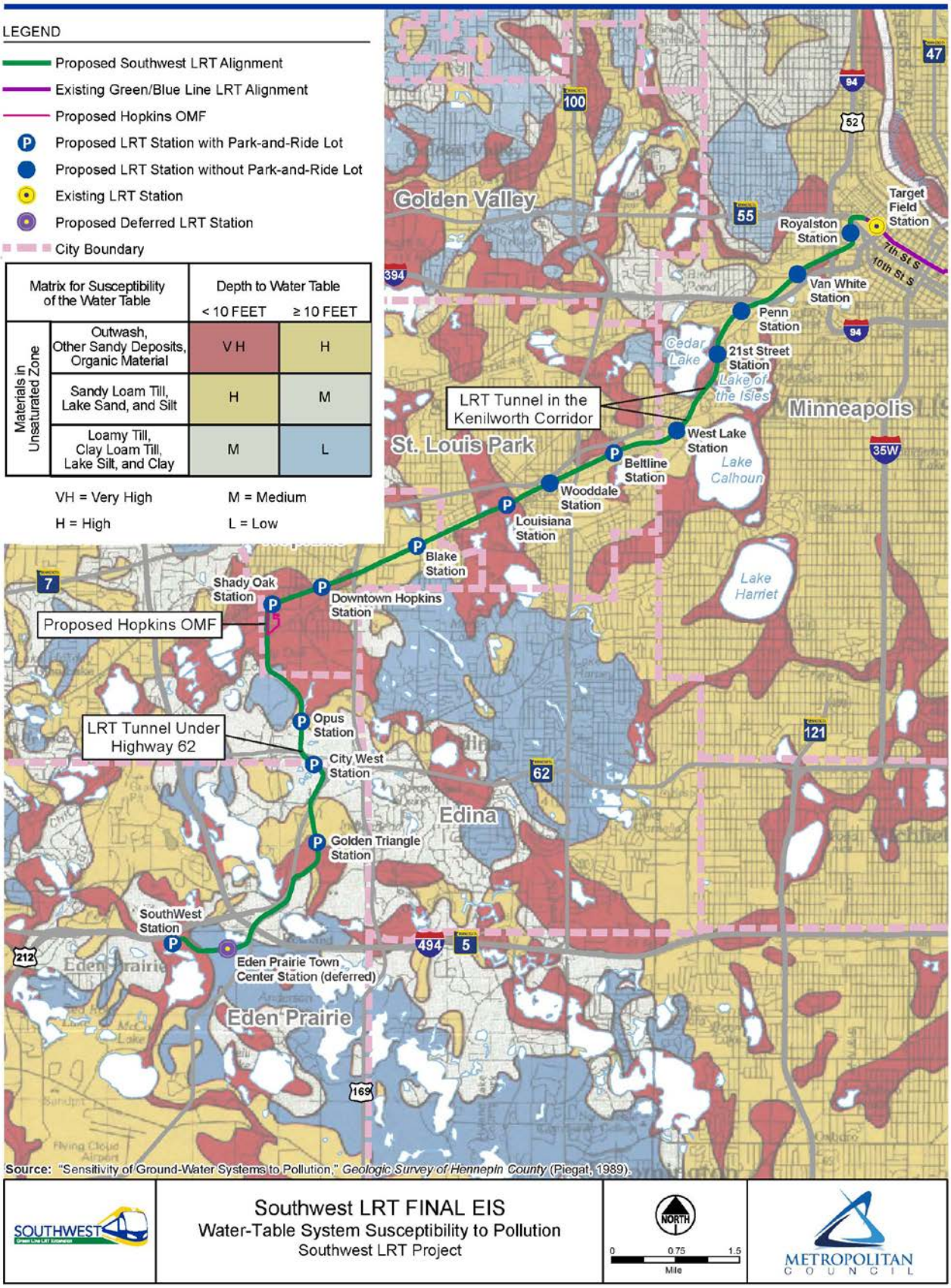
Municipal wells along the proposed light rail alignment draw from one or more of the following aquifers: Prairie du Chien-Jordan, Mt. Simon, Jordan-St. Lawrence, and St. Peters aquifers. The Mississippi River is the sole source of water supply for Minneapolis. [33] According to information provided by the Council, there are no public water supply wells within the Project's limits of disturbance. Fifteen private wells[34] are located within the limits of disturbance. Exhibit 3.8-1 illustrates the locations of private wells within the limits of disturbance. The uses for the private wells are monitoring, industrial, domestic, test, air conditioning, and scientific research. Exhibit 3.8-1 also illustrates Drinking Water Supply Management Areas, as well as Wellhead Protection Areas.[35] Exhibit 3.8-6 illustrates Drinking Water Supply Management Area vulnerability to pollution.

[33] Additional information regarding municipal drinking water can be found at the following sites: Eden Prairie (http://www.edenprairie.org/community/living-green/groundwater-and-drinking-water/drinking-water-faq), Minnetonka (http://eminnetonka.com/documents/utilitydocs/tap-water-quality-report-2013.pdf), Hopkins (http://www.hopkinsmn.com/services/water/pdf/water-quality2014.pdf), St. Louis Park (http://www.stlouispark.org/webfiles/file/public-works/2014_water_report_final.pdf), and Minneapolis (http://www.minneapolismn.gov/publicworks/water/water_waterfacts).

[34] Private wells are those that do not supply the public water system.

[35] The location of wells that supply public water systems cannot be mapped as per the Homeland Security Act of 2002.

EXHIBIT 3.8-5
Water-Table System Susceptibility to Pollution



Source: "Sensitivity of Ground-Water Systems to Pollution," *Geologic Survey of Hennepin County* (Piegat, 1989).

Southwest LRT FINAL EIS
Water-Table System Susceptibility to Pollution
Southwest LRT Project

NORTH
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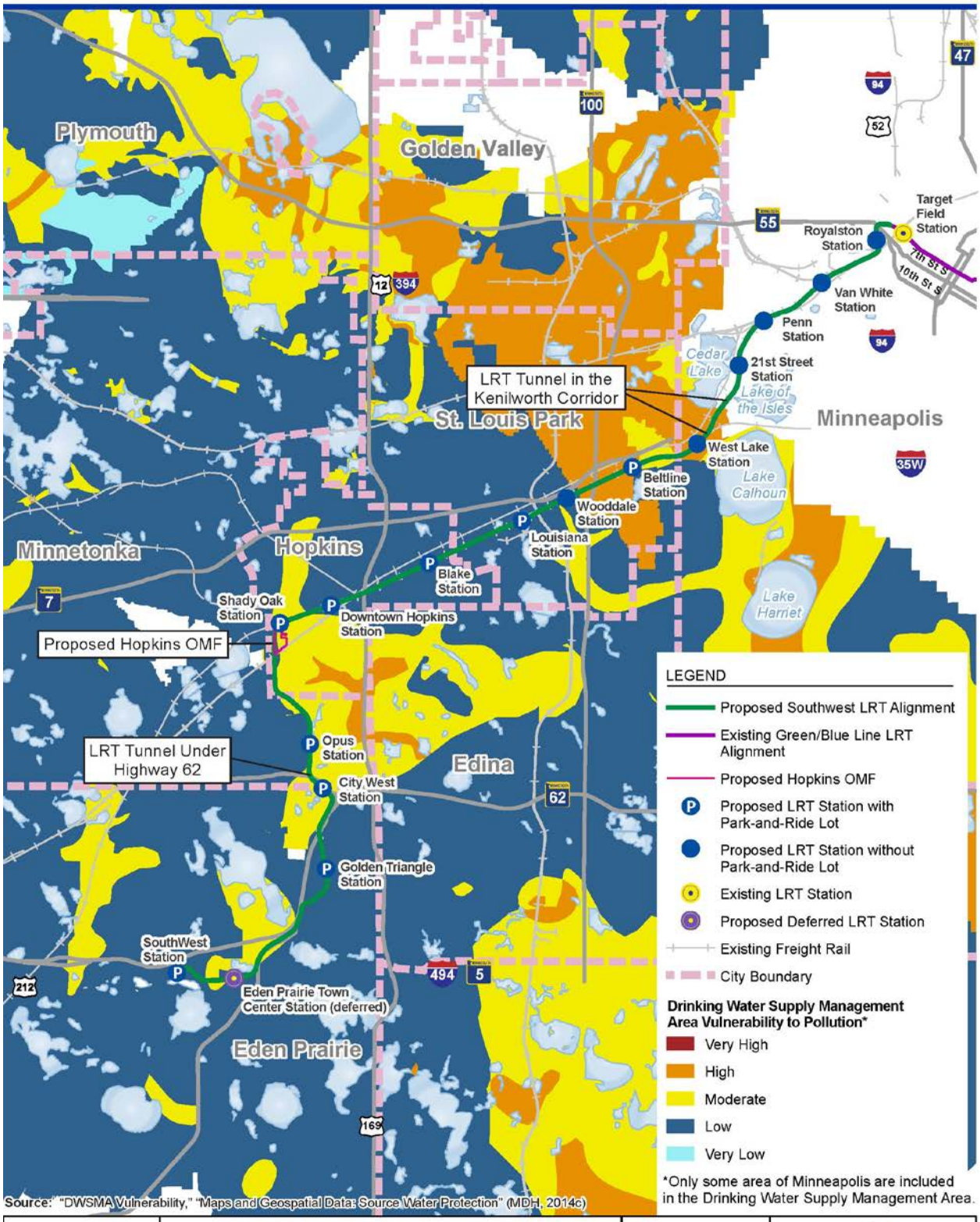
Mile

METROPOLITAN COUNCIL

EXHIBIT 3.8-6
Drinking Water Supply Management Area Vulnerability to Pollution



3.8.3 Environmental Consequences

This section identifies the long-term and short-term direct and indirect impacts on geology and groundwater from the Project.

3.8.3.1 Geology

A. Long-term Direct Impacts on Geology

Long-term direct geology impacts are organized into four categories: (1) uneven ground settlement; and (2) tunnels and underpasses, (3) engineered cut-and-fill locations, and (4) bedrock and karst.

- **Uneven Ground Settlement.** Soil and groundwater investigations conducted after the approval of the Draft EIS found that, in general, glacial soils are common along the proposed light rail alignment. These soils are coarse-grained and typically resistant to settlement during construction and operation, and will provide good bearing support for the proposed stations and track. Glacial soil will allow normal construction methods to build foundations for elevated light rail structures. Foundations for elevated guide ways and stations could include either driven piles or drilled shafts. Both foundation types perform well in glacial soil.

  Throughout the proposed light rail alignment, there are areas of compressible soils, which are illustrated in Exhibit 3.8-2. Areas of compressible soils along the Project will be addressed with appropriate design and construction techniques to avoid the potential for uneven ground settlement and bearing failure of the building foundations for the light rail alignment, stations, structures, and surface parking lots/parking structures. Methods of addressing soft soils include removing the soft soils and replacing them with suitable fill, deep foundations, driven piles, drilled shaft-supported foundations, or lightweight fill. The Council will continue to evaluate compressible soils during the Engineering phase and will obtain additional soil data where necessary to assist in making the decision about where to excavate and replace soft soils. Compressible soils excavated during construction that are not contaminated will either be used as non-structural fill at other locations along the Project or placed in an upland location outside the Project. No soils will be placed in floodplains or wetlands unless permitted.

- **Tunnels and Underpasses.** The Project includes two proposed cut-and-cover light rail tunnels: (1) located under Highway 62 in Eden Prairie and Minnetonka, and (2) in the Kenilworth Corridor in Minneapolis (illustrated on Exhibit 3.8-1 and Appendix E and described in Section 2.1.1). As compared to the saturated and unsaturated soil that will be removed from the tunneled zones, both the proposed cut-and-cover tunnels will be relatively light in weight, resulting in little, if any change in load. Therefore, settlement of the non-organic soils (sand, silt, gravel) in the area of the tunnels will likely be negligible and will not affect other structures located in the vicinity of the tunnel, such as roadways, utilities, freight rail tracks, and nearby buildings.

  The Project will also include six proposed bicycle and pedestrian underpasses that will require excavation (illustrated in Appendix E). Because of the soils that will surround the proposed underpasses and the design measures that consider soil quality, it is not expected that poor soils will create a problem at the underpasses during or after construction.

- **Engineered Cut-and-Fill Locations.** To maintain a suitable grade for LRT operations, the topography along the proposed light rail alignment will be modified through cutting (excavating soil to decrease elevation) and filling (adding soil to increase elevation). Cutting and filling will occur within the Project's groundwater and geology study area. The proposed light rail alignment in the eastern portion of the Project is largely on an existing freight rail right-of-way, which is already at or near a suitable grade for light rail operations. Therefore, little cutting or filling will be needed. The proposed cut locations along the proposed light rail alignment are summarized and illustrated in various reports located in *Southwest LRT Project Geology and Groundwater Evaluation Supporting Documentation* (see Appendix C for instructions on how to access supporting documentation).

- **Bedrock and Karst.** Of the borings the Council performed, two encountered bedrock at 84 feet and 96 feet. In addition, the borings did not encounter karst conditions during the field investigation. Therefore, no direct impacts on bedrock geology are expected.

B. Long-term Indirect Impacts on Geology

Section 3.1.3.1.B notes that light rail lines can advance the timing and increase the intensity of development, within the limits allowed by local comprehensive plans, particularly surrounding proposed station areas. If new development occurs within the proposed station areas, no indirect impacts to soil or bedrock are expected because of the existing disturbed soils underlying these areas.

C. Short-term Impacts on Geology

For construction activities at- or above-grade, sub-soil will be exposed during construction when topsoil is removed. This soil will be susceptible to surface-water and wind erosion. Wildlife-friendly BMPs will be used to avoid the potential effects of soil erosion. The Council will develop a stormwater pollution prevention plan (SWPPP) as a part of the permitting process. The plan will identify BMPs for reducing discharges of pollutants, including sediment from erosion.

3.8.3.2 Groundwater Resources

A. Long-term Direct Impacts on Groundwater Resources

Long-term direct groundwater resource impacts are organized into three categories: (1) groundwater flow/groundwater level impacts, (2) groundwater quality impacts, and (3) drinking water supply impacts.

- **Groundwater Flow/Groundwater Level Impacts.** The proposed Project is expected to encounter perched groundwater[36] and areas of high groundwater (saturated soils). Foundations for Project's light rail stations and park-and-ride facilities, or cut-and-fill features (e.g., tunnels and underpasses) will result in relatively minor localized changes in groundwater flow. In areas where the Project could prevent the movement of shallow groundwater, drainage features such as French drains will be installed to allow normal groundwater flow and prevent ponding.

  Within the Kenilworth Corridor, groundwater modeling studies to evaluate the impacts of the Kenilworth Tunnel on water levels in the vicinity of the tunnel show that, because of the sandy soil conditions and lack of groundwater flow in the vicinity of the tunnel, groundwater will rise and fall equally around the tunnel. The amount of water that could be collected by the tunnel's internal water control system is expected to be a small percentage of the water budget for the lakes. When the role of precipitation on the broader Kenilworth Corridor area is considered, the amount of water collected by the tunnel's internal water control system will not affect groundwater or lake levels.

  The Project will not adversely affect groundwater flow in the groundwater study area. See *Southwest LRT Project Geology and Groundwater Evaluation Supporting Documentation* (see Appendix C for instructions on how to access supporting documentation) and Burns and McDonnell (2014) for additional information.

- **Groundwater Quality Impacts**. The operation of the light rail system is not expected to affect the quality of shallow groundwater because the trains will be electric, and, generally, there are no activities associated with train operation that generate pollutants. See Section 3.14 for more information on containment of hazardous and contaminated materials at the OMF.

[36] "Perched groundwater" is unconfined groundwater separated from an underlying body of groundwater by an unsaturated zone. Perched groundwater may be either permanent where recharge is frequent enough to maintain a saturated zone above the perching bed or temporary where intermittent recharge is not great or frequent enough to prevent the perched water from disappearing from time to time as a result of drainage over the edge or through the perching bed (https://www.revisor.leg.state.mn.us/rules/?id=7060&date=2007).

The two light rail tunnels (under Highway 62 and in Kenilworth Corridor) have been designed to minimize the inflow of groundwater through use of various design features and BMPs (see *Kenilworth Shallow LRT Tunnel Basis of Design Technical Report* located in *Southwest LRT Project Geology and Groundwater Evaluation Supporting Documentation* [see Appendix C for instructions on how to access supporting documentation]). In summary, water collected at the tunnel portals will be routed through pumps, through a pretreatment system that captures debris and sediments and through an underground infiltration chamber, which will allow the water to enter into the groundwater system. If water enters the internal tunnel, it would likely be groundwater entering via small cracks or joints in the concrete walls, floors, and ceilings. In addition, some water could enter the internal tunnel by light rail trains (e.g., dripping, melting ice). Water collected in the tunnel will be treated, if required, and pumped to the adjacent sanitary sewer systems owned by either the City of Minneapolis or Metropolitan Council Environmental Services.

- **Drinking Water Supply Impacts**. For similar reasons to those discussed above under "Groundwater Quality Impacts," the Project is not expected to adversely affect the groundwater quality in the aquifers used for public drinking water. The depths of proposed cuts and the piles that will be used in various locations along the proposed light rail alignment will be above the depths of the municipal wells used in Eden Prairie, Minnetonka, Hopkins, and St. Louis Park.

B. Long-term Indirect Impacts on Groundwater Resources

Long-term indirect impacts may occur as commercial, transportation, and industrial activities in the Project's vicinity increase, potentially resulting in long-term groundwater impacts. Activities associated with future development will be held to regulatory standards and requirements no less stringent than those outlined in this Final EIS.

C. Short-term Impacts

Potential short-term shallow groundwater impacts associated with the Project are (1) the potential for groundwater contamination; (2) the potential that structures, roadways, and utilities may settle; and (3) potential for changes to waters of the United States, including wetland hydrology and vegetation (where wetlands are groundwater fed). A brief description of each category of potential short-term impacts follows.

- **The Risk of Groundwater Contamination during Construction**. Because the Project will be constructed with engineering controls to limit and contain releases and spills, the likelihood of soil and groundwater contamination during construction will be minimized. See Section 3.17.14 for additional information on construction impacts related to hazardous and contaminated materials.

  Where temporary groundwater pumping may be needed during construction, the Project will adhere to permit requirements related to groundwater pumping and discharge from groundwater pumping, thereby minimizing the potential of adverse groundwater quality impacts. Coordination with private well owners will occur as part of MnDOT Field Title meetings and subsequent acquisition negotiations if there is an acquisition from a parcel with such a well. Impacts caused by temporary groundwater pumping during construction of the tunnel in the Kenilworth Corridor will be minimized as described in the *Kenilworth Shallow LRT Tunnel Basis of Design Technical Report* located in *Southwest LRT Project Geology and Groundwater Evaluation Supporting Documentation* (see Appendix C for instructions on how to access supporting documentation).

- **The Risk of Settlement because of Groundwater Removal during Construction**. Removing shallow groundwater during construction may increase the risk of soil subsidence, building and utility settlement, and cracks to foundations and pavement. The Council has determined that the risk is very low that groundwater removal during construction will cause buildings to settle. To help minimize that risk, proper BMPs associated with groundwater removal will be employed during construction. Further, Project construction documents will include contractor requirements to address groundwater removal plans.

- **The Risk of Changes to Waters of the United States because of Groundwater Removal during Construction.** Although the Council is considering the use of infiltration ponds as a means of recharging

the shallow aquifer and minimizing impacts on the interaction among groundwater and surface water resources, it is possible that pumped groundwater will be discharged to the storm sewer and sanitary sewer systems. If the discharge points are in the general area where the groundwater is being pumped, groundwater discharged to the storm sewer system has the potential to discharge to project-area streams and the shallow aquifer. Within Minneapolis, groundwater discharged to the sanitary sewer system will be sent to the treatment plant on the Mississippi River, which will not recharge the shallow aquifer.

3.8.4 Mitigation Measures

This section describes the measures the Council will implement to mitigate the Project's long-term and short-term geology and groundwater impacts. For each mitigation measure or set of associated mitigation measures, this section generally notes the anticipated impact or associated impacts that the mitigation measures will address (see Sections 3.8.3.1 and 3.8.3.2 for additional information on the identified geology and groundwater resource impacts, avoidance measures, and BMPs, respectively).

3.8.4.1 Geology

No mitigation measures are warranted for long-term or short-term impacts to geology, because there will be no adverse impacts to geology due to the effectiveness of identified avoidance measures and BMPs.

3.8.4.2 Groundwater Resources

This section describes the measures the Council will implement to mitigate the Project's long-term and short-term groundwater impacts.

A. Long-term Mitigation Measures

Impact. Risk of long-term groundwater contamination.

> ***Mitigation.*** A groundwater management plan will be prepared by the Council, and approved by MnDNR and applicable local jurisdictions before construction. That plan will address collection, storage, and disposal of surface water runoff and pumped groundwater following construction of the Project. In developing the groundwater management plan, the Council will consider MDH's concerns about the placement of stormwater handling facilities in or near wellhead protection areas.[37]
>
> ***Mitigation.*** Particularly within the Kenilworth Corridor, the groundwater management plan will include monitoring, which will be used to assess excessive groundwater infiltration and to prioritize any potential repairs to the waterproofing systems. The Project's plan will be based on an appropriate safety factor, to be determined in consultation with the City of Minneapolis, MCWD and the MnDNR, which will be applied to pumping rates and yearly pumping volumes in calculating maximum inflow amounts.

B. Short-term Mitigation Measures

Impact. Short-term risk of settlement of buildings in the vicinity of construction groundwater pumping.

> ***Mitigation.*** The Council will develop and implement a monitoring plan that provides means for detecting the settlement of buildings, roads, or parking areas, so that additional remediation methods could be employed if necessary.

Impact. Short-term risk of groundwater and drinking water contamination during construction and short-term risk of changes to waters of the United States because of groundwater removal during construction.

> ***Mitigation.*** A groundwater management plan will be prepared by the Council, and approved by MnDNR and applicable local jurisdictions before construction. That plan will include required groundwater monitoring and management practices during construction.

[37] MDH's concerns can be found in its *Source Water Protection Issues Related to Stormwater* memorandum, available at http://www.health.state.mn.us/divs/eh/water/swp/stormissue.pdf.

Mitigation. All water or monitor wells or boreholes the Council installed as part of its soil and groundwater investigations will be sealed and abandoned as required by the MDH regulations. If any previously unidentified wells are encountered during project construction, the contractor will be responsible for notifying the MDH and retaining a licensed well contractor to abandon the well, if necessary.

3.9 Surface Water Resources

This section describes long-term direct and indirect effects and short-term (construction) direct and indirect effects of the Project on surface water resources, which include wetlands, public waters, surface water quality, and floodplains (see Section 3.17 for cumulative impacts). For the purpose of this section, the term "wetland" is used to describe any regulated aquatic resource. This section includes an overview of the regulatory context and methodology used for the analysis; a review of agency coordination activities; a description of existing surface water resources; anticipated environmental consequences related to surface water resources; and a description of mitigation measures to implement with the Project.

3.9.1 Regulatory Context

Federal, state, and local laws protect surface water resources because of ecological and social functions and values. Impacts on wetlands, floodplains, and other water bodies require permitting from various agencies and regulatory bodies. The required permits vary depending on the feature, size of impact, location of impact, and other factors. Table 3.9-1 lists permitting agencies and corresponding regulatory requirements. The table notes whether they apply to wetlands, public waters/surface water, and/or floodplains. The local jurisdictions associated with this Project include cities, watershed districts,[38] and watershed management organizations[39] (WMOs). See Exhibit 3.9-1 for city, watershed districts, and WMO boundaries along the proposed light rail alignment. The remainder of this section includes a summary of relevant laws and executive orders, and the associated federal, state, and local agencies and jurisdictions that have regulatory authority over wetlands, public waters and surface water quality, and floodplains.

3.9.1.1 Wetlands

Wetlands are regulated at the federal level by the U.S. Environmental Protection Agency (USEPA) and the U.S. Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act (CWA) and Section 10 of the Rivers and Harbor Act (RHA). The USACE is responsible for issuing a permit for the placement of dredged or fill material into any waters that are regulated by the CWA and/or the RHA. Wetlands are also regulated at the state level by the Minnesota Department of Natural Resources (MnDNR) under MN Rule 6115, and by the Minnesota Board of Water and Soil Resources (MnBWSR) under the Minnesota Wetland Conservation Act (WCA). Designated Local Government Units (LGUs) are responsible for making regulatory decisions regarding impacts to wetlands that are regulated by the WCA. Jurisdictional boundaries for WCA implementation vary based on specific local agreements between LGUs. In addition, some local jurisdictions maintain unique wetland buffer ordinances that become active upon the submittal of a local permit application associated with a construction activity.

3.9.1.2 Public Waters and Surface Water Quality

The regulatory environment for public waters and surface water quality includes federal, state, and local oversight and permitting requirements. Under authority from EPA, MPCA implements federal water quality regulations and manages the list of impaired water bodies within the state, based on the CWA 303[d] list prepared by the EPA. Impaired waters do not meet the water quality standards set by states, territories, or authorized tribes because of elevated levels of pollution or other types of degradation. Along with MPCA,

[38] Watershed districts are voluntary units of government created through a local petition process, with broad authorities, including the ability to manage surface and groundwater (MnBWSR, 2015a).

[39] WMOs are mandatory organizations based on watershed boundaries governed by a board appointed by the member municipalities and townships, which only have the ability to manage surface water (MnBWSR, 2015b). Each WMO has its own regulatory requirements that are adopted and enforced by member cities.

Minnesota Department of Water Resources (MnDNR) regulates public waters[40] and requires permits for work affecting the course, current, or cross-section of public waters. Local agencies also implement water quality requirements. Watershed management organizations (WMOs) and watershed districts have implemented stormwater management provisions in their jurisdictions to enforce compliance with the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit No. MNR040000, as well as the statewide NPDES Construction General Permit No. MN R100001. Detailed permitting requirements are discussed in Table 3.9-1.

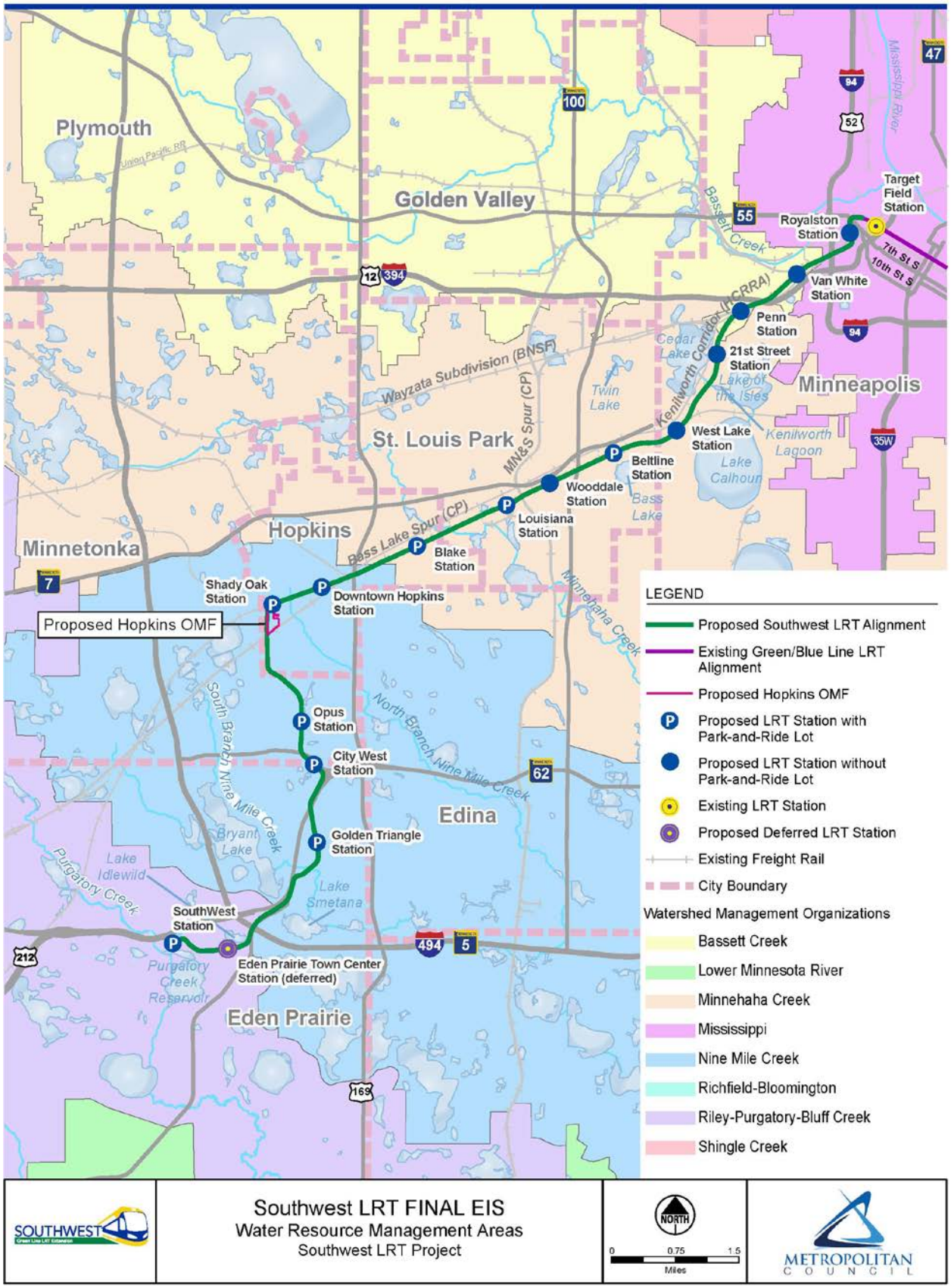
TABLE 3.9-1
Summary of Regulatory Agencies with Jurisdiction over Surface Water Resources and Related Requirements

Regulatory Agency	Requirements	Regulated Resource		
		W[a]	P/S[b]	FP[c]
Federal				
FEMA	EO 11988, as amended by EO 13690; NFIA, 42 U.S.C. 4001 et seq.			■
USACE	Section 404 of CWA; Clean Water Rule: Definition of "Waters of the United States"	■		
USEPA	Section 303(d) of CWA; EO 11990	■	■	
USDOT	Order 5650.2 Floodplain Management and Protection			■
State				
MPCA	Section 401 of CWA; MN Rules 7050 & 7090; MN Statute 103G.005; Section 402 of CWA, NPDES Permit Program	■	■	
MnBWSR	MN Rule 8420 (WCA)	■		
MnDNR	MN Rules 6115, 6120, & 8420 (WCA)	■	■	■
MnDOT	Enforce compliance with WCA and encroachment permits.	■	■	
Local Municipalities, Watershed Management Organizations, and Watershed Districts				
City of Eden Prairie	Eden Prairie City Code	■	■	■
City of Minnetonka	Minnetonka Code of Ordinances	■	■	■
City of Hopkins	Hopkins City Code		■	■
City of St. Louis Park	St. Louis Park City Code		■	■
City of Minneapolis	Minneapolis Code of Ordinances	■	■	■
Riley Purgatory Bluff Creek Watershed District	Riley Purgatory Bluff Creek Watershed District Rules		■	■
Minnehaha Creek Watershed District	Minnehaha Creek Watershed District Regulatory Rules	■	■	■
Nine Mile Creek Watershed District	Nine Mile Creek Watershed District Rules	■	■	■
Bassett Creek Watershed Management Commission	Bassett Creek Watershed Management Plan	■	■	■
Mississippi Watershed Management Organization	Mississippi Watershed Management Organization Watershed Management Plan		■	■

[a] Wetlands
[b] Public Waters and Surface Water Quality
[c] Floodplains
EO = Executive Order; FEMA = Federal Emergency Management Agency; MN = Minnesota; MnBWSR = Minnesota Board of Water and Soil Resources; MnDOT = Minnesota Department of Transportation; NFIA = National Flood Insurance Act of 1968, as amended; NPDES = National Pollutant Discharge Elimination System; USDOT = United States Department of Transportation.
Source: Council, 2015.

[40] Public waters include public watercourses and public water wetlands that meet the criteria set forth in Minnesota Statutes 103G.005, Subdivision 15, and that are identified on the Public Waters Inventory (PWI) maps and lists authorized by Minnesota Statutes 103G.201.

EXHIBIT 3.9-1
Water Resource Management Areas



3.9.1.3 Floodplains

Floodplains[41] and floodways[42] are regulated at the federal level by the Federal Emergency Management Agency (FEMA) under the National Flood Insurance Program (NFIP), which is administered by the states. In Minnesota, local jurisdictions are responsible for administering FEMA regulations for activities such as construction, excavation, or deposition of materials in, over, or under waters, which may affect flood stage, floodplain, or floodway boundaries. Such activities generally require mitigation in the form of compensatory volume to offset lost floodplain or floodway storage. Other specific local requirements associated with floodplains can be found in the *Local Governing Agency Floodplain Requirements Summary* (located in the *Surface Water Resources Evaluation Supporting Documentation Technical Memorandum* [see Appendix C for instructions on how to access supporting documentation]).

Floodplains are also regulated at the federal level by the U.S. Department of Transportation (DOT) Order DOT 5650.2, which prescribes policies and procedures for ensuring proper consideration to avoid and mitigate adverse floodplain impacts in agency actions, planning programs, and budget requests. In addition, Executive Order (EO) 11988, as amended by EO 13690, specifically requires floodplain impacts be considered in the preparation of an EIS for major federal actions. The Federal Flood Risk Management Standards (FFRMS), as defined in EO 13690, require federal agencies to select one of three approaches for establishing the flood elevation and hazard area that will be used for siting, designing, and constructing a given project. Additional details regarding the requirements associated with EO 11988 and EO 13690 can be found within the *Executive Order 11988 Summary and Recommendations* and *Executive Order 13690 Summary and Recommendations*, respectively (located in the *Surface Water Resources Evaluation Supporting Documentation Technical Memorandum* [see Appendix C for instructions on how to access supporting documentation]).

3.9.2 Methodology

This section describes the methodology and the study areas used to assess impacts on wetlands, public waters, surface water quality, and floodplains. Exhibits 3.9-2 and 3.9-3 illustrate existing wetlands and public waters and impacts. Exhibits 3.9-4 and 3.9-5 illustrate existing floodplains and impacts. A list of and instructions on how to access reports associated with the water resource studies can be found in Appendix C.

3.9.2.1 Wetlands

The wetlands study area includes the Project's proposed limits of disturbance[43] (LOD) and an additional area[44] beyond the LOD. This distance captures improvements included as a part of the Project that could have impacts on wetlands directly or indirectly, and wetlands that could potentially have impacts on the Project directly or indirectly.

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[41] EO 11988 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."

[42] According to 44 CFR 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."

[43] The term "limits of disturbance," is defined as the area of land that would experience ground alterations in the short-term due to construction of the Project (e.g., excavation, fill) and that would be occupied in the long-term with Project-related improvements (e.g., light rail alignment, park-and-ride lot). Appendix E includes an illustration of the limits of disturbance.

[44] The additional area beyond the LOD ranges from zero to 100 feet from either edge of the LOD. The Supplemental Draft EIS used a wetland study area that consisted of the area approximately 100 feet from either edge of the LOD, and the wetland study area has since been refined due to the development and adjustment of the LOD boundaries. The collective boundary of the wetland study area is included in the *Wetland Investigation Report, 2014 Supplemental Wetland Investigation Report,* and the *2015 Supplemental Wetland Investigation Report* (located in the *Surface Water Resources Evaluation Supporting Documentation Technical Memorandum* [see Appendix C for instructions on how to access supporting documentation]).

EXHIBIT 3.9-2
Delineated Wetlands (Including Streams and Wetlands) Impacts within Eden Prairie, Minnetonka and Hopkins

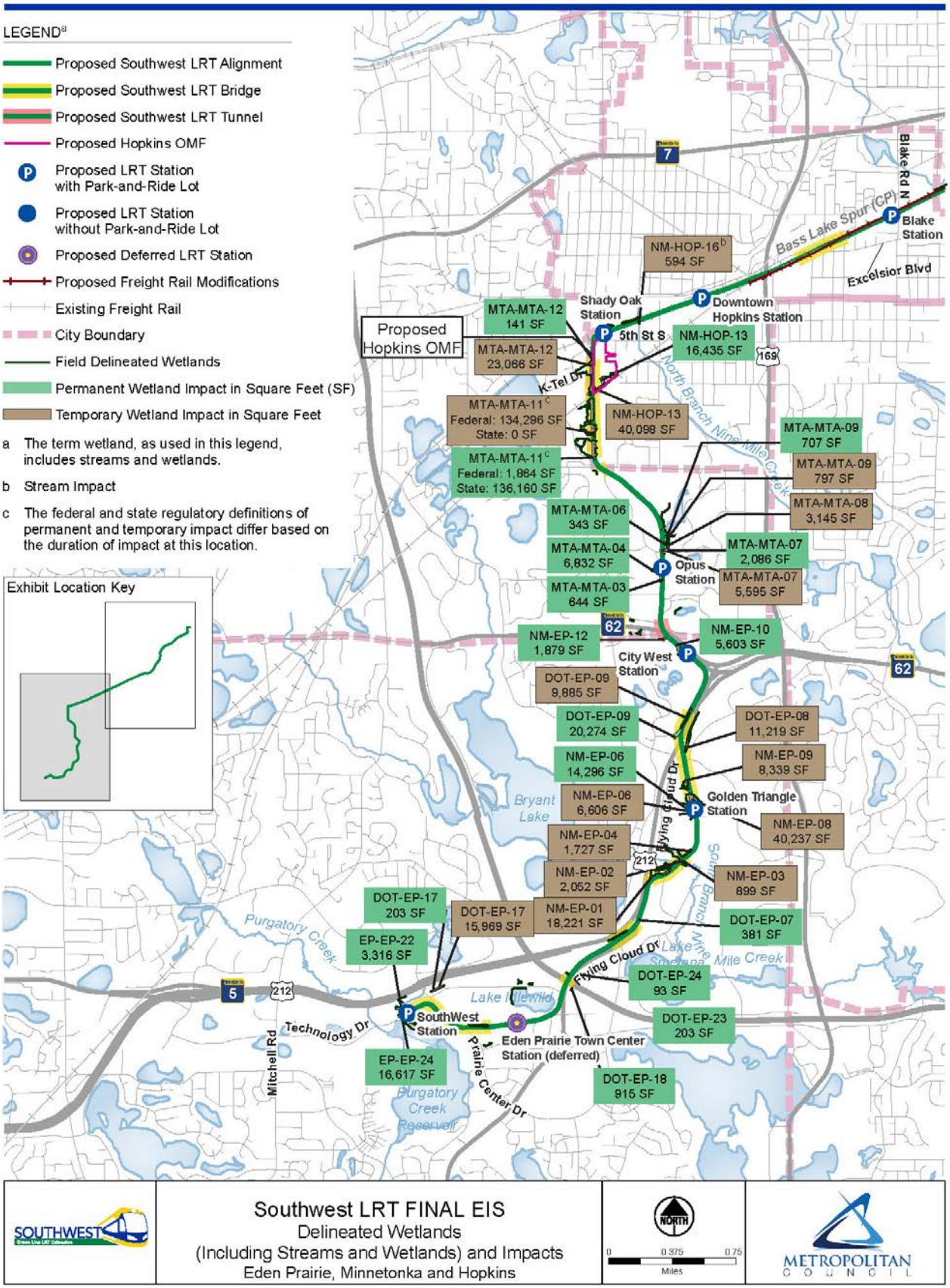


EXHIBIT 3.9-3
Delineated Wetlands (Including Streams and Wetlands) and Impacts within St. Louis Park and Minneapolis

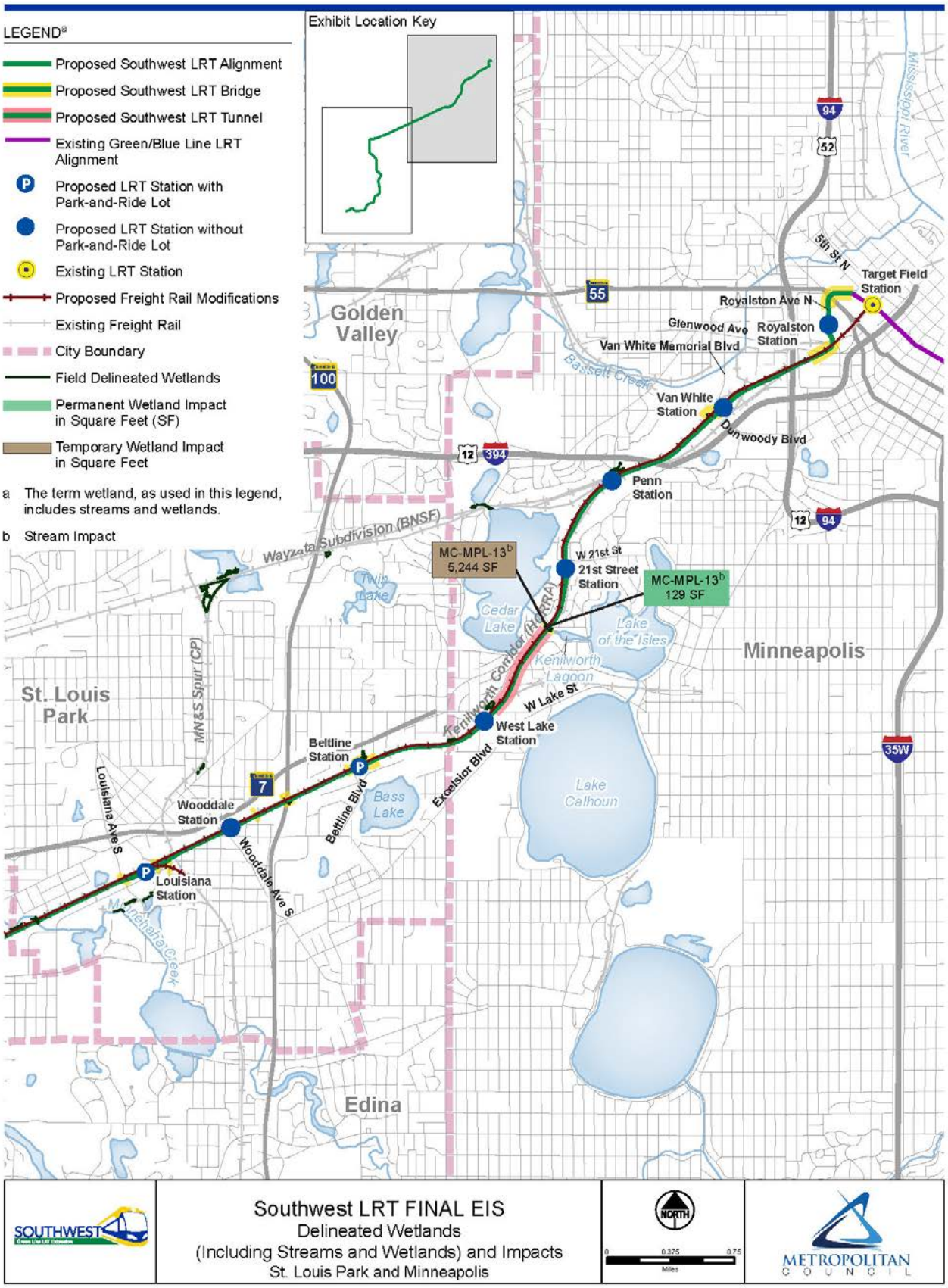


EXHIBIT 3.9-4
Floodplain Impacts within Eden Prairie, Minnetonka, and Hopkins

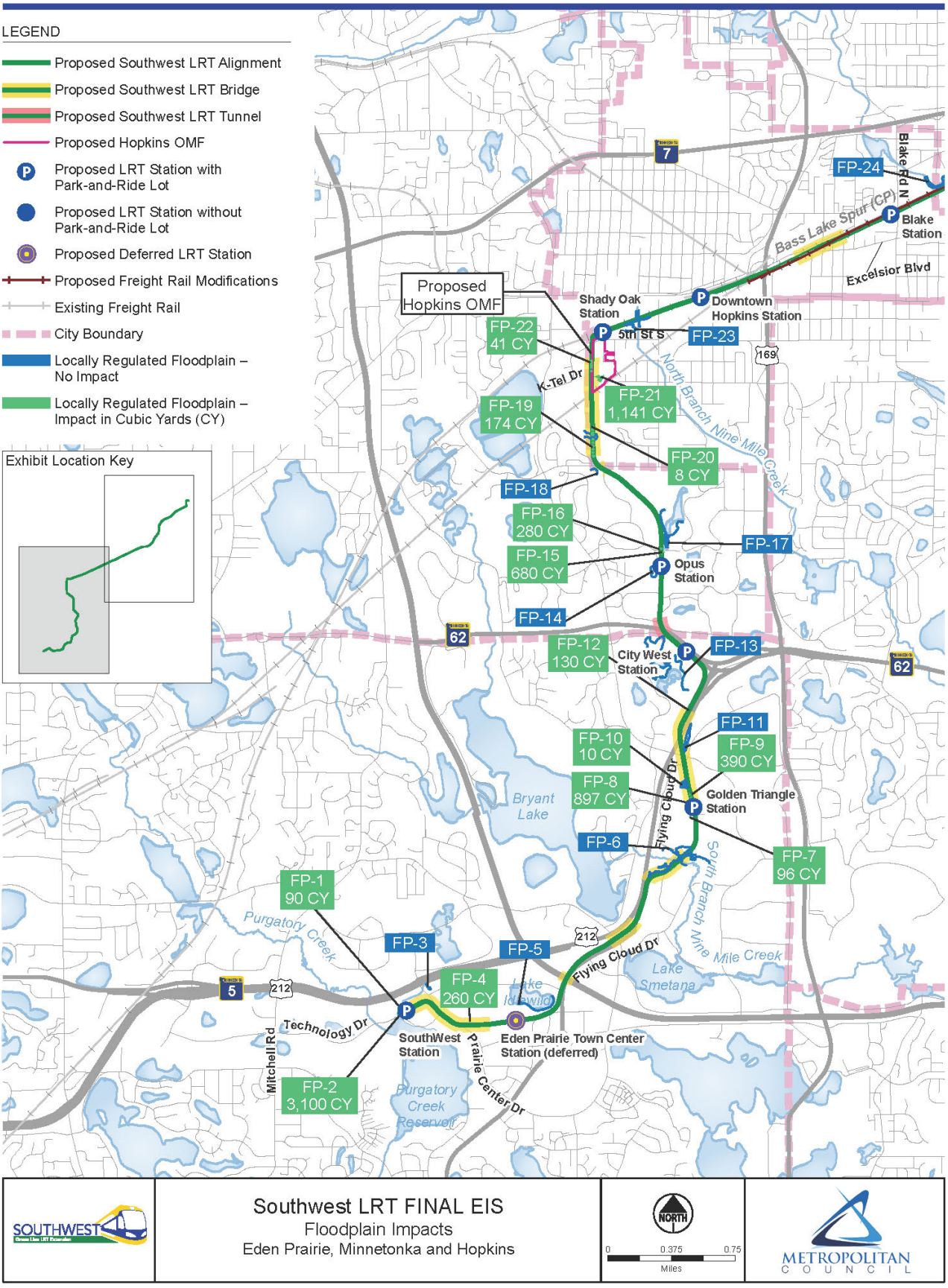
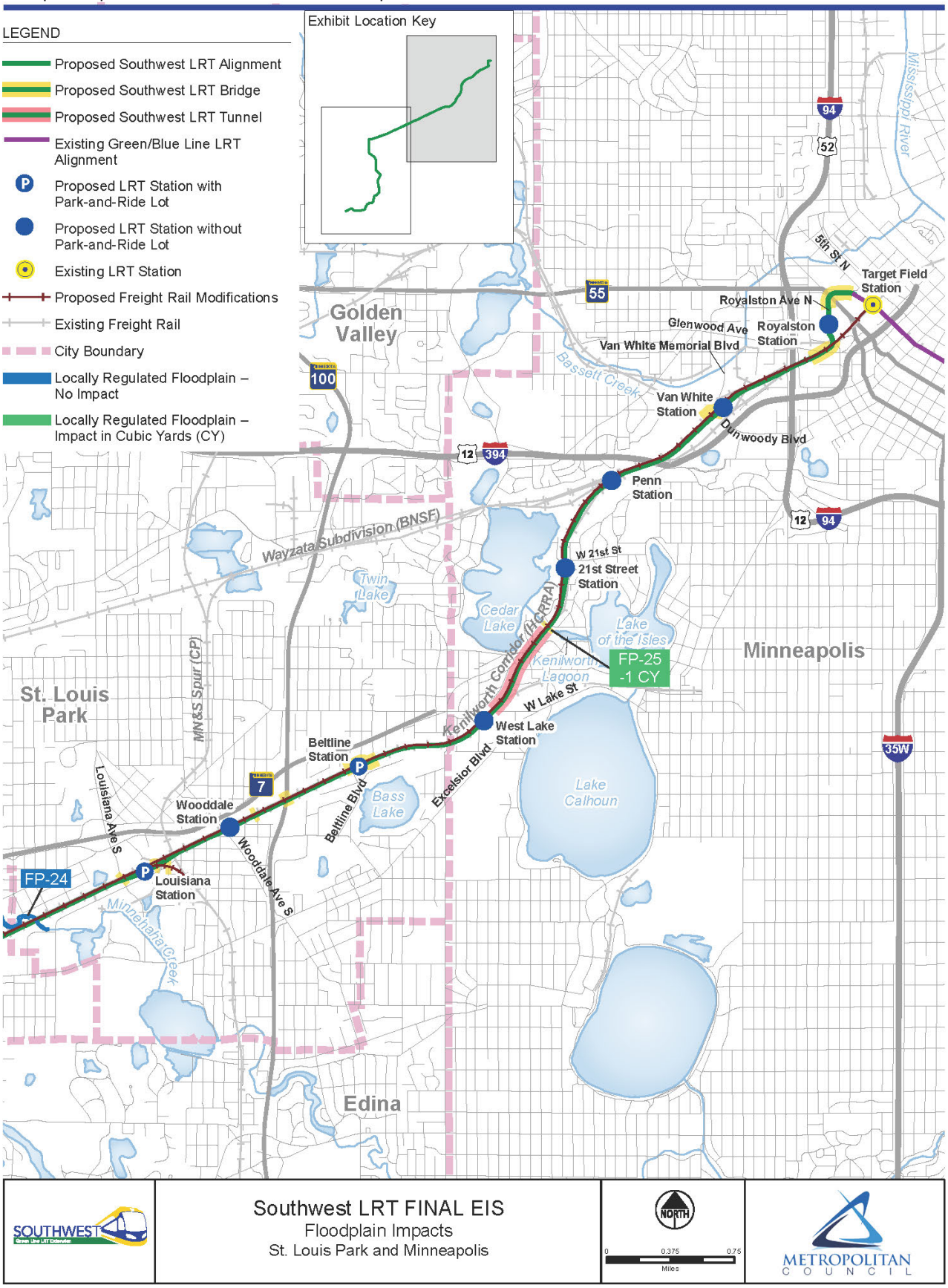


EXHIBIT 3.9-5
Floodplain Impacts within St. Louis Park and Minneapolis



Current spatial data and aerial survey mapping data and other sources identify wetland areas. These other sources include Natural Resource Conservation Service (NRCS) Web Soil Survey maps (U.S. Department of Agriculture-NRCS, 2015), United States Geological Survey quadrangle maps (Minnesota Geospatial Information Office, 2010), the United States Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) (USFWS, 1974–1988), MnDNR PWI maps (MnDNR, 1983), and LGU wetland inventory maps within the wetlands study area.

Field delineations of wetlands within the wetlands study area were conducted in 2013, 2014, and 2015, using the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, 1987). The results and conclusions of the investigations are documented in the *Wetland Investigation Report*, the *2014 Supplemental Wetland Investigation Report*, and the *2015 Supplemental Wetland Investigation Report* (located in the *Surface Water Resources Evaluation Supporting Documentation Technical Memorandum* [see Appendix C for instructions on how to access supporting documentation]).

Staff of the LGUs and of the USACE field-reviewed the wetland delineations. The LGUs issue formal approval of wetland boundary and type via Notices of Decision as required by WCA. The USACE issued a preliminary jurisdictional determination[45] on July 17, 2009 stating that there may be waters and/or wetlands subject to USACE oversight within the wetlands study area. Based on information developed during preliminary design, the USACE issued a second preliminary jurisdictional determination on February 18, 2015 and an approved jurisdictional determination on May 28, 2015. The WCA Notices of Decision and USACE jurisdictional determinations can be found in Appendix N.

The approved wetland boundaries were then incorporated into the design plans and utilized to avoid and minimize impacts to the maximum extent practicable. Unavoidable long-term and short-term impacts were calculated and quantified based on the design and placement of Project elements, as required by federal, state, and local rules.

3.9.2.2 Public Waters and Surface Water Quality

The surface water study area includes one mile on either side of the proposed light rail alignment. Within the surface water study area, public and impaired waters potentially affected by new runoff under the Project were identified. Existing information about surface water quality on the inventoried waters was obtained from the PWI published by the MnDNR. Stormwater impacts were calculated by quantifying the change in impervious surfaces within the Project's limits of disturbance and by assessing the Project's contribution to pollutants to surface water bodies. This analysis is based on the assumption that ballasted track is impervious, because the gradation of the subballast is similar to gravel and tends to impede runoff from infiltrating.[46] Direct evaluation of these stormwater impacts will be performed during final Engineering and design in order to satisfy federal, state, and local stormwater management regulations discussed above in Section 3.9.1.

3.9.2.3 Floodplains

The floodplains study area is the area within 100 feet of the Project limits of disturbance. This distance captures improvements included as a part of the Project that could have impacts on floodplains, and floodplains that could potentially have impacts on the Project.

[45] A *jurisdictional determination* is a preliminary finding by the USACE that jurisdictional waters of the United States are either present or absent on a particular site. A preliminary jurisdictional determination is advisory in nature and may not be appealed. An approved jurisdictional determination is an official USACE finding that jurisdictional waters of the United States are either present or absent on a particular site. Approved JDs are valid for five years and can be appealed through the USACE administrative appeal process set out at 33 CFR Part 331. For additional information, see: http://www.nab.usace.army.mil/Missions/Regulatory/JurisdictionalDeterminations.aspx

[46] Track ballast is material (often crushed stone) used to support the light rail ties and tracks and to facilitate drainage.

The Southwest LRT Project utilized FEMA FIRM maps and FIS data to identify hydraulically connected 100-year floodplains[47] and 500-year floodplains[48] in order to establish FFRMS flood hazard elevations, in compliance with EO 13690. Additional details regarding the methods used to establish FFRMS elevations and the results of the analysis are outlined in the *Executive Order 13690 Summary and Recommendations* (located in the *Surface Water Resources Evaluation Supporting Documentation Technical Memorandum* [see Appendix C for instructions on how to access supporting documentation]).

In addition, the Project used locally approved[49] methods to quantify and map locally regulated 100-year floodplains that are located within the floodplains study area. Floodplain impacts have been quantified by calculating the fill between the normal and high water levels associated with each local floodplain elevation. In general, impacts on floodplains consist of any design that will result in changes in flow, changes in cross-section, added hydrology, or other hydrologic changes, such as those caused by the addition of fill material or pilings, the addition or removal of culverts, or changes in stream alignments. In situations where the LRT design will result in a net gain of floodplain (i.e., removal of existing bridge pilings), the impact is depicted as negative.

3.9.3 NEPA/404 Merger Process

The analysis completed for this section includes Council and USACE coordination for obtaining permit approval under Section 404 of the CWA. Coordination with the USACE also included FTA and Council participation in a merger process between the NEPA and the CWA Section 404 permitting processes. The NEPA/404 merger process provided the USACE with an opportunity to review and comment on four sequential concurrence points at key milestones during project development: (1) Purpose and Need, (2) Array of Alternatives and Alternatives Carried Forward, (3) Identification of the Selected Alternative, and (4) Design Phase Impact Minimization. The goal of the NEPA/404 merger process is to achieve an orderly, concurrent NEPA/404 review process and to ensure that the Project is likely to succeed in obtaining a Section 404 permit.

The USACE provided concurrence to the first two milestones on December 12, 2012 upon review of the Draft EIS. The USACE indicated the need to re-evaluate the second milestone based on adjustments to the Project design that necessitated a Supplemental Draft EIS. In response, the Council submitted the *NEPA/404 Merger Process – Southwest LRT Concurrence Points Package* to document the design adjustments and provide documentation of all milestones (located in the *Surface Water Resources Evaluation Supporting Documentation Technical Memorandum* [see Appendix C for instructions on how to access supporting documentation]). The USACE reviewed the package and provided concurrence to the second and third milestone on October 16, 2014. As a part of concurrence to the third milestone, the USACE identified the Least Environmentally Damaging and Practicable Alternative from among those that meet the USACE's overall project purpose, and determined that the Project is likely to be permittable under the CWA.

The fourth milestone was documented in the *NEPA/404 Merger Process – Concurrence Point 4* document, which included a comprehensive description of the design minimization efforts for each aquatic resource located within the wetland study area (located in the *Surface Water Resources Evaluation Supporting Documentation Technical Memorandum* [see Appendix C for instructions on how to access supporting documentation]). The USACE provided concurrence to the fourth and final milestone on October 14, 2015. Documentation of USACE concurrence with each milestone can be found in Appendix N.

Upon receiving concurrence to the fourth milestone, the Council submitted the Section 404 CWA permit application to the USACE on November 13, 2015. This application included the following items: (1) applicant

[47] According to 44 CFR 9.4, a 100-year floodplain (also known as a base floodplain) means the floodplain "for the flood which has a one percent chance of being equaled or exceeded in any given year."

[48] According to 44 CFR 9.4, a 500-year floodplain means the floodplain "for the flood which has a 0.2 percent chance of being equaled or exceeded in any given year."

[49] Local agencies include the cities of Minneapolis, St. Louis Park, Hopkins, Minnetonka, and Eden Prairie, as well as NMCWD, BCWMC, RPBCWD, and MCWD.

and site location information; (2) a detailed summary of impacted aquatic resources; (3) supporting information for activities not requiring mitigation; (4) a detailed description of the Council's avoidance and minimization efforts; and (5) a summary of the replacement/compensatory mitigation that will be provided for this Project. The public notice period for this permit application is complete and the USACE is currently in the process of completing their review of the application. The Section 404 CWA permit will be issued prior to construction of the Project. A link to this permit application (Council, 2015d) can be found in Appendix D.

3.9.4 Affected Environment

The following sections provide an overview of existing environmental conditions regarding surface water resource features (i.e., wetlands, public waters, surface water quality, and floodplains) in the vicinity of the Project.

3.9.4.1 Wetlands

Commercial, industrial, and residential development characterizes the wetlands study area. Urbanization has had impacts on wetlands. Wetland areas are numerous within the western half of the Project and limited in the eastern half. Exhibits 3.9-2 and 3.9-3 illustrate wetland boundaries within the wetlands study area.

Wetlands occurring within the study area were field-delineated in three phases in 2013, 2014, and 2015. There were 94 areas identified and delineated within the study area that met wetland criteria, 79 of which are regulated as wetlands under the CWA and/or the WCA. Of the 79 wetlands, 40 are regulated by both the WCA and CWA, 16 are regulated only by the WCA, and 23 are regulated only by the CWA. The regulatory status of each wetland was determined by local, state, and federal agencies through formal WCA Notices of Decision and CWA jurisdictional determinations, as referenced in Section 3.9.2.1. Detailed information about each area that meets wetland criteria is included in the *Wetland Investigation Report*, the *2014 Supplemental Wetland Investigation Report*, and the *2015 Supplemental Wetland Investigation Report* (located in the *Surface Water Resources Evaluation Supporting Documentation Technical Memorandum* [see Appendix C for instructions on how to access supporting documentation]).

3.9.4.2 Public Waters and Surface Water Quality

The surface water study area lies within the Upper Mississippi and Minnesota River basins. The general topography is flat, with many lakes and meandering rivers and creeks, ultimately draining from southwest to northeast toward the Mississippi River. Exhibits 3.9-2 and 3.9-3 illustrate public waters within the surface water study area. The existing drainage infrastructure in the surface water study area consists of ditches for runoff conveyance, with limited storm sewers or culverts located at grade crossings or bridge structures. Table 3.9-2 describes the water bodies within the surface water study area.

Various land uses within the affected watersheds contribute pollutant loading to existing public waters, including municipal, industrial, agricultural, commercial, and residential land uses. Pollutant sources include both point sources and nonpoint sources.[50] Urban sources of water pollution include impervious surfaces (e.g., paved areas, parking lots, construction sites, rooftops) and pervious areas (e.g., landscaping). In contrast, rural sources include primarily agricultural fields and operations areas.

Minnesota Administrative Rules 5070 et seq. establish beneficial uses and related water quality standards for public waters. The MPCA also identifies the state public waters impairments listed on the CWA 303(d) list. Currently, 12 of the 14 water bodies within the surface water study area are impaired, which means these waters do not meet USEPA water quality standards for one or more constituents. Industrial, commercial, and agricultural activities, including mercury from resource extraction, contribute to the

[50] Water pollution is the contamination of natural water bodies by industrial, municipal, construction, or other anthropogenic sources of chemical, physical, radioactive, or pathogenic microbial substances, including naturally occurring substances such as sediment. Point sources of water pollution are described by the CWA as "any discernible, confined, and discrete conveyance from which pollutants are or may be discharged." Non-point sources of water pollution affects a water body from sources such as polluted runoff from agricultural areas draining into a river, or wind-borne debris blowing out to sea.

impairments. Various total maximum daily loads (TMDLs) are proposed or approved for water bodies within the surface water study area, as shown in Table 3.9-2.

TABLE 3.9-2
Surface Water Bodies within the Surface Waters Study Area

Water Body	TMDLs (Implementation Date)
Purgatory Creek and Reservoir[a]	None[b]
Lake Idlewild[a]	None[b]
Lake Smetana[a]	Mercury in Fish Tissue (2008)
Bryant Lake[a]	Mercury in Fish Tissue (2008) Nutrient/Eutrophication Biological Indicators (2018)
Nine Mile Creek[a]	Chloride (2010) Fish Bioassessments (2028) Impaired Biota (TBD) Turbidity (TBD)
Minnehaha Creek[a]	Aquatic Macroinvertebrate Bioassessments (2024) Chloride (2015) Fecal Coliform (to be determined [TBD]) Fish Bioassessments (2024) Dissolved Oxygen (2024)
Bass Lake[a]	Mercury in Fish Tissue (2008) Excess Nutrients (2009) Nutrient/Eutrophication Biological Indicators (2017)
Lake Calhoun[a]	Mercury In Fish Tissue (2025) PFOS in Fish Tissue (2022)
Twin Lake[a]	Excess Nutrients (2007) Nutrient/Eutrophication Biological Indicators (2017)
Cedar Lake[a]	Mercury in Fish Tissue (2008, 2025) Excess Nutrients (2012) Nutrient/Eutrophication Biological Indicators (2016)
Kenilworth Lagoon[a,c]	Mercury in Fish Tissue (2008) PFOS in Fish Tissue (2022)
Lake of the Isles[a]	Mercury in Fish Tissue (2008) PFOS in Fish Tissue (2022)
Bassett Creek[a]	Chloride (2015) Fecal Coliform (2015) Fish Bioassessments (2016)
Mississippi River[d] (downstream of Bassett Creek)	Mercury in Fish Tissue (2008) Fecal Coliform (2024) PCB in Fish Tissue (2025)

[a] Beneficial Use Classes include 2B, 3C, 4A, 4B, 5, and 6, as defined in Minnesota Administrative Rules Section 7050.0470.

[b] The 2014 CWA 303(d) list does not include any impairments or TMDLs for this water body.

[c] The Kenilworth Lagoon is an unnamed creek that extends from the eastern portion of Cedar Lake to the Lake of the Isles Parkway West bridge. The Kenilworth Lagoon is considered impaired and has been assigned the TMDLs associated with the Lake of the Isles, because the defined extent of the Kenilworth Lagoon overlays a portion of the PWI boundary for the Lake of the Isles.

[d] Beneficial Use Classes include 1C, 2Bd, and 3C, as defined in Minnesota Administrative Rules Section 7050.0470.

PCB = polychlorinated biphenyl; PFOS = perfluorooctane sulfonate; TBD = to be determined; TMDL = total maximum daily load

Sources: MPCA, 2014a; MPCA, 2014b; and MPCA, 2014c.

3.9.4.3 Floodplains

There are six hydraulically connected FEMA 100- or 500-year floodplains within the floodplain study area. Data associated with these floodplains were used to establish FFRMS flood hazard elevations. See the *Executive Order 13690 Summary and Recommendations* memorandum for additional information on the FEMA floodplains located within the floodplain study area (located in the *Surface Water Resources Evaluation Supporting Documentation Technical Memorandum* [see Appendix C for instructions on how to access supporting documentation]).

There are 24 locally regulated floodplains within the floodplains study area. Each locally regulated floodplain, the associated water body(ies), and the applicable regulatory agency(ies) are summarized in Table 3.9-3. The local floodplains are illustrated on Exhibits 3.9-4 and 3.9-5. Floodplains can include floodways, and impacts on floodways are documented as a part of floodplain impacts.[51]

TABLE 3.9-3
Locally Regulated Floodplains within the Floodplain Study Area

Locally Regulated Floodplain ID	Associated Water Body(ies)	Applicable Regulatory Agency(ies)
FP-1	Wetland EP-EP-22	RPBCWD, City of Eden Prairie
FP-2	Purgatory Creek; Wetlands EP-EP-15, EP-EP-16, EP-EP-24	RPBCWD, City of Eden Prairie
FP-3	Wetland DOT-EP-17	RPBCWD, City of Eden Prairie, MnDOT
FP-4	Wetland EP-EP-18	RPBCWD, City of Eden Prairie
FP-5	Lake Idlewild; Wetland EP-EP-20	RPBCWD, City of Eden Prairie
FP-6	South Fork of Nine Mile Creek; Wetlands NM-EP-01, NM-EP-02, NM-EP-03, NM-EP-04	NMCWD, City of Eden Prairie
FP-7	Wetland NM-EP-07	NMCWD, City of Eden Prairie
FP-8	Wetland NM-EP-06	NMCWD, City of Eden Prairie
FP-9	Wetland NM-EP-08	NMCWD, City of Eden Prairie
FP-10	Wetland NM-EP-09	NMCWD, City of Eden Prairie
FP-11	Wetland DOT-EP-08	NMCWD, City of Eden Prairie, MnDOT
FP-12	Wetland DOT-EP-09	NMCWD, City of Eden Prairie, MnDOT
FP-13	Wetland NM-EP-12	NMCWD, City of Eden Prairie
FP-14	Wetland MTA-MTA-05	NMCWD, City of Minnetonka
FP-15	Wetland MTA-MTA-06	NMCWD, City of Minnetonka
FP-16	Wetland MTA-MTA-07	NMCWD, City of Minnetonka
FP-17	Wetlands MTA-MTA-08 & MTA-MTA-09	NMCWD, City of Minnetonka
FP-18	Wetland MTA-MTA-10	NMCWD, City of Minnetonka
FP-19	Wetland MTA-MTA-11 (south portion)	NMCWD, City of Minnetonka
FP-20	Wetland MTA-MTA-11 (north & middle portion)	NMCWD, City of Minnetonka
FP-21	Wetland NM-HOP-13	NMCWD, City of Hopkins
FP-22	Wetland MTA-MTA-12	NMCWD, City of Minnetonka
FP-23	North Fork of Nine Mile Creek, Wetland NM-HOP-16	NMCWD, City of Hopkins
FP-24	Minnehaha Creek, Wetland MC-SLP-01	MCWD, City of St. Louis Park
FP-25	Wetland MC-MPL-13	MCWD, City of Minneapolis

RPBCWD= Riley Purgatory Creek Watershed District; MnDOT= Minnesota Department of Transportation; NMCWD= Nine Mile Creek Watershed District; MCWD= Minnehaha Creek Watershed District

Source: Council, 2015.

[51] A floodplain is an area that is susceptible to being inundated by water from any source. Mostly, this is the area adjacent to a river, creek, lake, stream, or other waterway that is subject to flooding when there is a significant runoff event. A floodway is the channel of a river or other watercourse that carries the deepest, fastest water downstream.

3.9.5 Environmental Consequences

This section identifies the long-term and short-term direct and indirect impacts on wetlands, public waters and surface water quality, and floodplains from the Project.

3.9.5.1 Wetlands

A. Long-term Direct Impacts on Wetlands

Federal and state regulations (described in Section 3.9.1.1) require that projects avoid, minimize, and mitigate any impacts on wetlands, a process referred to as *sequencing*. Under these wetlands regulations, impacts first must be avoided, where possible. If avoidance of impacts is not possible, impacts must be minimized where possible. Long-term impacts that cannot be avoided generally require replacement (mitigation). The Council strives to avoid impacts on wetlands through design solutions, including shifting and/or elevating the transitway alignment and associated civil improvements, adjusting construction work areas, and using retaining walls and ballast curbs to minimize the limits of disturbance. The long-term direct wetland impacts included in this section were determined to be unavoidable. Per regulatory requirements, the CWA 404 permit application includes a discussion on two alignment alternatives that would completely avoid wetland impacts, neither of which would meet the Project's purpose and need, as well as a comprehensive description of the design minimization efforts proposed for aquatic resources located within the wetland study area. A link to this permit application (Council, 2015d) can be found in Appendix D.

As summarized in Table 3.9-4, implementation of the Project will result in long-term direct impacts on 20 wetlands, 10 of which are regulated by both the WCA and CWA, three of which are regulated only by the WCA, and seven of which are regulated only by the CWA (illustrated on Exhibits 3.9-2 and 3.9-3). Each of the wetland basins with long-term direct impacts associated with the Project are described in the *Wetland Investigation Report*, the *2014 Supplemental Wetland Investigation Report*, and the *2015 Supplemental Wetland Investigation Report* (located in the *Surface Water Resources Evaluation Supporting Documentation Technical Memorandum* [see Appendix C for instructions on how to access supporting documentation]).

B. Long-term Indirect Impacts on Wetlands

Light rail lines can advance the timing and increase the intensity of development, within the limits allowed by local comprehensive plans, particularly surrounding proposed station areas. Long-term indirect impacts to wetlands may occur if new development occurs within the proposed station areas. Future development will be subject to the laws and regulations in place at the time of development.

C. Short-term Impacts on Wetlands

For the purposes of this project, an impact on a wetland is defined as "short-term" when the physical characteristics of a wetland are affected by construction activities (e.g. temporary fill or vegetation disturbance) and restored to pre-project conditions sufficient to restore pre-project functions. Short-term impacts do not require replacement (mitigation), unless specified by a regulatory agency on a case-by-case basis. The USACE has indicated that mitigation will be required for CWA regulated short-term wetland impacts lasting longer than 180 days.

The Project will have short-term (temporary) impacts on 18 wetlands, 13 of which are regulated by both the WCA and CWA and five of which are regulated only by the CWA, as listed in Table 3.9-5. Each of the wetland basins with short-term impacts associated with the Project is described in the *Wetland Investigation Report*, the *2014 Supplemental Wetland Investigation Report*, and the *2015 Supplemental Wetland Investigation Report* (located in the *Surface Water Resources Evaluation Supporting Documentation Technical Memorandum* [see Appendix C for instructions on how to access supporting documentation]).

Impacts due to access requirements will be limited because much of the new light rail alignment will be built adjacent to existing roadways, providing direct access to the construction site. Some construction activities, such as grading and equipment staging, will result in the loss or disturbance of soils and vegetation, which will increase the likelihood of erosion and sedimentation in surface water resources located in the wetlands study area.

TABLE 3.9-4
Long-term Direct Wetland Impacts (Including Streams and Wetlands) by Resource Type

Resource I.D.	Resource Size (acres)	WCA Regulated Long-term Direct Impact[a] (square feet)	CWA Regulated Long-term Direct Impact[b] (square feet)	Resource Type[c]
DOT-EP-07	0.01	0[d]	381	Type 2 (fresh wet meadow)
DOT-EP-09	0.70	0[d]	20,274	Type 3 (shallow marsh)
DOT-EP-17	2.21	203	203	Type 2/5 (fresh wet meadow/shallow open water)
DOT-EP-18	0.10	0[d]	915	Type 3 (shallow marsh)
DOT-EP-23	0.05	0[d]	203	Type 1 (seasonally flooded basin)
DOT-EP-24	0.02	0[d]	93	Type 1 (seasonally flooded basin)
EP-EP-22	0.20	3,316	3,316	Type 3 (shallow marsh)
EP-EP-24[e]	0.38	16,617	16,617	Type 5 (shallow open water)
NM-EP-06	4.02	14,296	14,296	Type 3/6 (shallow marsh/scrub carr)
NM-EP-10	0.13	5,603	0[d]	Type 3 (shallow marsh)
NM-EP-12	3.40	1,879	1,879	Type 3/6 (shallow marsh/scrub carr)
NM-HOP-13	2.67	16,435	16,435	Type 1/3/5/6 (seasonally flooded basin/shallow marsh/shallow open water/scrub carr)
MTA-MTA-03	0.01	644	0[d]	Type 1 (seasonally flooded basin)
MTA-MTA-04	0.16	6,832	0[d]	Type 1 (seasonally flooded basin)
MTA-MTA-06	0.01	0[d]	343	Type 1 (seasonally flooded basin)
MTA-MTA-07[e,f]	0.18	2,086	2,086	Type 3 (shallow marsh)
MTA-MTA-09[e]	36.20	707	707	Type 3 (shallow marsh)
MTA-MTA-11	11.79	136,160	1,864	Type 2/3/5 6/7 (fresh wet meadow/shallow marsh/shallow open water/scrub carr/hardwood swamp)
MTA-MTA-12	2.70	141	141	Type 5 (shallow open water)
Wetland Subtotal	**64.94**	**204,919**	**79,753**	
MC-MPL-13[e,g] (Kenilworth Channel)	N/A	0[d]	129 (20 linear feet)	Type 90 (channel)
Stream Subtotal	N/A	**0**[d]	**129 (20 linear feet)**	
Total	**64.94**	**204,919 (4.70 acres)**	**79,882 (1.83 acres)**	

[a] Impacts to WCA regulated wetlands that will not be fully restored within six months.

[b] Impacts to CWA regulated wetlands that will not be fully restored.

[c] Based on wetland types defined in USFWS Circular 39 System (Shaw and Fredine, 1956).

[d] Impact quantity is zero because the resource is not regulated by the applicable law listed in the column heading.

[e] Resource is associated with a public watercourse or public water wetland.

[f] Impact is partially due to an access road associated with a proposed TPSS. See Sheet 7 of the preliminary engineering plans located in Appendix E for a detailed view of the TPSS layout and the associated wetland impact.

[g] Resource is a stream and is associated with a state listed 303(d) impaired waterbody, as identified in Table 3.9-2. "Resource Size" is not applicable (N/A) for linear features.

Note: Quantities are based on the Project's preliminary engineering plans. The final impact quantities will be included in an addendum to the CWA Section 404 permit application and the state/local wetland permit applications.

Source: Section 404 CWA permit application (a link to this application [Council, 2015d] can be found in Appendix D).

TABLE 3.9-5
Short-term Wetland Impacts (Including Streams and Wetlands) by Resource Type

Resource ID	Resource Size (acres)	WCA Regulated Short-term Impact[a] (square feet)	CWA Regulated Short-term Impact[b] (square feet)	Resource Type[c]
DOT-EP-08	0.84	0[d]	11,219	Type 3 (shallow marsh)
DOT-EP-09	0.70	0[d]	9,885	Type 3 (shallow marsh)
DOT-EP-17	2.21	15,969	15,969	Type 2/5 (fresh wet meadow/shallow open water)
NM-EP-01	1.81	18,221	18,221	Type 5/6 (shallow open water/scrub carr)
NM-EP-02[e] (South Fork of Nine Mile Creek)	6.22	2,052	2,052	Type 3/6 (shallow marsh/scrub carr wetland)
NM-EP-03[e] (South Fork of Nine Mile Creek)	2.16	899	899	Type 3 (shallow marsh)
NM-EP-04	1.18	1,727	1,727	Type 7 (hardwood swamp)
NM-EP-06	4.02	6,606	6,606	Type 3/6 (shallow marsh/scrub carr)
NM-EP-08	2.25	40,237	40,237	Type 3/6 (shallow marsh/scrub carr)
NM-EP-09	0.66	8,339	8,339	Type 3 (shallow marsh)
NM-HOP-13	2.67	40,098	40,098	Type 1/3/5/6 (seasonally flooded basin/shallow marsh/shallow open water/scrub carr)
MTA-MTA-07[e,f]	0.18	5,595	5,595	Type 3 (shallow marsh)
MTA-MTA-08[e]	0.34	3,145	3,145	Type 3 (shallow marsh)
MTA-MTA-09[e]	36.20	797	797	Type 3 (shallow marsh)
MTA-MTA-11	11.79	0[d]	134,296	Type 2/3/5 6/7 (fresh wet meadow/shallow marsh/shallow open water/scrub carr/hardwood swamp)
MTA-MTA-12	2.70	23,066	23,066	Type 5 (shallow open water)
Wetland Subtotal	**75.93**	**166,751**	**322,151**	
NM-HOP-16[e,g] (North Fork of Nine Mile Creek)	N/A	0[d]	594 (60 linear feet)	Type 90 (channel)
MC-MPL-13[e,g] (Kenilworth Channel)	N/A	0[d]	5,244 (100 linear feet)	Type 90 (channel)
Stream Subtotal	**N/A**	**0[d]**	**5,838 (160 linear feet)**	
Total	**75.93**	**166,751 (3.83 acres)**	**327,989 (7.53 acres)**	

[a] Impacts to WCA regulated wetlands that will be fully restored within six months.

[b] Impacts to CWA regulated wetlands that will be fully restored.

[c] USFWS Circular 39 System (Shaw and Fredine, 1956).

[d] Impact quantity is zero because the resource is not regulated by the applicable law listed in the column heading.

[e] Resource is associated with a public watercourse or public water wetland.

[f] Impact is partially due to an access road associated with a proposed TPSS. See Sheet 7 of the preliminary engineering plans located in Appendix E for a detailed view of the TPSS layout and the associated wetland impact.

[g] Resource is a stream and is associated with a state listed 303(d) impaired waterbody, as identified in Table 3.9-2. "Resource Size" is not applicable (N/A) for linear features.

Note: Quantities are based on the Project's preliminary engineering plans. The final impact quantities will be included in an addendum to the CWA Section 404 permit application and the state/local wetland permit applications.

Sources: Section 404 CWA permit application (a link to this application [Council, 2015d] can be found in Appendix D).

The Southwest LRT Project has avoided and minimized short-term impacts to wetlands through design adjustments, including shifting and/or elevating the alignment and adjusting construction work areas. In-stream construction will be avoided when possible; temporary portable dams or cofferdams will be installed as required when in-stream construction cannot be avoided. Additional details regarding construction staging areas and the minimization of short-term wetland impacts can be found in the Section 404 CWA permit application. A link to this permit application (Council, 2015d) can be found in Appendix D.

In addition, the implementation of appropriate wildlife-friendly (e.g. natural materials, no welded webbing) construction BMPs will help to avoid or minimize erosion and sedimentation impacts and protect water quality when needed. Examples of surface water resource BMPs include the following:

- Minimizing the amount of cleared area at a construction site
- Stabilizing construction entrances and haul roads
- Washing truck tires at construction entrances, as necessary
- Building silt fences downslope from exposed soil
- Protecting catch basins from sediment
- Containing and controlling concrete and hazardous materials onsite
- Installing temporary ditches to route runoff around or through construction sites, with straw bales or rock check dams strategically located to slow and settle runoff
- Providing temporary plastic or mulch to cover soil stockpiles and exposed soil
- Using straw wattles to reduce the length of unbroken slopes and minimize runoff concentration
- Using temporary erosion control blankets or mulch on exposed steep slopes to minimize erosion before vegetation is established
- Building temporary sedimentation ponds to remove solids from concentrated runoff and groundwater pumping before being discharged
- Conducting vehicle fueling and maintenance activities no closer than 100 feet from a wetland

3.9.5.2 Public Waters and Surface Water Quality

A. Long-term Direct Impacts on Public Waters and Surface Water Quality

Long-term direct impacts will generally result from conversion of undeveloped land and operations and maintenance of the Project during its life. The following bullets summarize long-term direct impacts on public waters and surface water quality. For additional discussion of long-term direct impacts see *Southwest LRT Water Quality Report* (located in the *Surface Water Resources Evaluation Supporting Documentation Technical Memorandum* [see Appendix C for instructions on how to access supporting documentation]).

- The Project will increase pollutant-generating impervious surfaces by approximately 39.9 acres, as shown in Table 3.9-6.[52] These impervious surfaces, such as new park-and-ride lots, roadway, light rail alignment, and freight rail improvements will capture pollutants in their runoff. However, because the new impervious surfaces will represent a small overall increase in the total impervious surface area in each watershed and the Council will adhere to applicable stormwater management regulations (such as the installation of water treatment facilities), adverse impacts to public waters and surface water quality resulting from new impervious surfaces are unlikely to occur. In particular, the Project will not contribute to an increase in the pollutants of concern identified in Table 3.9-2.

[52] If the Eden Prairie Town Center Station is not constructed by 2040, the total impervious area would be 199.7 acres, or approximately 0.33 acres less than the Project as completed with this station completely built.

TABLE 3.9-6
Project Impacts to Pollutant-Generating Impervious Surface

Existing Impervious Areas	Proposed Impervious Areas	New Impervious Areas
160.1 acres	200.0 acres	39.9 acres

Sources: Southwest LRT Water Quality Technical Report (located in the Surface Water Resources Evaluation Supporting Documentation Technical Memorandum [see Appendix C for instructions on how to access supporting documentation]).

- The Project will cross over five water bodies as follows: Nine Mile Creek (North Fork), Nine Mile Creek (South Fork), Minnehaha Creek, Kenilworth Lagoon, and Bassett Creek.[53]
- The proposed Hopkins Operations and Maintenance Facility (OMF) site will require fill into an unidentified ditch that connects two nearby wetlands. The Project will maintain the existing ditch and construct a new culvert between the two wetlands.

Project Design Features to Meet Stormwater Management Requirements

To protect surface water quality, the Project will implement various design features that meet storm water regulatory requirements, including (1) minimizing or eliminating pollutant sources and (2) implementing structural and non-structural BMPs to treat and control runoff from both developed and redeveloped areas. The Project will implement the following criteria and design features for runoff rate and volume control:

- Conserve natural areas and minimize the extent of disturbed areas.
- Implement pollutant source reduction measures.
- Provide landscape and soil-based BMPs that promote infiltration and stormwater retention onsite.
- Develop a stormwater pollution prevention plan (SWPPP) prior to construction.
- Deploy and maintain construction site BMPs during construction.
- Provide stormwater management features that control peak flow rates and volumes.
- Incorporate stormwater treatment BMPs wherever feasible at LRT facilities to maximize infiltration of runoff onsite; examples include biofiltration swales and trackside infiltration basins.
- Where infiltration is not feasible within the corridor, the Project will evaluate and implement other BMPs based on the sequence of compliance alternatives prescribed by each watershed district's and WMO's stormwater management ordinance discussed in *Local and State Governing Agency Stormwater Requirements Summary* (located in *Surface Water Resources Evaluation Supporting Documentation Technical Memorandum* [see Appendix C for instructions on how to access supporting documentation]).
- Locate all constructed stormwater BMPs outside of natural wetlands and streams.
- The Project will obtain an Individual Section 404 Permit from the USACE and a CWA Section 401 Water Quality Certification from the MPCA, and will comply with the stormwater conditions of those permits.

For additional discussion of design features see *Southwest LRT Water Quality Report* (located in the *Surface Water Resources Evaluation Supporting Documentation Technical Memorandum* [see Appendix C for instructions on how to access supporting documentation]).

B. Long-term Indirect Impacts on Public Waters and Surface Water Quality

There is potential for increased development and redevelopment in areas surrounding proposed light rail stations because of improved transit access. To the extent that the Project increases development and redevelopment intensity, long-term indirect impacts will result as commercial, transportation, and industrial

[53] The five crossings will not alter the cross-sections or hydrological characteristics, or obstruct flow patterns within these water bodies. Work completed within the water bodies will require permitting and coordination with federal, state, and local regulatory agencies.

activities in the Project's vicinity increase new point and non-point sources of water pollutants. Water quality impacts can include:

- Increased export of pollutants from impervious surfaces and compacted soil
- Decreased pollutant filtration
- Increased water temperatures as a result of riparian vegetation removal
- Export of pollutants from motor vehicles using park-and-ride lots and other associated infrastructure

C. Short-term Impacts on Public Waters and Surface Water Quality

Short-term impacts include increased rates and volumes of sediment-laden runoff during excavation, accidental spills and leaks from construction vehicles and equipment, and removal of riparian vegetation. Short-term sediment and erosion impacts to public waters and surface water quality will occur near stream crossings, where slopes are greater and construction activities occur closer to the public water, and where controls are more difficult to implement and maintain. The likelihood of spills affecting surface water bodies also is greatest in these areas. Detailed short term impacts related to specific LRT design features are presented in the *Southwest LRT Water Quality Report* (located in the *Surface Water Resources Evaluation Supporting Documentation Technical Memorandum [*see Appendix C for instructions on how to access supporting documentation]). These impacts are summarized below:

- Construction may lead to temporary changes in grades and drainage patterns.
- Construction over public waters may directly contribute pollutants.
- Construction of LRT facilities (stations, parking lots, and park-and-ride facilities) that involve large areas of clearing and grubbing may expose soil to stormwater and potentially erosive conditions.
- Construction materials and stockpiles could be exposed to stormwater.

To address these temporary impacts, the Project will develop an SWPPP that complies with the Construction General Permit. The SWPPP will be developed prior to construction and will identify source control and wildlife-friendly erosion and sediment control BMPs required for the Project. The SWPPP will also provide details on construction techniques required to minimize pollutant loadings directly to surface waters, such as using coffer dams for in-stream construction.

3.9.5.3 Floodplains

A. Long-term Direct Impacts on Floodplains

The Project has been designed in compliance with EOs 11988 and 13690; therefore, floodplain impacts have been minimized to the greatest practicable extent and tracks and structures associated with the Project will be built above the applicable FFRMS elevations. Details regarding impact minimization measures and the specific Project design elevations and associated FFRMS elevations can be found in the *Executive Order 13690 Summary and Recommendations* and *Executive Order 11988 Summary and Recommendations* (located in the *Surface Water Resources Evaluation Supporting Documentation Technical Memorandum* [see Appendix C for instructions on how to access supporting documentation]).

Construction of the Project will result in 7,296 cubic yards of long-term floodplain impacts, as summarized in Table 3.9-7 and illustrated on Exhibits 3.9-4 and 3.9-5. The Project will include balanced cut and fill at any affected floodplain locations, which accounts for the fill that will occur at each location. Where it is not feasible to meet this requirement, a variance may be needed from the applicable regulatory agency. If the Project will result in a net gain of floodplain, the impact is depicted as negative.

B. Long-term Indirect Impacts on Floodplains

Light rail lines can advance the timing and increase the intensity of development, within the limits allowed by local comprehensive plans, particularly surrounding proposed station areas. Long-term indirect impacts to floodplains may occur if new development occurs within the proposed station areas. Future development will be subject to the laws and regulations in place at the time of development.

TABLE 3.9-7
Long-term Area of Floodplains Filled, by Floodplain ID

Locally Regulated Floodplain ID	Associated Water Body(ies)	Applicable Regulatory Agency(ies)	Area of Floodplain Fill[a] (cubic yards)
FP-1	Wetland EP-EP-22	RPBCWD, City of Eden Prairie	90
FP-2	Purgatory Creek, Wetlands EP-EP-15, EP-EP-16, EP-EP-24	RPBCWD, City of Eden Prairie	3,100
FP-4	Wetland EP-EP-18	RPBCWD, City of Eden Prairie	260
FP-7	Wetland NM-EP-07	NMCWD, City of Eden Prairie	96
FP-8	Wetland NM-EP-06	NMCWD, City of Eden Prairie	897
FP-9	Wetland NM-EP-08	NMCWD, City of Eden Prairie	390
FP-10	Wetland NM-EP-09	NMCWD, City of Eden Prairie	10
FP-12	Wetland DOT-EP-09	NMCWD, City of Eden Prairie, MnDOT	130
FP-15	Wetland MTA-MTA-06	NMCWD, City of Minnetonka	680
FP-16	Wetland MTA-MTA-07	NMCWD, City of Minnetonka	280
FP-19	Wetland MTA-MTA-11 (south portion)	NMCWD, City of Minnetonka	174
FP-20	Wetland MTA-MTA-11 (north & middle portion)	NMCWD, City of Minnetonka	8
FP-21	Wetland NM-HOP-13	NMCWD, City of Hopkins	1,141
FP-22	Wetland MTA-MTA-12	NMCWD, City of Minnetonka	41
FP-25	Wetland MC-MPL-13 (Kenilworth Channel)	MCWD, City of Minneapolis	(1)[b]
		Total	7,296

[a] Quantities are based on the Project's preliminary engineering plans. The final impact quantities will be included in the local floodplain permit applications.

[b] Impact is negative because the volume of existing timber piers to be removed from this location exceeds volume of proposed piers.

Note: MCWD = Minnehaha Creek Watershed District; MnDOT = Minnesota Department of Transportation; NMCWD = Nine Mile Creek Watershed District; RPBCWD = Riley Purgatory Bluff Creek Watershed District.

Source: Council, 2015.

The Project will develop appropriate plans and obtain applicable permits for floodplains, as well as implement BMPs to minimize long-term direct impacts.

C. Short-term Impacts on Floodplains

The Project will incur some short-term impacts on floodplains, because of the various construction activities associated with the Project. Temporary workspaces and access roads will require temporary fill within floodplains. Some construction activities will result in the loss or disturbance of soils and vegetation, which will increase the likelihood of temporary erosion and sedimentation in floodplains. The Project will develop appropriate plans and obtain applicable permits for floodplains, as well as implement appropriate wildlife-friendly BMPs to avoid erosion and sedimentation impacts to floodplains during construction.

3.9.6 Mitigation Measures

This section describes the measures the Council will implement to mitigate the Project's long-term and short-term surface water resource impacts. For each mitigation measure or set of associated mitigation measures, this section generally notes the anticipated impact or associated impacts that the mitigation measures will address (see Sections 3.9.5.1, 3.9.5.2, and 3.9.5.3 for additional information on the identified surface water resource impacts, avoidance measures, and BMPs, respectively).

3.9.6.1 Wetlands

A. Long-term Mitigation Measures

Impact. Permanent wetland fill.

Mitigation. The Project will require coordination and permitting from local, state, and federal water resource agencies. The Council coordinated with the Project's appointed WCA Technical Evaluation

Panel, as defined in Section 9.3, regarding mitigation strategies prior to the submittal of the WCA and CWA Section 404 permit applications. Analysis of preliminary mitigation strategies included establishing project-specific permittee-responsible mitigation sites and purchasing wetland mitigation bank credits. Through a series of coordination meetings with the Technical Evaluation Panel prior to the submittal of permit applications, the Council identified purchasing bank credits as the preferred strategy that will meet federal, state, and local mitigation requirements.

The compensatory mitigation ratios for the loss of wetland function and value is dependent on the location, type, and functional value of the wetland being affected and the type and duration of impact. The Council will purchase the required amount of wetland mitigation bank credits based on the long-term impacts and associated replacement ratios identified in the WCA and CWA Section 404 permit applications. Wetland mitigation banks credits will be purchased from established and approved wetland bank accounts located in watershed 33/USACE bank service area 9 (Minnesota River-Shakopee), in accordance with the applicable USACE, WCA, and LGU siting priority requirements, prior to the construction of the Project. The USACE has indicated that the Project will not be required to mitigate for permanent impacts that do not alter the cross-section or hydrological characteristics, or obstruct flow patterns within streams that are regulated under Section 404 of the CWA.

B. Short-term Mitigation Measures

Impact. Temporary loss of wetland vegetation and/or hydrology.

Mitigation. Wetland areas affected on a temporary basis during construction will be restored to existing grade, hydrology (to existing conditions when applicable), and reseeded with an appropriate native wetland species seed mix, as required by the WCA and CWA. The restoration details associated with each short-term wetland impact will be identified in the WCA and CWA permit applications. The Project will purchase wetland mitigation bank credits for CWA regulated short-term impacts lasting longer than 180 days.

3.9.6.2 Public Waters and Surface Water Quality

A. Long-term Mitigation Measures

Impact. Long-term degradation of surface water quality.

Mitigation. Long-term stormwater runoff will be directed into stormwater management facilities created as part of the Project as approved by local jurisdictions and through final permitting. These facilities will be designed to provide stormwater treatment in compliance with NPDES requirements.

B. Short-term Mitigation Measures

Impact. Short-term degradation of surface water quality.

Mitigation. Short-term (construction) stormwater runoff will be directed into temporary stormwater management facilities created as part of the Project. These facilities will be designed to provide stormwater treatment in compliance with NPDES requirements.

3.9.6.3 Floodplains

A. Long-term Mitigation Measures

Impact. Permanent floodplain fill.

Mitigation. Impacts to locally regulated floodplains will be mitigated by appropriate compensatory storage[54] within or adjacent to the affected water body, as summarized in Table 3.9-8. The Project will utilize the following methods to create compensatory storage: excavation of upland adjacent to existing floodplain, excavation of existing floodplain, and construction of stormwater BMPs with the capacity for storage. Final design will include the appropriate compensatory storage required by

[54] Local permitting authorities require compensatory storage at a ratio of 1:1 within +/- one foot of the floodplain impacts within the same water body.

applicable local agencies. Where it is not feasible to meet this requirement, a variance will be requested from the applicable regulatory agency and the appropriate documentation provided to justify the variance.

TABLE 3.9-8
Floodplain Mitigation by Floodplain ID

Locally Regulated Floodplain ID	Associated Water Body(ies)	Applicable Regulatory Agency(ies)	Area of Floodplain Mitigation (cubic yards)
FP-1	Wetland EP-EP-22	RPBCWD, City of Eden Prairie	493
FP-2	Purgatory Creek, Wetlands EP-EP-15, EP-EP-16, EP-EP-24	RPBCWD, City of Eden Prairie	492
FP-4	Wetland EP-EP-18	RPBCWD, City of Eden Prairie	280
FP-7	Wetland NM-EP-07	NMCWD, City of Eden Prairie	TBD[a]
FP-8/FP-9	Wetland NM-EP-06/NM-EP-08	NMCWD, City of Eden Prairie	1,409
FP-10	Wetland NM-EP-09	NMCWD, City of Eden Prairie	12
FP-12	Wetland DOT-EP-09	NMCWD, City of Eden Prairie, MnDOT	2,533
FP-15/FP-16	Wetland MTA-MTA-06/MTA-MTA-07	NMCWD, City of Minnetonka	960
FP-19	Wetland MTA-MTA-11 (south portion)	NMCWD, City of Minnetonka	175
FP-20	Wetland MTA-MTA-11 (north and middle portion)	NMCWD, City of Minnetonka	8
FP-21	Wetland NM-HOP-13	NMCWD, City of Hopkins	1,546
FP-22	Wetland MTA-MTA-12	NMCWD, City of Minnetonka	86
		Total	7,994

[a] To be determined (TBD) indicates that mitigation at this floodplain is under development. The final mitigation quantities will be included in the local floodplain permit applications.

Source: Council, 2015.

B. Short-term Mitigation Measures

Impact. Temporary floodplain disturbance and/or fill.

Mitigation. Short-term floodplain fill placed during construction will be removed and elevations restored to existing conditions resulting in a no net-loss of flood storage volume.

3.10 Ecosystems

This section describes long-term direct and indirect effects and the short-term (construction) direct and indirect effects of the Project on ecosystems (see Section 3.17 for cumulative impacts). Within this Final EIS, ecosystems include threatened and endangered species, habitat, and migratory birds. This section includes an overview of the regulatory context and methodology used for the analysis, a description of existing ecosystems conditions, anticipated environmental consequences related to ecosystems, and a description of mitigation measures to implement with the Project.

3.10.1 Regulatory Context and Methodology

This section includes a summary of relevant laws and executive orders, an overview of the methodology, and descriptions of the study areas for the analyses completed as part of the ecosystems evaluation. In summary, the following study areas are used throughout this section, as appropriate, to account for regulatory review standards and availability of data:

- USFWS study area: defined as Hennepin County; used in Threatened and Endangered Species analysis

- MnDNR study area: defined as the area that extends approximately one mile around the Project's Limit of Disturbance (LOD) [55]; used in Threatened and Endangered Species analysis
- Habitat study area: defined as the area that extends 100 feet around the Project's LOD; used in Habitat analysis
- Migratory bird study area: defined as Hennepin County; used in Migratory Bird analysis

3.10.1.1 Threatened and Endangered Species

The primary federal law protecting threatened and endangered species is the Endangered Species Act (ESA) of 1973 (16 U.S.C. §§ 1531-1544). This law requires that all federal agencies consider and avoid, if possible, adverse impacts to federally listed rare, threatened and endangered species or their critical habitats, which may result from their direct, regulatory, or funding actions. Under 16 U.S.C. §§ 1536 Section 7 of the ESA, federal agencies are required to consult with the USFWS and/or the National Marine Fisheries Service (NMFS) (jointly referred to as the Services[56]), to ensure that FTA is not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat.

Section 7 requirements vary based on the level of effect a federal action is anticipated to have on the federally listed species and designated critical habitat identified at the location of that action. For an action that will have "no-effect," the applicant will submit documentation to USFWS and/or NMFS stating that the proposed action, including its interrelated and interdependent actions, will not affect (i.e., influence or bring about any change to) listed species or designated critical habitat, either directly or indirectly. For an action that "may affect, but is not likely to adversely affect" a species or their habitat, informal consultation is conducted, which results in a concurrence letter from the Services. For an action that is "likely to adversely affect" a species or their habitat, formal consultation is conducted with the applicable agency(ies). The outcome of formal consultation is a Biological Opinion, which may include an incidental take permit if the applicant is allowed to proceed with the action. [57]

The USFWS catalogues federally listed threatened and endangered species by occurrence within a given county. The Council reviewed the USFWS Endangered Species Program website[58] (USFWS, 2015) to identify the federally listed threatened or endangered species and critical habitats occurring within the USFWS study area, which is defined as within Hennepin County. The identified species and critical habitat were assessed for impacts due to the Project. The FTA then made a determination of this Project's level of effect on the identified species and habitat and requested concurrence from USFWS.

Minnesota's endangered species law (Minnesota Statutes 84.0895) and associated rules (Minnesota Rules 6212.1800-2300) regulate the taking, importation, transportation, and sale of state-listed threatened, endangered, or special concern species. MnDNR administers the state law and manages the listing of state threatened, endangered, and special concern species.

MnDNR assesses potential impacts to state-listed species within approximately one mile of a given project. As requested by the Project on December 11, 2013 and June 12, 2015, MnDNR performed a query on the Natural Heritage Information System (NHIS) database (MnDNR, 2015c) to identify potential element occurrences[59] of state-listed species within the MnDNR study area, which is defined as the area that extends approximately one mile around the Project's limits of disturbance. In addition, the Council executed a license

[55] The Project's limits of disturbance is depicted on the preliminary engineering plans located in Appendix E.
[56] The USFWS has primary responsibility for terrestrial and freshwater organisms, while the responsibilities of the NMFS are mainly marine wildlife such as whales and anadromous fish such as salmon.
[57] For a detailed discussion regarding USFWS formal and informal consultation processes under Section 7 of the ESA, see http://www.fws.gov/Midwest/endangered/section7/index.html.
[58] See http://www.fws.gov/endangered/.
[59] An element occurrence is defined as an area of land and/or water in which a rare species or native plant community is or was present (MnDNR, 2015b).

agreement with the MnDNR to obtain a copy of the NHIS database for internal Project review. The NHIS database comprises locational records of rare plants, rare animals, and other rare sensitive natural resources features (including native plant communities and animal aggregations [such as nesting colonies]). The MnDNR study area has also been evaluated for preferred habitats of identified rare species in coordination with state and local agencies, and in accordance with Minnesota's endangered species law (Minnesota Statutes 84.0895).

3.10.1.2 Habitat

The habitat study area is defined as the area that extends 100 feet around the Project's limits of disturbance.[60] Habitat is not specifically protected under local, state, or federal law, unless the habitat is designated as critical habitat for a federally listed threatened or endangered species that is regulated by the ESA. Critical habitat directly associated with federally listed threatened or endangered species is discussed as a part of the assessment of threatened and endangered species (See Sections 3.10.2.1 and 3.10.3.1 for a discussion of affected environment and environmental consequences regarding threatened and endangered species, respectively).

Some regulated resources within the habitat study area could be associated with habitat. For instance, the removal of trees could have an impact on existing habitat and be regulated under various municipal zoning and tree ordinances. In response to ordinance requirements, the Council collected tree survey data in the *Kenilworth Corridor Vegetation Inventory* and the *Opus Hill Tree* Survey (see Appendix C for instructions on how to access these supporting documents).

The existing habitat within the habitat study area has been assessed through the review and evaluation of five environmental spatial data sources created by MnDNR: (1) Minnesota Land Cover Classification System (MLCCS), (2) Regional Ecological Corridors, (3) Regionally Significant Ecological Areas, (4) Native Plant Communities, and (5) Sites of Biodiversity Significance. This analysis is documented in the *Southwest LRT Habitat Analysis* technical report that is listed in Appendix C. The resulting data from the *Southwest LRT Habitat Analysis* technical report were also utilized to quantify the Project's long-term direct and short-term impacts on habitat, as appropriate. There are no regulatory requirements associated with these spatial data sources; they were reviewed to support the analysis of existing habitat within the habitat study area.

In addition to the environmental spatial data analysis associated with habitat, all wetland habitat areas within the Project's defined wetland study area were identified and field delineated as required by local, state, and federal law. See Section 3.9 for information on wetlands identified within the wetland study area.

3.10.1.3 Migratory Birds

The Migratory Bird Treaty Act of 1918 (16 U.S.C. 703-712) governs the taking, killing, possession, transportation, and importation of migratory birds, including related items such as eggs, parts, and nests. Such actions are prohibited unless authorized under a valid permit. This law applies to migratory birds that are native to the United States and its territories, as catalogued in the 50 CFR 10.13 List of Migratory Birds.[61] In addition to being regulated by the Migratory Bird Treaty Act of 1918, bald eagles and golden eagles are protected by the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d, 54 Statutes [Stat.] 250), which prohibits taking, possession, or commerce of these two migratory bird species.

The Minnesota Ornithologists' Union maintains composite lists containing accepted records of bird species observed within each county in Minnesota, and the MnDNR records element occurrences of eagle nesting sites in the NHIS. The *Hennepin County Composite List* (Minnesota Ornithologists' Union, 2015)[62] was cross-referenced with the 50 CFR 10.13 list of migratory birds in October 2015 to determine the regulated species that have been observed in the migratory bird study area, which is defined as Hennepin County. This analysis is documented in the *Southwest LRT Migratory Bird Analysis* technical report that is listed in Appendix C. The

[60] The study area used for habitat analysis has been refined since publication of the Draft EIS due to development of the Project. The Draft EIS used a study area that consisted of the area one-half mile on either side of the build alternatives.
[61] See http://www.gpo.gov/fdsys/granule/CFR-2000-title50-vol1/CFR-2000-title50-vol1-sec10-13.
[62] See http://moumn.org/cgi-bin/countychecklist.pl?county=Hennepin.

NHIS database was also reviewed in October 2015 to identify any element occurrences of bald or golden eagle nests within the migratory bird study area.

In addition, MnDNR maintains a spatial representation of designated Migratory Waterfowl Feeding and Resting Areas[63] located throughout the state of Minnesota. The most current available data (MnDNR, 2005) were reviewed in June 2015 to assess the presence of potential migratory waterfowl habitat within the migratory bird study area.

3.10.2 Affected Environment

The following sections provide an overview of the existing environmental conditions regarding threatened and endangered species, habitat, and migratory birds in each defined study area.

3.10.2.1 Threatened and Endangered Species

A review of the USFWS Endangered Species Program website identified the presence of three threatened or endangered species within the USFWS study area, as summarized in Table 3.10-1.

TABLE 3.10-1
Summary of Federally Listed Threatened or Endangered Species

Scientific Name	Common Name	Federal Status	Preferred Habitat
Lampsilis higginsii	Higgins eye (pearlymussel)	Endangered	Large rivers with deep water and moderate current
Epioblasma triquetra	Snuffbox mussel	Endangered	Small- to medium-sized creeks with swift current
Myotis septentrionalis	Northern long-eared bat	Threatened	Winter: Caves and mines Summer: Cavities or crevices of live or dead trees

The Council participated in interagency cooperation with the USFWS in 2015, to help ensure the Project does not jeopardize the existence of listed species. The FTA made a determination that the Project will have "no effect" on the Higgins eye (pearlymussel) and Snuffbox mussel, or their associated critical habitats, and that the Project "may affect, but is not likely to adversely affect" the northern long-eared bat. The USFWS concurred with these determinations on September 25, 2015 and October 27, 2015 (see Appendix N for agency coordination letters).[64]

The MnDNR identified element occurrences of one endangered species, four threatened species, and six special concern species within the MnDNR study area, as stated in a letter from MnDNR on January 31, 2014, and confirmed in a response dated August 4, 2015 (see Table 3.10-2). Of these, the MnDNR identified one state threatened species, Blanding's turtle (*Emydoidea blandingii),* as the only rare species that *may* be adversely affected by the proposed Project (see Appendix N for agency coordination letters). This species has the potential to be adversely affected because it has been reported within the MnDNR study area and because the Blanding's turtle is the only state-listed species that has suitable habitat within the MnDNR study area.

In addition to the NHIS review performed by MnDNR, the Council performed an independent review of the NHIS database in August 2015 to determine the proximity of the Blanding's turtle element occurrence in relation to the areas that will be disturbed by the Project. Based on this review, the closest Blanding's turtle element occurrence is 0.9 mile from any area that will be disturbed by the Project.

[63] See http://www.dnr.state.mn.us/wildlife/shallowlakes/mwfra.html.

[64] The Project's informal Section 7 consultation was completed under the interim 4(d) rule for the northern long-eared bat. The USFWS announced the final 4(d) rule for this species on January 13, 2016. FTA's original determination that the Project "may affect, but is not likely to adversely affect" the northern long-eared bat remains adequate under the final 4(d) rule.

TABLE 3.10-2
Summary of State-Listed Threatened, Endangered, or Special Concern Species

Scientific Name	Common Name	State Status	Preferred Habitat
Erythronium propullans	Dwarf trout lily	Endangered	Wooded floodplains, river terraces, or north-facing slopes above or near streams
Emydoidea blandingii	Blanding's turtle	Threatened	Wetland complexes and adjacent sandy uplands
Notropis anogenus	Pugnose shiner	Threatened	Clear, glacial lakes and streams with submerged vegetation
Valeriana edulis var. *ciliata*	Valerian	Threatened	Calcareous fens, wet meadows, and moist prairies
Besseya bullii	Kitten-tails	Threatened	Oak savanna communities, dry prairies, and oak woodlands
Etheostoma micoperca	Least darter	Special Concern	Freshwater streams and lakes with cool to warm waters
Falco peregrinus	Peregrine falcon	Special Concern	Cliff ledges along rivers or lakes; buildings and bridges in urban settings
Gallinula galeata	Common gallinule	Special Concern	Freshwater cattail-bulrush marshes
Perimyotis subflavus	Tricolored bat	Special Concern	Winter: Caves and mines Summer: Caves, mines, and/or trees
Ligumia recta	Black sandshell	Special Concern	Riffle and run areas of medium to large rivers
Setophaga citrina	Hooded warbler	Special Concern	Large tracts of mature deciduous forests

3.10.2.2 Habitat

The analysis associated with existing habitat within the affected environment of the Project is documented in the *Southwest LRT Habitat Analysis* technical report (see Appendix C for instructions on how to access the report). Based on a review of MLCCS data, approximately 83.1 percent of the habitat study area (891 acres) consists of non-natural land cover types (impervious surfaces and cultivated vegetation), which is common in urbanized areas. Natural land cover types (herbaceous, woodlands, forests, shrublands, and water) make up approximately 16.9 percent (181 acres) of the habitat study area. The MLCCS land cover classifications are illustrated on Exhibit 3.10-1.

Portions of urban Regional Ecological Corridors (MLCCS-derived) occur in five locations throughout the habitat study area: near the proposed SouthWest Station, Interstate 494 near Eden Prairie Town Center Station, City West Station, Highway 100 near Wooddale Station, and Penn Station (Exhibit 3.10-2). Of the five Regional Ecological Corridors identified within the habitat study area, there are three that will be physically bisected by the Project.

Approximately 7.2 percent of the habitat study area (77.3 acres) consists of Regional Significant Ecological Areas (MLCCS-derived) that are ranked as having either low or medium ecological importance (Exhibit 3.10 2). There are no areas of high ecological importance located within the habitat study area. In addition, there are no data points or polygons associated with Native Plant Communities or Sites of Biodiversity Significance within the habitat study area (Exhibit 3.10-3).

In many instances, invasive species and noxious weeds dominate disturbed ecosystems, particularly in wetlands. Because the Project will generally be located in a previously disturbed/urbanized area containing wetlands, it is common for invasive species and noxious weeds to be present within the habitat study area. See Section 3.9 for analysis of field delineated wetland habitat areas located within the defined Project wetland investigation area.

3.10.2.3 Migratory Birds

The Migratory Bird Treaty Act regulates 343 species that have been observed in the migratory bird study area. Of those 343 species, 132 have been confirmed to nest in the migratory bird study area. Both the bald eagle and the golden eagle have been observed in the migratory bird study area, and the bald eagle has been confirmed to nest in the migratory bird study area. This analysis is documented in the *Southwest LRT Migratory Bird Analysis* technical report (see Appendix C for instructions on how to access this report).

EXHIBIT 3.10-1
Existing Land Cover

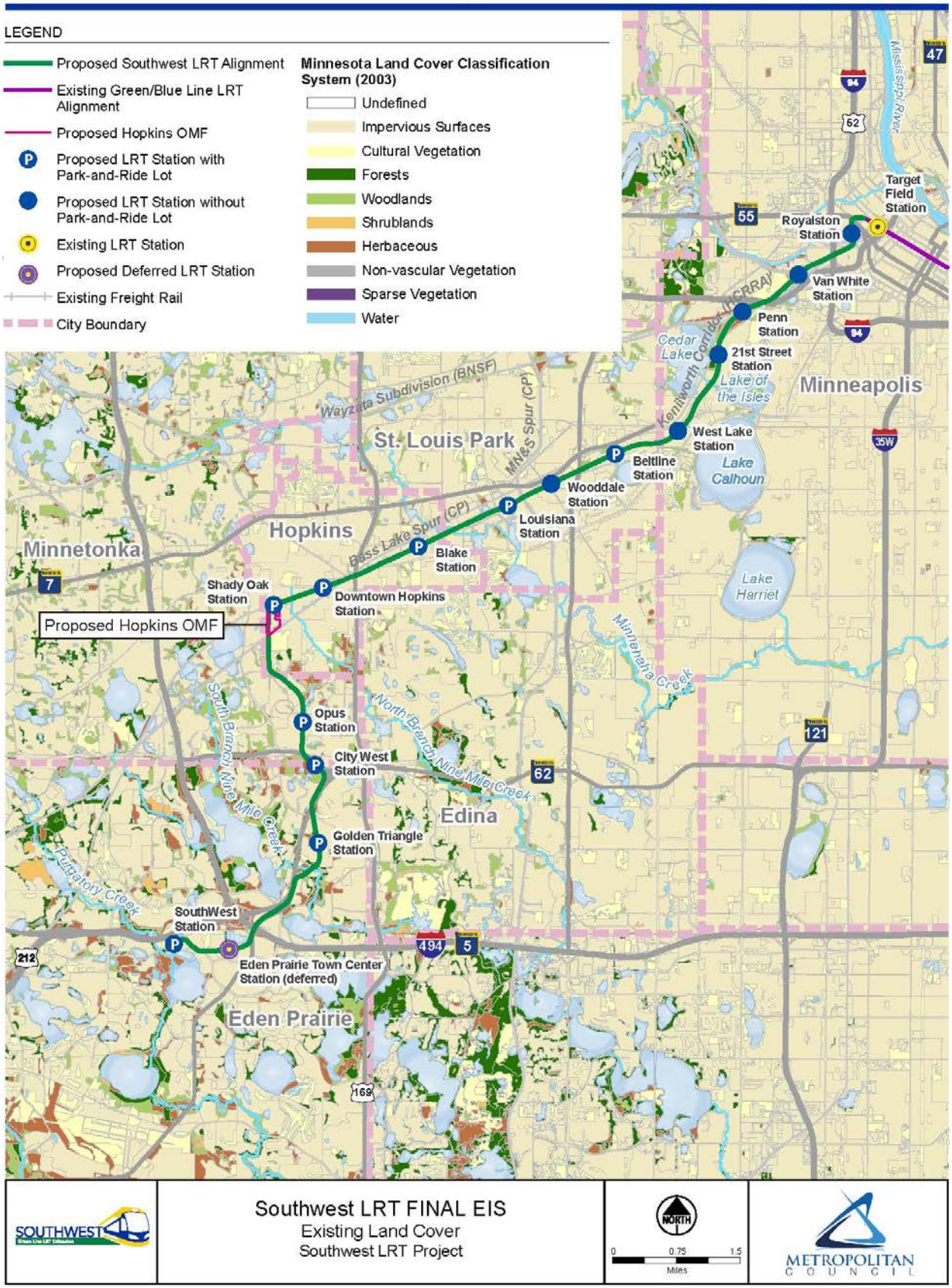
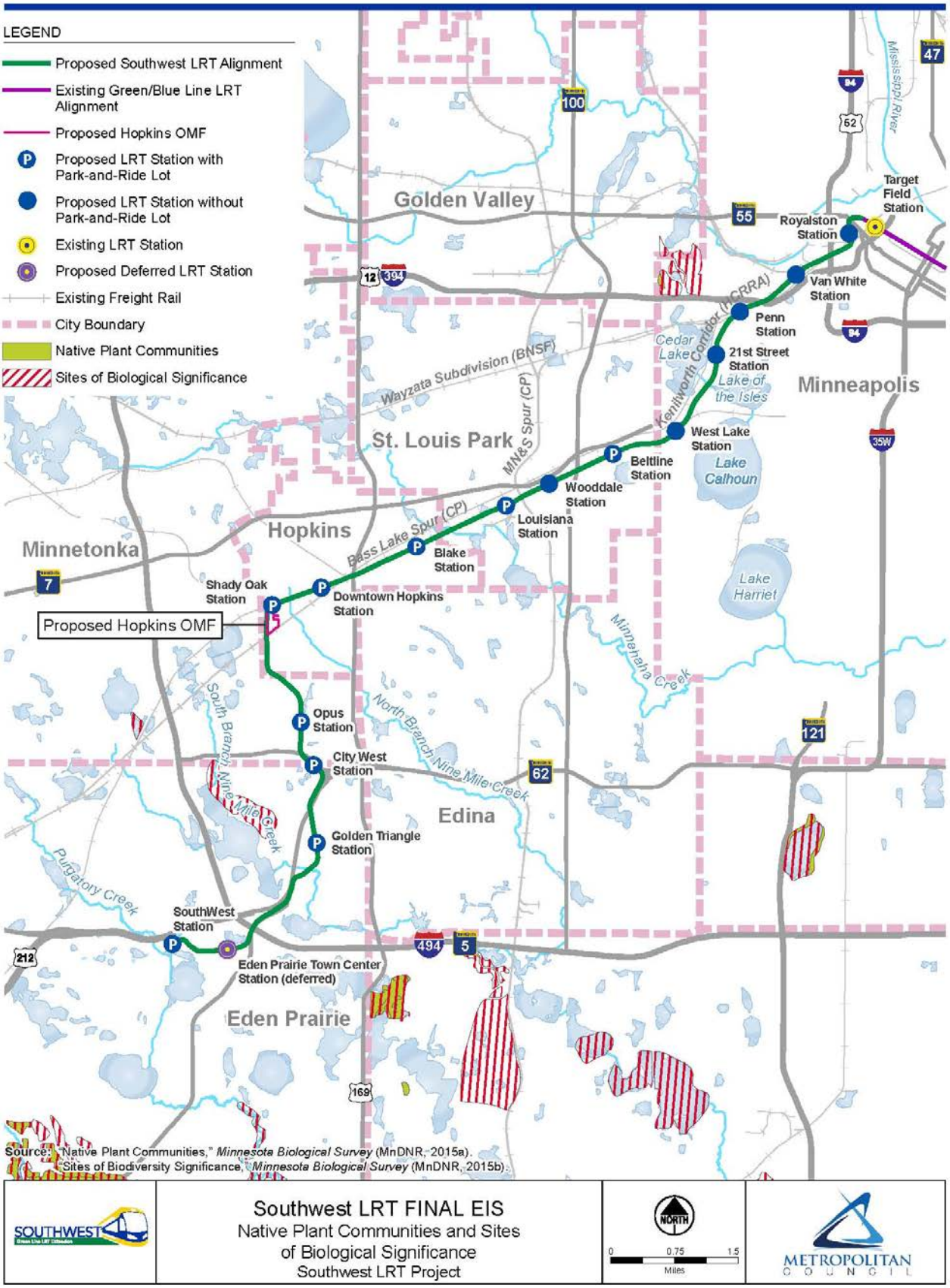


EXHIBIT 3.10-2
Regional Ecological Corridors and Regionally Significant Ecological Areas

EXHIBIT 3.10-3
Native Plant Communities and Sites of Biological Significance



Based on a review of the NHIS database, there are 34 element occurrences of bald eagle nesting sites in the migratory bird study area. However, the closest element occurrence of a bald eagle nesting site is approximately 3.2 miles away from any area that will be disturbed by the Project. In addition, a review of MnDNR's Migratory Waterfowl Feeding and Resting Area geospatial data layer (MnDNR, 2005) indicated that there are no areas meeting this criterion within the migratory bird study area.

3.10.3 Environmental Consequences

This section identifies the long-term and short-term direct and indirect impacts on threatened and endangered species, habitat, and migratory birds from the Project.

3.10.3.1 Threatened and Endangered Species

A. Long-term Direct Impacts on Threatened and Endangered Species

The USFWS concurred that the Project will have "no effect" on the Higgins eye (pearlymussel) and Snuffbox mussel, or their associated critical habitats, and the Project "may affect, but is not likely to adversely affect" the northern long-eared bat. Impacts to the northern long-eared bat are generally temporary in nature and are usually the result of tree removal during construction. The Project will not require tree removal after construction is complete; therefore; the Project will not have long-term direct impacts on any federally listed threatened or endangered species.

As stated previously, there are no element occurrences of the Blanding's turtle within 0.9 mile of the Project's alignment. However, there is an element occurrence of the Blanding's turtle within the MnDNR study area, so the MnDNR has indicated that this species may be adversely affected by the Project. The following MnDNR recommendations are part of the Project's design to avoid long-term direct impacts to the Blanding's turtle (see Appendix N for agency coordination letters):

- Roads have been designed using the minimum standard for widths and lanes when practicable (which reduces road kills by slowing traffic and reducing the distance turtles need to cross).
- Wetland crossings have been elevated where practicable.
- Utility access and maintenance roads have been kept to a minimum where practicable (this reduces road-kill potential).
- Terrain disturbed by the Project will be left with as much natural contour as practicable.

B. Long-term Indirect Impacts on Threatened and Endangered Species

Light rail lines can advance the timing and increase the intensity of development within the limits allowed by local comprehensive plans, particularly surrounding proposed station areas. Long-term indirect impacts to federal- and state-listed threatened and endangered species may occur if new development occurs within the proposed station areas. Future development will be subject to the laws and regulations in place at the time of development.

C. Short-term Impacts on Threatened and Endangered Species

The Council engaged the USFWS to discuss potential short-term impacts to the northern long-eared bat from the construction of the proposed Project. These discussions resulted in the following measures to be implemented during construction to avoid impacts to the northern long-eared bat:

- Seasonal restriction on removal of trees during the summer pup season (June 1 to July 31) at the South Fork Nine Mile Creek
- No activities within ¼ mile of a known hibernacula

The MnDNR has provided a general list of recommendations for avoiding and minimizing short-term construction impacts to Blanding's turtle (see Appendix N for agency coordination letters). The following MnDNR recommendations are part of the Project's design to avoid short-term construction impacts to the Blanding's turtle:

- If found on site, turtles that are in imminent danger will be moved, by hand, out of harm's way. Turtles that are not in imminent danger will be left undisturbed.
- Silt fencing will be established to exclude turtles from construction areas near wetland habitats with the potential to support Blanding's turtles. The silt fencing will be removed after the area has been vegetated.
- Trenches created during construction will be checked for turtles prior to being backfilled.
- Graded areas will be revegetated with native grasses and forbs where practicable.

In addition, MnDNR provided the Council with a Blanding's turtle flyer to be distributed to contractors to inform them of the turtle's potential presence and provide typical construction BMPs (see Appendix N for agency coordination letters). This flyer will be provided to applicable contractors.

3.10.3.2 Habitat

A. Long-term Direct Impacts on Habitat

Long-term impacts to habit include removal, conversion, degradation, or splitting of existing habitat within the areas where the Project's permanent civil improvements will be located. The Project will result in a loss and/or degradation of vegetated areas associated with five natural land cover types, which could result in a decrease in wildlife foraging areas, breeding habitats, and nesting areas. The Project will result in approximately 60 acres of long-term direct impacts on habitat as summarized in Table 3.10-3.

TABLE 3.10-3
Summary of Long-term Direct Impacts to Natural Vegetated Land Cover Types

MLCCS Land Cover Classification	Long-term Direct Impacts to Natural Land Cover (acres)
Herbaceous	34.6
Woodlands	18.8
Forests	4.5
Shrublands	1.1
Water	0.9
Total	59.9

MLCCS = Minnesota Land Cover Classification System.
Source: MnDNR, 2008.

Approximately 43 acres of the Regionally Significant Ecological Areas with long-term direct impacts are ranked as "low" or "medium," and none is ranked as "high," as summarized in Table 3.10-4.

TABLE 3.10-4
Summary of Long-term Direct Impacts to Regionally Significant Ecological Areas

Ranking	Long-term Direct Impacts to RSEAs (acres)
1 (Low)	20.9
2 (Medium)	22.0
3 (High)	0
Total	42.9

RSEA = Regionally Significant Ecological Areas
Source: MnDNR, 2008.

The impacts associated with habitat loss and/or degradation have been avoided or minimized during Project Development through the design adjustment process, including shifting and/or elevating the transitway alignment and associated civil improvements, and using retaining walls and ballast curbs to minimize

impacts. Impacts not completely avoided will be mitigated appropriately after efforts to minimize the impact have taken place. Section 3.10.4.2 describes mitigation measures for habitat loss.

Three urban Regional Ecological Corridors will be bisected by the Project (see Exhibit 3.10-2). Because the proposed light rail alignment will be elevated over the corridors at Interstate 494 near the Eden Prairie Town Center Station and at Highway 100 near the Wooddale Station, only the corridor located at Penn Station could result in habitat fragmentation. To avoid habitat fragmentation at this location, appropriately sized and spaced openings will be provided in the permanent safety/security barriers (fences) in the area located approximately between 21st Street Station and Penn Station to maintain connectivity of terrestrial habitat and allow movement of terrestrial species, primarily small mammals.

In some cases, the Project will result in conversion of habitat type. For example, cutting trees will convert some areas from forested habitat to herbaceous habitat. Where the Project will result in the removal of trees, the Project has and will continue to coordinate with the local jurisdiction on design of the preservation or restoration of landscaping features through construction, as appropriate. See Section 3.9.5 for a discussion on conversion of aquatic habitat.

B. Long-term Indirect Impacts on Habitat

The Project will result in increased disturbance of habitat because of activities associated with the daily operation of the light rail (e.g., noise and lighting), as well as an increase in human activity in or adjacent to habitat areas. It is likely that the species that use habitat within the habitat study area have adapted to survive in urban areas and tolerate high levels of human activity given the limited habitat present. Other indirect impacts could occur if the induced development around the station areas results in direct impacts to natural habitat. The amount of these habitat effects will be limited, because the station areas are located in already urbanized and suburbanized areas.

C. Short-term Impacts on Habitat

The proposed light rail alignment and associated improvements will be located in a predominantly urban area. In general, species occurring in an urban setting are adapted to functioning within a highly variable and altered environment. In addition to the long-term direct impacts listed in Section 3.10.3.2.A, the Project will result in an additional short-term loss of vegetated areas associated with five natural land cover types, which could result in short-term loss of habitat within the areas that will be temporarily disturbed by the Project's construction activities. This loss of habitat is considered short-term because these areas will be revegetated upon the completion of the Project. The Project will result in approximately 23 acres of short-term impacts on habitat, as summarized in Table 3.10-5.

TABLE 3.10-5
Summary of Short-term Impacts on Natural Vegetated Land Cover Types

MLCCS Land Cover Classification	Short-term Impacts on Natural Land Cover (acres)
Herbaceous	15.1
Woodlands	5.1
Forests	2.0
Shrublands	0.8
Water	0.4
Total	23.4

MLCCS = Minnesota Land Cover Classification System.
Source: MnDNR, 2008.

Approximately seven acres of the Regionally Significant Ecological Areas with short-term impacts are ranked as a "low" or "medium," and none is rated as "high," as summarized in Table 3.10-6.

TABLE 3.10-6
Summary of Short-term Impacts on Regionally Significant Ecological Areas

Ranking	Short-term Impacts on RSEAs (acres)
1 (Low)	1.5
2 (Medium)	5.4
3 (High)	0
Total	6.9

RSEA = Regionally Significant Ecological Areas
Source: MnDNR, 2008.

The Project is implementing design features to avoid or minimize construction impacts by placing fencing to isolate areas of construction disturbance, developing a plan prior to construction to minimize the amount of trees and vegetation that will be removed as part of the Project, and protecting aquatic habitat (see Section 3.9 for additional information regarding surface water resources).

Aiding the spread of invasive species or noxious weeds will be avoided by implementing BMPs. An invasive species and noxious weeds management plan will be identified in the Project's construction specifications. The Council will monitor plan compliance during construction. Avoidance efforts will include the following BMPs: using certified weed-free fill when applicable; proper disposal of soils disturbed by the Project and known to contain a seed base of a prohibited invasive species and noxious weeds; and application of a native seed mix soon after grading or construction has been completed to avoid presenting colonization opportunities.

3.10.3.3 Migratory Birds

A. Long-term Direct Impacts on Migratory Birds

The Project will not have a long-term direct impact on migratory birds. It is likely that the regulated migratory bird species present in the migratory bird study area have adapted to survive in urban areas and tolerate high levels of human activity given the limited forest or woodland areas present. Therefore, the Project is not expected to result in long-term impacts on migratory bird populations.

B. Long-term Indirect Impacts on Migratory Birds

It is likely that the regulated migratory bird species present in the Project's vicinity have adapted to survive in urban areas and tolerate high levels of human activity given the limited forest or woodland areas present. Therefore, the Project is not expected to result in long-term indirect impacts on migratory bird populations.

C. Short-term Impacts on Migratory Birds

Short-term impacts on migratory birds are not anticipated as a result of the Project. Because the Project's light rail alignment will be located in a predominantly urban area, the species of migratory birds that regularly travel throughout or nest within this region are likely familiar with and/or have adapted to dealing with construction activities similar to those associated with construction of the Project.

However, construction activities associated with the Project might temporarily disturb a nesting site or alter the path of a migratory bird. To avoid those construction impacts, where appropriate, removal of trees, structures, buildings, brush, shrubs, tall grasses, or ground nesting habitat (i.e. short grasses, weeds, sand, shoreline areas) will occur outside of the local migratory bird primary nesting season (May 1 to August 31). If removal of trees, structures, buildings, brush, shrubs, tall grasses, or ground nesting habitat needs to occur during the primary nesting season, a field survey by a qualified biologist will be conducted to identify and locate nests of migratory birds before the removal of trees, structures, buildings, brush, shrubs, tall grasses, or ground nesting habitat will occur. Specifications within the construction contract will state protocol should active nests be encountered during the field survey prior to removal of trees, structures, buildings, brush, shrubs, tall grasses, or ground nesting habitat or should nests be discovered during construction.

The Council will comply with the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d, 54 Statutes [Stat.] 250), which prohibits taking, possession, or commerce of these species. Specifications within the construction contracts will state that if an eagle nest is observed during construction, contractors will follow the standards included in the *National Bald Eagle Management Guidelines* (USFWS; 2007).[65]

3.10.4 Mitigation Measures

This section describes the measures the Council will implement to mitigate the Project's long-term and short-term threatened and endangered species, habitat, and migratory bird impacts. For each mitigation measure or set of associated mitigation measures, this section generally notes the anticipated impact or associated impacts that the mitigation measures will address (see Sections 3.10.3.1, 3.10.3.2 and 3.10.3.3 for additional information on the identified threatened and endangered species, habitat, and migratory bird impacts, avoidance measures, and BMPs, respectively).

3.10.4.1 Mitigation Measures for Impacts on Threatened and Endangered Species

No mitigation measures are warranted for long-term or short-term impacts to state or federally listed threatened and endangered species, because there will be no impacts due to the effectiveness of identified design features.

3.10.4.2 Mitigation Measures for Impacts on Habitat

This section describes the measures the Council will implement to mitigate the Project's long-term habitat impacts.

A. Long-term Mitigation Measures

Impact. Physical loss of habitat.

> ***Mitigation.*** Native landscaping will be incorporated into the Project's design during Engineering, where applicable and appropriate. Within the Kenilworth Corridor specifically, the Council developed a landscape design that preserves and builds upon the natural character of the corridor, where applicable and appropriate.

B. Short-term Mitigation Measures

Impact. Temporary physical loss of habitat.

> ***Mitigation.*** Habitat that is temporarily disturbed during construction will be re-seeded and restored, where appropriate, upon construction completion.

3.10.4.3 Mitigation Measures for Impacts on Migratory Birds

No mitigation measures are warranted for long-term or short-term impacts to migratory birds, because there will be no adverse impacts to migratory birds due to the effectiveness of identified design features and BMPs.

3.11 Air Quality and Greenhouse Gases

This section describes the long-term direct and indirect and short-term (construction) direct and indirect effects of the Project on air quality and greenhouse gas (GHG) (see Section 3.17 for cumulative impacts). Comparative air quality data for the No Build Alternative are also provided in this section. This section includes an overview of the regulatory context and methodology used for the analysis; an assessment of existing built environment; a description of the anticipated impacts related to air quality and GHG; and a description of mitigation measures to implement with the Project. This analysis is supported by a memorandum discussing methodology, calculations, and results for transportation conformity, mobile source air toxics, and GHG analyses. See the *Air Quality and Greenhouse Gases Analysis, Methodology and*

[65] Standard USFWS guidelines for bald eagle management are located at http://www.fws.gov/northeast/ecologicalservices/eaglenationalguide.html.

Results Technical Memorandum (Technical Memorandum) listed in Appendix C. Instructions on how to access the *Technical Memorandum* are in Appendix C.

3.11.1 Regulatory Context and Methodology

This section describes the regulatory context related to air quality and GHG, and methodologies used to evaluate the project related air quality and GHG/climate change. The air quality impacts of the Project were analyzed by addressing criteria pollutants, a group of common air pollutants regulated by the United States Environmental Protection Agency (EPA) on the basis of information on the health and/or environmental effects of pollution. A qualitative evaluation of Mobile Source Air Toxics (MSATs) has also been performed for this project. The scope and methods of these analyses were developed in collaboration with the Minnesota Pollution Control Agency (MPCA), Hennepin County, the Metropolitan Council (Council), Minnesota Department of Transportation (MnDOT), and Federal Highway Administration (FHWA).

3.11.1.1 Regulatory Context

Federal Clean Air Act and National Ambient Air Quality Standards

Federal air quality policies are regulated through the federal Clean Air Act (CAA). The EPA adopted the CAA in 1970 and its amendments in 1977 and 1990. Pursuant to the CAA, EPA has established nationwide air quality standards, known as the National Ambient Air Quality Standards (NAAQS) (40 CFR Part 50), representing the maximum allowable atmospheric concentrations for six criteria pollutants: ozone, nitrogen dioxide (NO_2), carbon monoxide (CO), particulate matter less than 10 microns in aerodynamic diameter (PM_{10}) and particulate matter less than 2.5 microns in aerodynamic diameter ($PM_{2.5}$), sulfur dioxide (SO_2), and lead. The NAAQS represent safe levels of each pollutant to avoid specific adverse effects to human health and the environment. A summary of the NAAQS is provided in the *Technical Memorandum*.

The Federal CAA requires EPA to classify areas in the country as attainment or nonattainment, with respect to each criteria pollutant, depending on whether the areas meet the national standards. Three air quality designations can be given to an area for a particular pollutant:

- **Nonattainment.** Ambient air quality monitoring data indicate that standards have not been consistently achieved.
- **Attainment.** Air quality standards have been achieved.
- **Unclassified.** There is not enough monitoring data to determine whether the area is in nonattainment or attainment.

Maintenance areas are the former nonattainment areas that are now consistently meeting the NAAQS, and have been reclassified by EPA from "nonattainment" to "attainment with a maintenance plan."

The 1977 CAA amendment requires each state to ensure that its actions "conform to" the state's air quality plan in nonattainment areas, developed and maintained in a State Implementation Plan (SIP), for each criteria pollutant that violates the applicable NAAQS. The SIP serves as a tool to avoid and minimize emissions of pollutants that exceed ambient threshold criteria and to achieve compliance with the NAAQS.

Transportation Conformity

The process for determining compliance with a SIP is known as "transportation conformity." Conformity to a SIP requires that a proposed project not cause a violation, worsen an existing violation, or delay timely attainment of the NAAQS. Transportation conformity is an analytical process required for all federally-funded transportation projects. Conformity requirements apply only in nonattainment and maintenance areas of the NAAQS.

Demonstration of conformity with the CAA takes place on two levels for transportation projects: the regional, or planning and programming level; and the project level. A project must conform at both levels to be approved. Regional conformity is demonstrated when a project is included in a financially constrained conforming Transportation Improvement Program (TIP) and Long-Range Transportation Plan. At project level, a project must not cause a new local violation of the NAAQS, or exacerbate an existing violation of the federal standards for CO, $PM_{10,}$ and $PM_{2.5}$.

Conformity at the project level requires "hot spot" analysis if an area is nonattainment or maintenance for CO and/or PM_{10} and $PM_{2.5}$. The localized CO, $PM_{2.5}$, and PM_{10} hot spot analyses are not required for construction-related activities that occur only during the construction phase and last five years or less at any individual site (40 CFR 93.123(c)(5)).

Because the Project is located in Hennepin County, which is in a maintenance area for CO, the Project is subject to the transportation conformity requirements. Detailed methodologies for conformity demonstration are discussed in Section 3.11.1.2.

Mobile Source Air Toxics

In addition to the criteria pollutants, EPA also regulates air toxic emissions. Controlling mobile source air toxic (MSAT) emissions became a national priority with the passage of the Clean Air Act Amendments of 1990, whereby Congress mandated that the EPA regulates 188 air toxics, also known as hazardous air pollutants.

No federal or state ambient standards exist for MSATs. Specifically, EPA has not established NAAQS or provided standards for hazardous air pollutants. Methodologies for evaluating the MSAT effects related to the Project are discussed in Section 3.11.1.2.

Greenhouse Gases and Climate Change

GHGs are gases that trap heat in the atmosphere. These emissions occur from natural processes and human activities. The accumulation of GHGs in the atmosphere can potentially influence the long-term range of average atmospheric temperatures. Scientific evidence indicates a trend of increasing global temperature over the past century due to an increase in GHG emissions from human activities (EPA, 2015).

Climate change and its associated effects are being addressed through various efforts at the federal level to improve fuel economy and energy efficiency, such as Executive Order 13693 – *Planning for Federal Sustainability in the Next Decade*, signed on March 19, 2015. Executive Order 13693 sets a goal of 40 percent reduction in GHG emissions by implementing more efficient federal agency operations and revokes and supersedes Executive Order 13524. It focuses on reducing GHGs internally in federal agency missions, programs, and operations.

The Council on Environmental Quality (CEQ) released revised draft guidance on the consideration of GHG in National Environmental Policy Act (NEPA) documents for all federal actions on December 18, 2014. The revised guidance established a reference point of 25,000 metric tons of CO_2-e emissions on an annual basis, below which a quantitative GHG emissions analysis is not warranted, unless quantification below that reference point is easily accomplished. The revised guidance went on to further state that if an Agency describes the emissions on a qualitative basis, it must include a discussion on why a quantitative analysis cannot be prepared for the given action.

State and local agencies are also taking initiatives to address the GHG emissions and climate change. Minnesota's Next Generation Energy Act of 2007 established a 2015 reduction goal 15 percent below 2005 emissions. The longer term goals of the Next Generation Energy Act are to reduce emissions 30 percent below 2005 emissions by 2025, and 80 percent below 2005 emissions by 2050.

Consistent with the state GHG reduction target, the Hennepin County Board adopted the Cool County Initiative in 2007 (Hennepin County, 2007), calling for the reduction of GHG emissions by 15 percent by 2015, 30 percent by 2025, and 80 percent by 2050, from a baseline of 2005.

3.11.1.2 Methodology

This section discusses the methodologies used to evaluate the air quality impacts of the Project.

Transportation Conformity

Because the Project will be located in an area that is designated as maintenance for CO national air quality standards, the Project is subject to the transportation conformity requirements for CO emissions (i.e., demonstrate conformity at both regional and project levels).

Regional Conformity

At the regional level, Regional Transportation Plans (RTPs) are developed that include the transportation projects planned for a region over a period of years, usually at least 20 years. If a proposed project is included in a conforming and financially constrained RTP, and the design and scope of the Project is the same as that described in the RTP, the proposed project is deemed to meet regional conformity.

Project-Level Conformity

Demonstrating project level conformity requires that the project is also listed in the Regional Transportation Improvement Program (RTIP), with the same design concept and scope. The project must not cause a new local violation of the federal standards or exacerbate an existing violation of the federal standards for CO.

Because the Project is located in a CO maintenance area, project-level conformity was demonstrated by performing a CO "hot spot" analysis. The project-level hot spot analyses for PM_{10} and $PM_{2.5}$ are not required for this project because the Project is in an attainment area for these two pollutants.

Procedures for determining hot spot CO concentrations are set forth in 40 CFR 93.123; however, EPA approved a screening method for the Twin Cities area to determine if a detailed hot spot analysis is necessary (MnDOT, 2009).

- The first criterion in this screening method is to determine if the Project annual average daily traffic[66] (AADT) is greater than the benchmark AADT. The benchmark AADT for the Twin Cities is 79,400, as identified in MnDOT's Intersection Benchmark Criteria for Twin Cities CO Maintenance Area (MnDOT, 2009). This value is equal to the highest intersection AADT in Twin Cities CO maintenance area based on 2007 data.
- The second criterion is to determine whether the Project involves one of the "top 10" intersections[67] in the Twin Cities CO Maintenance Area.

Following this EPA-approved approach, a screening analysis was performed for the affected intersections in the project vicinity by comparing the AADT at the affected intersections to the Twin Cities benchmark values. If the affected intersections have AADT less than the benchmark values and none of the intersections are within the top 10 intersections of the Twin Cities CO maintenance area, the Project demonstrates project-level conformity and a detailed CO hot spot modeling analysis is not required.

Mobile Source Air Toxic Analysis

Currently, FTA has not adopted guidance on evaluating MSAT impacts from transit projects. Therefore, MSAT impacts of the Project are evaluated following the FHWA's *Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA* (FHWA, 2012a).

Because the Project is expected to improve the regional and local traffic conditions when it is fully built by the opening year of 2020 and it does not involve adding diesel vehicle travel into the region, MSAT impacts because of the Project are highly unlikely; however, the Project will change localized vehicle traffic patterns, especially near the stations and parking facilities. The Project will have low potential MSAT effects. Therefore, a qualitative MSAT analysis was performed following the FHWA guidance (FHWA, 2012a).

[66] Annual Average Daily Traffic (AADT) represents the total volume of vehicle traffic over the course of an average 24-hour day. AADT is a theoretical value based on traffic volumes collected in the field which have then been adjusted to account for seasonal or day-of-the-week fluctuations in traffic.

[67] Top 10 Intersections have the highest vehicle volume and worst level of service in the Twin Cities CO Maintenance Area based on 2007 data. These intersections are:
Highway 169 at CSAH 81, Highway 7 at CSAH 101, Highway 252 at 85th Avenue, University Avenue at Snelling Avenue, Highway 252 at Brookdale Drive, Cedar Avenue at County Road 42, Highway 7 at Williston Road, University Avenue at Lexington Avenue, Highway 252 at 66th Avenue, Hennepin Avenue at Lake Street (MnDOT, 2009).

3.11.1.3 Greenhouse Gas and Climate Change

GHGs are different from other air pollutants evaluated in environmental reviews. Their impacts are not localized because these gases rapidly disperse into the global atmosphere; however, GHG emissions on a project level can serve as a proxy for assessing a proposed action's potential impact on climate change.

Currently, neither the EPA nor FTA has adopted quantitative GHG emission thresholds applicable to the Project. Nevertheless, GHG emissions associated with the regional vehicles (i.e., personal automobiles, transit buses, and rail vehicles) in the seven-county Twin Cities metropolitan area were estimated based on the projected changes in vehicle miles traveled (VMT) under the Project. GHG emissions were calculated by multiplying the VMT of each type of vehicle by the CO_2 emission factors taken from the *New and Small Starts Evaluation and Rating Process Final Policy Guidance* (FTA, 2013b).[68] Table 3.11-1 shows the New Starts GHG emission factors.

TABLE 3.11-1
FTA New Starts GHG Emission Factors (g CO_2e/VMT)[a]

Mode	Current Year	10-year Horizon	20-year Horizon
Automobile	532	434	397
Bus – Diesel	3,319	2,854	2,721
Bus – Hybrid	2,655	2,283	2,177
Bus - CNG	2,935	2,524	2,406
Bus - Electric	2,934	2,441	2,303
Heavy Rail	3,211	3,106	3,073
Light Rail and Streetcar	4,779	4,623	4,574
Commuter Rail - Diesel (new) and DMU	7,970	7,970	7,970
Commuter Rail - Diesel (used)	7,970	7,970	7,970
Commuter Rail - Electric and EMU	5,821	5,632	5,572

[a] Grams per carbon dioxide equivalent per vehicle mile traveled.
Acronyms: CNG = compressed natural gas; DMU = diesel multiple unit; EMU = electric multiple unit
Source: *New and Small Starts Evaluation and Rating Process Final Policy Guidance* (FTA, 2013b).

3.11.2 Affected Environment

This section describes the existing air quality conditions of Hennepin County where the Project is located. This section also includes a description of the air pollution criteria, MSATs, and GHGs.

3.11.2.1 Criteria Air Pollutants

Hennepin County has been designated as a maintenance area for CO and SO_2 (1971 standard) by EPA. Because of the maintenance designation for CO, the transportation air quality conformity rule (40 CFR Part 93, Subpart A) applies to the region. For the other pollutants listed in Table 3.11-2, the Project is located in an attainment/unclassifiable area (ozone, NO_2, PM_{10} and $PM_{2.5}$).

The monitoring data of Hennepin County are summarized in Table 3.11-2. The monitoring data demonstrated the criteria pollutants in the region are below the NAAQS for the last three years.

[68] FTA's evaluation of environmental benefits in the New Starts guidance (FTA, 2013b) estimates GHG emissions by using a combination of tools best suited for assessing emissions from different vehicle types and regulated air pollutants. Emission rates of automobiles, diesel, and compressed natural gas (CNG) transit buses are based on MOVES 2010a; and electric powered vehicles (including transit vehicles) PM, volatile organic compound, and CO forecasts are based on current emission levels in Argonne National Laboratory's Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation Model (GREET) model and forecast generating mix from the U.S. Department of Energy's Annual Energy Outlook.

TABLE 3.11-2
Ambient Air Quality Monitoring Data of Hennepin County

Pollutant	2011	2012	2013	NAAQS
Ozone[a]				
1-hour average	ND	ND	0.075 ppm	0.075 ppm
CO[b]				
1-hour average	1.9 ppm	2.6 ppm	1.8 ppm	35 ppm
8-hour average	1.3 ppm	1.3 ppm	1.1 ppm	9 ppm
NO_2[b]				
1-hour average	ND	ND	54 ppb	100 ppb
PM_{10}[c]				
24-hour average	60 $\mu g/m^3$	37 $\mu g/m^3$	39 $\mu g/m^3$	150 $\mu g/m^3$
$PM_{2.5}$[d]				
24-hour average (98th Percentile)	25 $\mu g/m^3$	25 $\mu g/m^3$	21 $\mu g/m^3$	35 $\mu g/m^3$
Annual arithmetic average	8.6 $\mu g/m^3$	8.8 $\mu g/m^3$	9.1 $\mu g/m^3$	12 $\mu g/m^3$
SO_2[e,f]				
1-hour average	7 ppb	9 ppb	18 ppb	140 ppb
24-hour average	2 ppb	4 ppb	16 ppb	75 ppb

[a] Ozone monitoring data were from 1444 E. 18th Street in Minneapolis.
[b] CO and NO_2 monitoring data were from 1444 E. 18th Street and 528 Hennepin Avenue in Minneapolis.
[c] PM_{10} monitoring data were from 309 South 2nd Avenue in Minneapolis.
[d] $PM_{2.5}$ monitoring data were from 2727 South 10th Avenue in Minneapolis and 5005 Minnetonka Boulevard in St. Louis Park.
[e] SO_2 monitoring data were from 528 Hennepin Avenue in Minneapolis.
[f] Project-level SO_2 analysis is not required under conformity regulations (http://www3.epa.gov/otaq/stateresources/transconf/regs/420b12013.pdf).
Acronyms: $\mu g/m^3$ = micrograms per cubic meter; ND = no data collected; ppb = parts per billion
Source: EPA, 2014. http://www3.epa.gov/airdata/.

3.11.2.2 Mobile Source Air Toxics

The regional or local air toxic concentrations of MSAT emissions are affected by changes of vehicle mix types and miles traveled (FHWA, 2012a). Nationwide MSAT emissions are expected to be lower than present levels in the future years as a result of EPA's national control programs that are projected to reduce annual MSAT emissions (FHWA, 2012a). For example, based on an FHWA analysis using EPA's MOVES2010b model, as illustrated on Exhibit 3.11-1, even if 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.

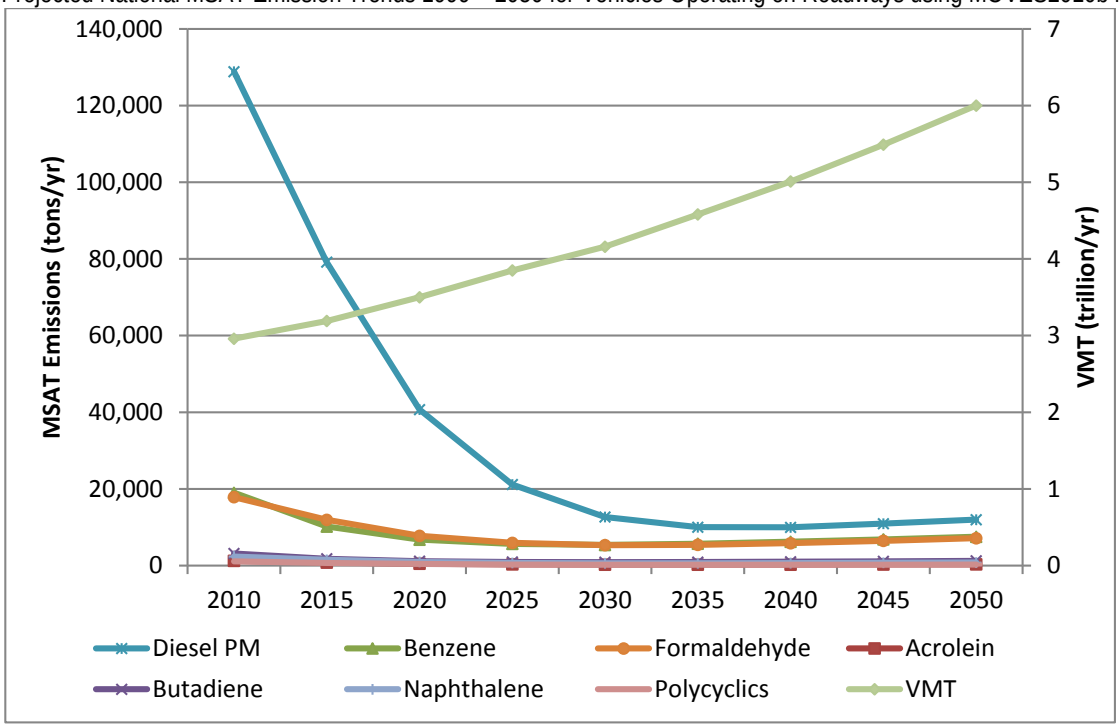
Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures; however, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future.

3.11.2.3 Greenhouse Gases

Minnesota's GHG inventory, published in March 2008, provides historical GHG emissions estimates from 1990 through 2005 and reference case projections from 2006 to 2025. GHG emissions in 2012, expressed as CO_2e, totaled 154 million tons. The electric power and transportation sectors together account for 56 percent of the 2012 GHG emissions in the state. Between 2005 and 2012, GHG emissions from Minnesota declined by 11 million tons of CO_2e, or about 7 percent, with the most significant reductions coming from electric power utilities and transportation energy use (MPCA and Minnesota Department of Commerce, 2015).

Since 2007, Hennepin County has conducted annual inventory of GHG emissions. Based on Hennepin County's 2012 report (Hennepin County, 2013a), CO_2e emissions from Hennepin County

EXHIBIT 3.11-1
Projected National MSAT Emission Trends 1999 – 2050 for Vehicles Operating on Roadways using MOVES2010b Model



Note: Trends for specific locations may be different, depending on locally derived information representing VMT, vehicle speeds, vehicle mix, fuels, emission control programs, meteorology, and other factors.

Source: EPA MOVES2010b model runs conducted during May – June 2012 by FHWA (FHWA, 2012a).

operations totaled approximately 92,000 metric tons, which continues a trend of decreasing GHG emissions and demonstrates that the county is on track to meet its goal of a 15 percent reduction from the 2005 emission level of 107,000 metric tons by 2015.

3.11.3 Environmental Consequences

The Project will result in changes to air quality due to changes in air pollutant emissions from construction and operation of the Project. During construction, vehicle and construction equipment exhaust emissions and fugitive dust emissions from earth-moving activities will result in temporary air quality impacts. During operation, switching of travel mode and the subsequent changes of traffic conditions in the project vicinity will result in localized air quality impacts. The air quality impacts for the Project were evaluated in this chapter for the horizon year of 2040.

3.11.3.1 Transportation Conformity

The Project will be located in a federal maintenance area for CO and SO_2; therefore, the Project is subject to transportation conformity requirements and needs to demonstrate regional and project-level conformity.

A. Regional Conformity

Regional conformity for transportation projects is satisfied by inclusion of the transportation project in an approved RTP and TIP. The proposed project is listed in the region's long-range transportation plan, the *2040 Transportation Policy Plan (TPP)* (Council, 2015e) as "Metro Green Line Extension, 16-mile light rail extension of the Green Line with plans to include 16 new stations from Minneapolis to Eden Prairie." The Council adopted the 2040 TPP on January 14, 2015. The FHWA/FTA approved the conformity determination of the 2040 TPP on March 13, 2015. The Project is also included in the 2015-2018 TIP that was adopted by the Council on September 24, 2014, and approved by the FHWA/FTA on November 5, 2014. The regional analysis of the 2040 TPP and the 2015-2018 TIP shows that the planned emissions are below the EPA-established emissions budget for the region. The Project does not interfere with the implementation of any transportation control measures included in the SIP. Although the total length of the light rail extension

changed from 16 miles to 14.5 miles, after design adjustments were identified by the Council in July 2015, the overall project's design concept and scope are consistent with what were used in the 2040 TPP and 2015-2018 TIP (through Amendment conformity analyses). The relevant pages showing the project list in the TPP and TIP as well as the FHWA/FTA approval letters are included in *Air Quality and Greenhouse Gases Analysis Methodology and Results Technical Memorandum,* listed in Appendix C. Instructions on how to access the *Technical Memorandum* are in Appendix C.

The proposed freight rail modifications (see Section 4.4) included within the Project are not included in the Metropolitan Planning Organization's TPP or in the four-year TIP. The modifications to freight rail under the Project will not result in the relocation of the freight rail to another corridor, additional freight train trips, or unforeseen stops or idling of freight trains compared to the current freight rail operating scenario. Therefore, under the MnDOT definition, the freight rail modifications within the Project are not considered a regionally significant project for the purposes of air quality conformity and are not required to be included in the TPP or TIP.

As such, the Project conforms to the requirements of the CAA and the Transportation Conformity Rule (40 CFR Part 93).

B. Project-level Conformity

The Project will be located in a federal maintenance area for CO and SO_2 and, as such, under the conformity rule, must also demonstrate project-level conformity for CO. This section evaluates whether the proposed project will cause or contribute to any new localized CO violations.

Carbon Monoxide Hot Spot Analysis

This section describes the potential CO impacts from vehicle traffic at intersections that will be affected by the Project.

Following the CO hot spot screening procedure approved by EPA for the Twin Cities CO Maintenance Area as discussed in Section 3.11.1.2, the forecasted AADT at intersections that will be affected by the Project were compared to the Twin Cities CO Maintenance Area's benchmark AADT of 79,400, as identified in MnDOT's *Intersection Benchmark Criteria* (MnDOT, 2009). A list of the intersections that will be affected by the Project and the forecasted AADT at each of the intersection in 2040 for the Project are shown in the *Technical Memorandum*. The highest AADT at the affected intersections will be 63,330, located at the intersection of Blake Road (CSAH 20) and Highway 7. Because the worst-case AADT of the affected intersection is less than the benchmark AADT of 79,400, all other intersection AADTs are lower than the CO screening procedure benchmark. In addition, none of the intersections are among the "top 10" intersections that have the highest traffic volumes in the Twin Cities CO Maintenance Area.

As discussed above, the Project is not be expected to cause localized CO concentrations that violate the NAAQS, and a detailed modeling analysis of CO "hot spot" is not required.

3.11.3.2 Mobile Source Air Toxics Analysis

The Project will cause changes in VMT for a variety of vehicles such as passenger vehicles, buses, and rail vehicles. These VMT changes will result in changes in the MSAT emissions locally and regionally. Potential MSAT effects from the Project operations were evaluated following the FHWA Memorandum titled *Interim Guidance Update on Air Toxic Analysis in NEPA Documents* (FHWA, 2012a).

According to the interim guidance, the types of projects considered to have low potential for MSAT effects include those that serve to improve operations of highway, transit, or freight without adding substantial new capacity or without creating a facility that is likely to meaningfully increase MSAT emissions.

The Project will improve access and mobility to the jobs and activity centers in the Minneapolis central business district, and support regional transportation efficiency. The Project is projected to reduce vehicle travel on roadways of the region when passengers switch from driving or using buses to light rail. Therefore, the Project will not create or add significant capacity to urban highways, or concentrate high levels of diesel vehicles at a single location, and has design year (2040) traffic less than 140,000 AADT.

As shown in Table 3.11-3, the regional VMT for cars and trucks for the Project will be lower than those for the No Build Alternative. The VMT decrease of cars and trucks under the Project is attributed to removal of vehicles from roadways when people switch from driving to using light rail. There will be an increase in bus VMT from Metro Transit buses with the Project, but the bus VMT increase is lower than the VMT reduction by cars and trucks, resulting in a net decrease of VMT. Therefore, the overall MSAT emissions from vehicles on the region's highways and surface streets will decrease compared to the No Build Alternative.

TABLE 3.11-3
Average Weekday VMT of the Region [a]

	2013 VMT	2040 VMT	
	Existing	No Build	Project
Cars	79,205,393	99,435,381	99,317,589
Trucks	2,454,774	3,192,153	3,191,577
Bus (Metro Transit)	98,430	107,478	112,942
Diesel Bus	90,950	99,310	104,358
Hybrid Bus	7,481	8,168	8,584
Bus (Other Agencies, Diesel)	48,539	85,099	83,924
LRT	14,480	23,997	33,013
Commuter rail	1601	1601	1601
Total VMT	81,823,217	102,845,709	102,740,646

[a] Regional VMT refers to data for the seven-county Twin Cities metropolitan area.
Source: AECOM Travel Demand Model, August 2015.

Project operations will have the potential effect of increasing MSAT emissions in the vicinity of nearby homes, schools, and businesses; therefore, under the Project there may be localized areas where ambient concentrations of MSATs will be higher than under the No Build Alternative. The localized increases in MSAT emissions will likely occur near the proposed light rail stations, the park-and-ride lots, and OMF; however, as discussed in the *Technical Memorandum*, the magnitude and the duration of these potential effects cannot be reliably quantified due to incomplete or unavailable information in forecasting project-specific health impacts. In addition, even if these increases do occur, they will be substantially reduced in the future due to implementation of EPA's vehicle and fuel regulations.

In summary, the Project in the design year is expected to be associated with lower levels of MSAT emissions in the region, relative to the No Build Alternative, along with benefit from improvements in speed and reductions in region-wide vehicle traffic. There could be slightly higher MSAT levels in localized areas where Project-related activities (e.g. automobile trips to park-and-ride lots) will occur closer to homes, schools, and businesses. (MSAT levels are likely to decrease over time due to nationally mandated cleaner vehicles and fuels.)

This MSAT analysis includes a basic analysis of the likely MSAT impacts of the proposed project. Limitations of information and methodology for the MSAT analysis, in accordance with CEQ regulations regarding incomplete or unavailable information (40 CFR 1502.22[b]), are included in the *Technical Memorandum.*

3.11.3.3 Greenhouse Gas

This section discusses the GHG emissions from project operation and construction. It concludes with an assessment of the Project's potential to aid in achieving state and regional GHG emissions reduction goals.

A. Project Operation Greenhouse Gas Emissions

The Project operation will result in a net GHG emissions reduction in the region and beneficial to GHG and climate change impacts. GHG emissions were estimated using the *New and Small Starts Evaluation and Rating Process Final Policy Guidance* (FTA, 2013b) as described in Section 3.11.1.3. A summary of the GHG emissions from the regional vehicles (i.e., personal automobile, trucks, and transit buses and rail vehicles) in 2040 is shown in Table 3.11-4. Detailed GHG emission calculations are in the *Technical Memorandum*.

TABLE 3.11-4
Annual Greenhouse Gas Emissions of the Region [a] (metric Tons in 2013 and 2040)

	2013	2040	
	metric tons	No Build (metric tons)	Build (metric tons)
Autos	15,380,103	14,408,684	14,391,615
Trucks	476,668	462,559	462,475
Bus (Metro Transit)	117,430	105,122	110,466
Bus (other Agencies, Diesel)	58,802	84,517	83,350
LRT	25,258	40,063	55,116
Commuter rail	4,657	4,657	4,657
Total Emissions	16,062,918	15,105,602	15,107,680

[a] Region: The seven-county Twin Cities metropolitan area

When compared to 2013 existing conditions, the GHG emissions in 2040 will decrease by more than 955,000 and 957,000 metric tons per year, respectively, for the Project and No Build Alternative. These emission reductions are related to factors such as the overall improvements of the region's travel network, the use of newer and more fuel efficient vehicles, and the improvements of emission control technologies.

The Project will reduce regional VMT of automobiles, trucks, and buses on roadways in 2040 by approximately 113,000 miles (see Table 3.11-3) compared to No Build Alternative. Although the Project will generate GHG emissions from the proposed light rail operation and the additional Metro Transit bus service, the majority of these emissions will be offset by the GHG emission reductions from removing portions of passenger vehicles from the roadways in the region. The Project operation will increase the GHG emission in the Twin Cities area by approximately 2,000 metric tons per year in 2040 compared to No Build Alternative. Compared to the total GHG emissions from vehicles and transit rail in the Twin Cities area of over 15 million metric tons per year (Table 3.11-4), the 2,000 metric tons per year of GHG emissions increases are minimal (less than 0.015 percent), and thus are not anticipated to cause substantial impacts to the environment or climate change.

The proposed project construction may require removal of a limited number of trees and disturb some vegetated areas along the rail corridor. Trees and vegetation sequester CO_2 through the process of photosynthesis and store the gas as carbon in their biomass. When trees and vegetation are removed, some of their stored carbon may be released as CO_2 into the atmosphere, although the quantity and rate of CO_2 that is emitted may vary, depending on the amount of removal and how the biomass would be handled afterwards. Because the number of trees and the area of vegetation disturbance would be limited during Project construction, the effects on the sequestered CO_2 or the loss of carbon stored in the removed trees or vegetation would be minimal and thus are not further analyzed.

B. Project Construction Greenhouse Gas Emissions

Project construction will have the potential to emit GHGs from the construction equipment and vehicles. The short-term GHG emissions during the construction period of the Project will be temporary, and implementation of Best Management Practices (BMPs), such as using energy efficient construction equipment vehicles and limiting the equipment and vehicle idling time during construction, will reduce GHG emissions from construction activities.

The FHWA Infrastructure Carbon Estimator (ICE) model was used to estimate construction and maintenance GHG emissions. The ICE model estimates the lifecycle energy and GHG from the construction and maintenance of transportation facilities.

Construction activities for the Southwest LRT are planned between 2017 and 2019; therefore, the majority of construction was conservatively assumed to be over a three-year period. Construction project types, as input into the ICE model, are provided in the *Technical Memorandum*.

GHG emissions are categorized as upstream energy materials or direct energy for routine construction activities. Model results are shown in Table 3.11-5 as metric tons (MT) of carbon dioxide equivalent (CO2e) per year. Changes of the GHG emissions due to direct emissions from Project construction will be minimal. Most of the GHG emission presented in Table 3.11-5 would be from the indirect upstream emissions of raw materials energy consumption, including raw material extraction, production, and transportation.

TABLE 3.11-5
Annual Greenhouse Gas Emissions

Energy Use Type	Bridges (MT CO_2e/year)	Rail (MT CO_2e/year)	Total (MT CO_2e/year)
Upstream Energy Materials	680	66,125	66,805
Direct Emissions Construction	150	3,718	3,868
Routine Maintenance	N/A	N/A	165
Total	830	69,843	70,838

Note: See *Technical Memorandum* for construction project types.
Source: Council, 2015

C. Conclusions

Currently, there are no quantitative GHG emission thresholds at federal or state levels that are applicable to the Project. The Project's construction emission is temporary, and the Project would make an effort to minimize the amount of emissions generated during construction. If amortized over the life of the Project, the GHG emission from this Project is minimal. In addition, the Project is included in the regional RTP and TIP, which consider climate change mitigation, adaptation and resilience for sustainable development of the region. Therefore, GHG emissions from the proposed Project will not hinder the region's GHG emission reduction efforts.

3.11.3.4 Indirect Air Quality Impacts

The Project will provide more options for public transportation; therefore, the reliance on passenger cars for daily work commute and recreational trips will be reduced as people choose transit instead of driving. The reduced vehicle travel on highways and local streets will help to relieve traffic congestion. Because air pollution tends to accumulate at locations with many vehicles idling or traveling at low speeds, the improved traffic conditions will reduce vehicle emissions and contribute to indirect air quality improvements.

3.11.3.5 Short-term Impacts on Air Quality

Project construction activities can result in short-term increases in dust and equipment-related emissions in the project vicinity. Exhaust emissions during construction will be generated by fuel combustion in motor vehicles and construction equipment, and particulate emissions will result from soil disturbance, earthwork, and other construction activities. Construction vehicle activity and disruption of normal traffic flow may result in increased motor vehicle emissions within certain areas. Potential air quality impacts will be short-term, occurring only while construction work is in progress. BMPs described below will be implemented to minimize the air pollutant emissions during construction.

The Project will comply with federal and state regulations, including the EPA's emission standards for on-road vehicles and off-road construction equipment, the state air regulations in Chapter 7023: Mobile and Indirect Sources, and the applicable MnDOT Standard Specifications for construction. The Project will also implement BMPs to avoid or minimize the temporary construction emission impacts. Examples of the short-term BMPs may include, but are not limited to the following:

- Minimization of land disturbance during site preparation
- Watering of the construction site
- Stabilization of dirt piles if they are not removed immediately
- Use of dust suppressants on unpaved areas
- Covering of trucks while hauling soil/debris offsite or transferring materials
- Minimization of unnecessary vehicle and machinery idling
- Use of energy efficient equipment and vehicles

EPA recommends the following measures to reduce short-term construction impacts to air quality. These measures will be implemented where applicable:

- Use ultra low-sulfur diesel fuel.
- Retrofit engines with an exhaust filtration device to capture diesel particulate matter before it enters the construction site.
- Position the exhaust pipe so that diesel fumes are directed away from the operator and nearby workers, thereby reducing the exposure of personnel to concentrated fumes.
- Use catalytic converters to reduce CO, aldehydes, and hydrocarbons in diesel fumes. These devices must be used with low sulfur fuels.
- Attach a hose to the tailpipe of diesel vehicles running indoors and exhaust the fumes outside, where they cannot reenter the workplace. Inspect hoses regularly for defects and damage.
- Use enclosed, climate-controlled cabs pressurized and equipped with high efficiency particulate air (HEPA) filters to reduce the operators' exposure to diesel fumes. Pressurization ensures that air moves from inside to outside. HEPA filters ensure that any incoming air is filtered first.
- Regularly maintain diesel engines, which is essential to keep exhaust emissions low. Follow the manufacturer's recommended maintenance schedule and procedures. Smoke color can signal the need for maintenance. For example, blue/black smoke indicates that an engine requires servicing or tuning.
- Reduce exposure through work practices and training, such as turning off engines when vehicles are stopped for more than a few minutes, training diesel-equipment operators to perform routine inspection, and maintaining filtration devices.
- Purchase new vehicles that are equipped with the most advanced emission control systems available.
- With older vehicles, use electric starting aids such as block heaters to warm the engine to reduce diesel emissions.
- Use respirators, which are only an interim measure to control exposure to diesel emissions. In most cases, an N95 respirator is adequate. Workers must be trained and fit-tested before they wear respirators. Depending on work being conducted, and if oil is present, concentrations of particulates present will determine the efficiency and type of mask and respirator. Personnel familiar with the selection, care, and use of respirators must perform the fit testing. Respirators must bear a NIOSH approval number.

According to 40 CFR 93.123(c)(5), "CO, PM_{10}, and $PM_{2.5}$ hot spot analyses are not required to consider construction-related activities which cause temporary increases in emissions. Temporary increases are defined as those which occur only during the construction phase and last five years or less at any individual site." Because the duration of construction activities for the Project will not exceed five years, construction emissions are considered a temporary impact and are not required for the project-level conformity analysis.

3.11.4 Mitigation Measures

No mitigation measures related to long-term air quality and GHG impacts are warranted because air quality and GHG impacts associated with the Project operation will not be substantial. No mitigation measures related to short-term air quality are warranted because the construction emissions are expected to be temporary and will not cause long-term air quality impacts.

3.12 Noise

This section describes the long-term direct and indirect and short-term (construction) direct and indirect noise impacts from the Project (see Section 3.17 for cumulative impacts). This section provides an overview of the regulatory context and methodology used for the analysis, an assessment of existing noise conditions, a description of the anticipated impacts related to noise, and a description of mitigation measures to implement with the Project. A technical report has been prepared in support of this section (see Appendix K).

3.12.1 Regulatory Context and Methodology

This section describes the methodology used to assess predicted noise impacts for the Final EIS and to develop mitigation strategies. Noise has been assessed in accordance with guidelines specified in the FTA's *Transit Noise and Vibration Impact Assessment* guidance manual (FTA, 2006).

The FTA guidance manual is the primary source for the noise assessment methodology. Noise impacts were evaluated using the Detailed Noise Assessment methodology contained in Chapter 6 of the FTA guidance manual (FTA, 2006). The noise assessment included the following steps:

- Identify noise-sensitive land uses in the corridor using aerial photography, GIS data and field surveys, typically within 300 feet of the alignment (see Section 3.12.2.1).
- Measure existing noise levels in the corridor near sensitive receptors (see Section 3.12.2.2).
- Predict future project noise levels from transit operations, using Project preliminary engineering plans and information on speeds, headways, track type, vehicle type, and grade-crossing operations. The project noise level assessment included LRT operations, horns, and bells at grade crossings and stations, associated roadway improvements, and changes and feeder bus operations at select stations. Details regarding the information used to predict future Project noise levels can be found in Appendix K.
- Assess the impact of the Project by comparing the projected future noise levels with existing noise levels using the FTA noise impact criteria in Chapter 3 of the FTA guidance manual.
- Recommend mitigation at locations where projected future noise levels exceed the FTA impact criteria.

For roadway improvements and changes to feeder bus routes, a screening procedure consistent with FTA methodology was conducted to determine if any impacts specific to these improvements and/or changes would have occurred. This included identifying locations where changes to the traffic volumes, roadways, or bus routes were significant and identifying any potentially sensitive land uses near these areas. As reflected in the analysis presented within the following environmental consequences discussions, and except for locations with major park-and-ride facilities or where transit centers are to be constructed, the Project noise levels are dominated by LRT operations.

In addition, a construction noise impact assessment was conducted using the methodology contained in Chapter 12 of the FTA guidance manual (see Appendix K).

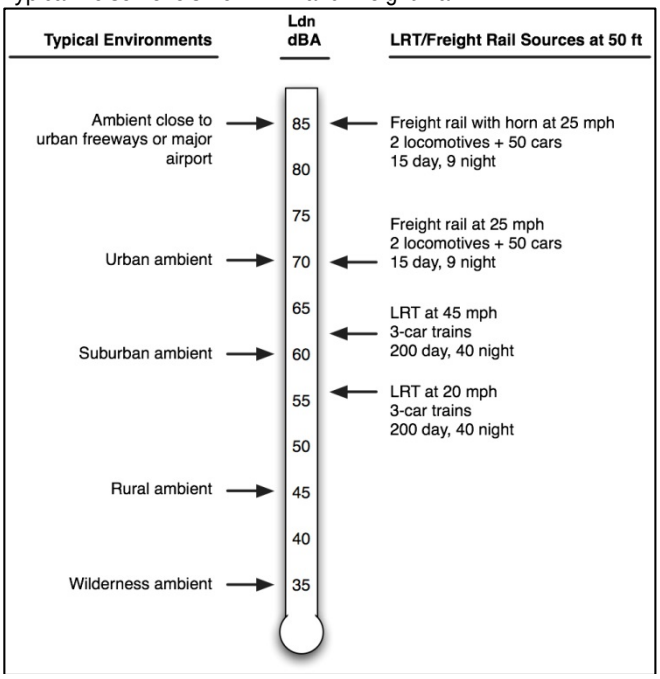
3.12.1.1 Understanding Noise

Sound is defined as small changes in air pressure above and below the standard atmospheric pressure. Noise is usually considered to be unwanted sounds. The three parameters that define noise include:

- **Level**. The level of sound is the magnitude of air pressure change above and below atmospheric pressure, and is expressed in decibels (dB). Typical sounds fall within a range between 0 dB (the lower limits of human hearing) and 120 dB (the highest sound levels experienced in the environment). A three-dB change in sound level is perceived as a barely noticeable change outdoors and a 10 dB change in sound level is perceived as a doubling (or halving) of the sound level.
- **Frequency**. The frequency (pitch or tone) of sound is the rate of air pressure changes. It is expressed in cycles per second, or Hertz (Hz). Human ears can detect a wide range of frequencies from around 20 Hz to 20,000 Hz. However, human hearing is not effective at high and low frequencies, and the A-weighting system (dBA) is used to correlate with human response to noise. The A-weighted sound level has been widely adopted by acousticians 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 of time, typically one hour or 24-hours in transit noise assessments. The common noise descriptor used for LRT and freight rail projects is the Day-Night Sound Level (Ldn). It has been adopted by most agencies as the best way 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 pm to 7 am). This nighttime penalty means

that any noise events at night are equivalent to 10 similar events during the day. Typical Ldn values for various transit and freight operations are illustrated on Exhibit 3.12-1.

EXHIBIT 3.12-1
Typical Noise Levels from LRT and Freight Rail



Source: Cross-Spectrum Acoustics, 2015.

3.12.1.2 Noise Criteria

This section describes FTA and Minnesota Pollution Control Agency (MPCA) noise impact criteria and their applicability to the Final EIS noise assessment.

A. FTA Noise Criteria

FTA noise impact criteria are described in Chapter 3 of the FTA noise and vibration guidance manual (FTA, 2006). FTA noise impact criteria are based on well-documented research on community response to noise, existing noise levels, and the change in noise exposure due to a project. The FTA noise criteria compare project noise levels with existing noise levels (not the No Build noise condition).

FTA noise criteria are based on the land use category of the sensitive receptor. The Ldn descriptor is used to assess transit-related noise at residential land uses where overnight sleep occurs (Category 2), and the Leq descriptor is used to assess transit-related noise at other land uses, as shown in Table 3.12-1.

TABLE 3.12-1
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)[a]	Tracts of land where quiet is an essential element in their intended purpose. This category includes lands set aside for serenity and quiet, and such land uses as outdoor amphitheaters and concert pavilions, as well as 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 where a nighttime sensitivity to noise is assumed to be of utmost importance.
3	Outdoor Leq(h)[a]	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. Places for meditation or study associated with cemeteries, monuments, museums, campgrounds and recreational facilities can also be considered to be in this category. Certain historical sites and parks are also included.

[a] Leq for the noisiest hour of transit-related activity during hours of noise sensitivity

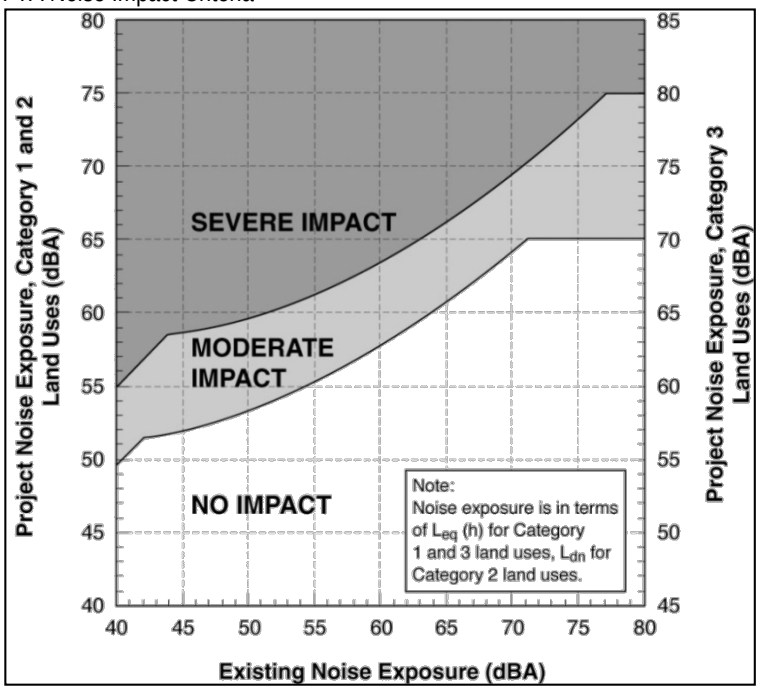
Source: FTA, 2006.

The noise impact criteria are defined by the two curves illustrated on Exhibit 3.12-2. The exhibit illustrates existing noise exposure and project-related noise exposure, and demonstrates that FTA noise impact thresholds vary with existing noise levels. The FTA noise impact criteria include three levels of impact, as illustrated on Exhibit 3.12-2. The severity of noise impact is characterized by two curves that allow for higher project noise exposure where there are higher levels of existing background noise, up to a threshold level beyond which project noise exposure would result in an impact. The left vertical axis in Exhibit 3.12-2 applies to FTA land use Categories 1 and 2, and the right vertical axis to Category 3. The three levels of impact include:

- **No Impact.** In this range, the proposed project is considered to have no impact since, on average, the introduction of the project will result in an insignificant increase in the number of people highly annoyed by the new project noise.
- **Moderate Impact.** At the moderate impact range, changes in the cumulative noise level are noticeable to most people, but may not be sufficient to cause strong, adverse reactions from the community. In this transitional area, other project-specific factors must be considered to determine the magnitude of the impact and the need for mitigation, such as the existing noise level, projected level of increase over existing noise levels, and the types and numbers of noise-sensitive land uses affected.
- **Severe Impact.** At the severe impact range, a significant percentage of people are highly annoyed by the new project noise. Noise mitigation is applied for severe impact areas unless it is not feasible or reasonable (i.e., unless there is no practical method of mitigating the impact).

For locations with no exterior land use, such as apartment buildings or motels without exterior use areas (e.g., pools, patios, or picnic areas), and where outdoor impacts are identified, a supplemental interior noise level criterion of 45 dBA is used to assess the potential for impacts inside buildings.

EXHIBIT 3.12-2
FTA Noise Impact Criteria



Source: FTA, 2006.

B. MPCA Noise Criteria

MPCA has an established set of Noise Standards (Minnesota Rules, Chapter 7030), which provide limits on environmental noise using the L10 and L50 descriptors, which represent the noise level exceeded 10 percent (6 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 classification, with residential lands included in noise area classification 1. Classifications 2 and 3 are generally for commercial and industrial land uses, respectively. The standards are shown in Table 3.12-2.

TABLE 3.12-2
MPCA Noise Standards

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

dBA = decibels on an A-weighted scale
L10 = Noise level exceeded 10% of the time
L50 = Noise level exceeded 50% of the time
Source: Minnesota Rules Section 7030 Noise Pollution.

Because of the time limit component of the MPCA noise standards, the Project will not exceed the standards under the proposed operating conditions. Light rail vehicles will pass by a location for approximately 10 seconds 12 times an hour (based on the operating assumptions of 10 minute headways in each direction) for a total of 120 seconds, or two minutes. Because the duration of exposure to LRT noise does not exceed the L10 (six minutes) and L50 (30 minutes) time components, there is no potential for the Project to exceed MPCA thresholds. Because the Project does not exceed the MPCA thresholds, the FTA noise impact criteria described previously are more protective than the MPCA standards and have been used to assess and mitigate noise impacts identified within this Final EIS.

Information regarding existing noise levels in the noise study area and any exceedances of the MPCA standards can be found in Appendix K.

C. Construction Noise Criteria

The FTA's construction noise criteria, summarized in Table 3.12-3, were used for the short-term noise impact analysis. The FTA construction noise criteria provide adequate protection for short-term noise impacts and allow for reasonable mitigation measures to be applied to the Project. Additionally, MPCA noise criteria were evaluated for the Project, and the Project will work with local jurisdictions to ensure that reasonable measures are taken to limit construction noise.

TABLE 3.12-3
FTA Construction Noise Criteria

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

dBA = decibels on an A-weighted scale
Leq = Equivalent sound level over a time period
Source: FTA, 2006.

3.12.2 Affected Environment

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

3.12.2.1 Noise Sensitive Land Uses

Noise-sensitive land uses for the Final EIS were identified based on aerial photography, project drawings, and a site survey. Information regarding noise-sensitive land uses by city within the Project corridor can be found in Appendix K.

3.12.2.2 Existing Noise Measurements

Existing noise levels were measured at representative sites near the proposed project during March 2010, July and August 2013, and May 2015 (see Appendix K for additional detail). Measurement sites were selected to 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 noise criteria are based on the existing noise levels. Noise measurements included both long-term (24-hour) and short-term (one-hour) monitoring of the A-weighted sound level at noise-sensitive locations. The additional noise measurements conducted in 2013 and 2015 were located in areas where measurements had not been conducted during the Draft EIS and in the freight co-location portions of the corridor in Hopkins, St. Louis Park, and Minneapolis. These additional efforts were necessary to update the existing condition noise measurements and to reflect changes in the freight operations since the Draft EIS.

Table 3.12-4 summarizes the results of the existing noise measurements, and Exhibits 3.12-3 and 3.12-4 illustrate the general location of the monitoring sites. The 15 long-term noise measurements were used to characterize the existing noise at residential locations because the FTA assessment methodology uses Ldn (24-hour noise descriptor) for all residential locations. The two short-term noise measurements were used to characterize the existing noise at non-residential locations because the FTA assessment methodology uses Leq (1-hour noise descriptor) for all non-residential locations. Two interior noise measurements were conducted to determine the project noise levels at locations where an impact was identified with no outdoor use identified. The first location was inside a hearing testing booth at an audiologist and the second was at the hotels in Eden Prairie where no outdoor land use was present (see Section 3.12.3.1 for more information).

At each site, the existing noise measurement was conducted at the same distance as the building(s) will be relative to the Project location (e.g., LRT tracks, alignments and operations) to allow for an accurate modeling of the noise impact assessment on the sensitive location. Existing ambient noise levels are described in Appendix K.

3.12.3 Environmental Consequences

This section identifies the long-term and short-term direct and indirect noise impacts from the Project. The long-term noise impact evaluation considers the increase in noise levels at sensitive receptors closest to the proposed light rail stations and track, as a result of the operation of the Project.

3.12.3.1 Long-term Direct Impacts from Noise

This section describes the long-term direct noise impacts that will result from the Project. The project team conducted a Detailed Noise Analysis (see Appendix K for more information). A summary of the analysis results are presented in Tables 3.12-5 and 3.12-6 for residential and institutional land uses, respectively. The tables include a tabulation of location information for each sensitive receptor group, the existing noise levels from all sources, the project noise levels from LRT operations, the FTA impact criteria (moderate or severe), and the type and number of noise impacts, without the implementation of mitigation measures. Because the Project would never exceed the MPCA standards, the FTA criteria are more protective in assessing impacts from the Project.

As shown in Table 3.12-5, the proposed Project will result in moderate noise impacts at 52 buildings and 237 residential units and severe noise impacts at 69 buildings and 558 residential units (see Exhibits 3.12-5 and 3.12-6). The majority of the noise impacts will be related to LRT horns sounding at FRA shared grade crossings in the corridor. The proposed tunnel in the Kenilworth Corridor will eliminate most noise impacts

compared to an at-grade light rail alignment within the same segment of the corridor. Without the tunnel, the number of noise impacts shown in Table 3.12-5 would be much greater.

A summary of each residential location with a projected noise level that exceeds the FTA criteria is contained in Appendix K.

TABLE 3.12-4
Summary of Existing Noise Level Measurements*

Site No.	City	Measurement Location	Measurement Start		Meas. Duration (hrs)	Noise Level (dBA) [d]	
			Date	Time		L_{dn}	L_{eq}
N2[a]	Eden Prairie	Southwest Station Condos	7/25/2013	14:00	24	71	--
N3[a]	Eden Prairie	Purgatory Creek Park	7/25/2013	7:30	1	--	54
N4[a]	Eden Prairie	Apartments on Singletree Lane	8/7/2013	16:00	24	62	--
N25[b]	Eden Prairie	Homestead Hotel	3/8/2010	10:07	24	61	--
N25a[c]	Eden Prairie	Hampton Inn/Baymont Inn	5/13/2015	Interior Noise Measurements[e]			
N26[b]	Eden Prairie	Nine Mile Creek Apartments	3/2/2010	14:05	24	64	65
N5a[c]	Eden Prairie	ShopHQ	5/13/2015	11:02	1	--	53
N5[a]	Minnetonka	Claremont Apartments	8/7/2013	14:00	24	57	--
N27[b]	Hopkins	Nolan Drive	3/4/2010	10:15	24	62	--
N6a[a]	Hopkins	Hearing Care Specialists (Audiologist)	5/14/2015	Interior Noise Measurements[e]			
N6[a]	Hopkins	6th Avenue and Excelsior Blvd	7/24/2013	14:00	24	65	59
N7[a]	Hopkins	Jackson Ave S	7/24/2013	14:00	24	58	--
N8[a]	Hopkins	Westside Apartments	7/25/2013	13:00	24	60	--
N9[a]	St. Louis Park	Edgebrook Drive	7/25/2013	11:00	24	57	--
N14[a]	St. Louis Park	W 37th Street	7/23/2013	11:00	24	58	54
N15[a]	Minneapolis	Calhoun Isle Condos	7/23/2013	11:00	24	64	--
N16[a]	Minneapolis	Kenilworth Place and S. Upton Ave	7/23/2013	10:00	24	61	--
N17[a]	Minneapolis	21st Street and Upton Street	7/23/2013	11:00	24	56	--
N18[a]	Minneapolis	Mary's Place	8/7/2013	11:00	24	74	--

*See Exhibit 3.12-3

[a] Noise sites from Supplemental Draft EIS and/or Final EIS measurements conducted July and August 2013.

[b] Noise sites from Draft EIS measurements conducted March 2010.

[c] Noise site from Final EIS measurement conducted May 2015.

[d] Ldn is used for FTA Category 2 (residential) land use and Leq is used for Category 3 (institutional land use).

[e] Site-specific outdoor-indoor noise measurements conducted at these locations to determine the reduction in noise due to the building for interior spaces.

EXHIBIT 3.12-3
Existing Noise Measurement Locations in Eden Prairie, Minnetonka and Hopkins

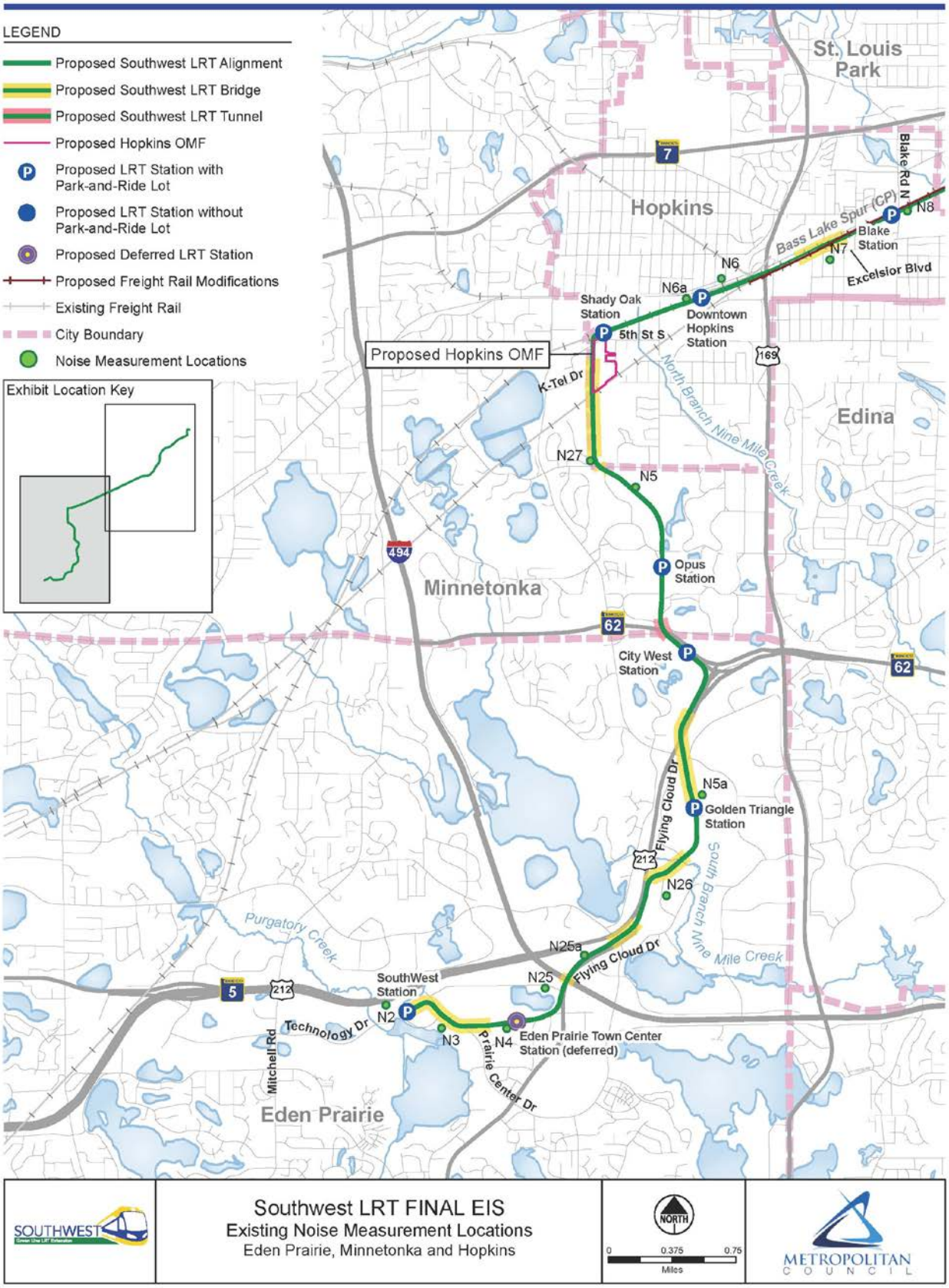


EXHIBIT 3.12-4
Existing Noise Measurement Locations in St. Louis Park and Minneapolis

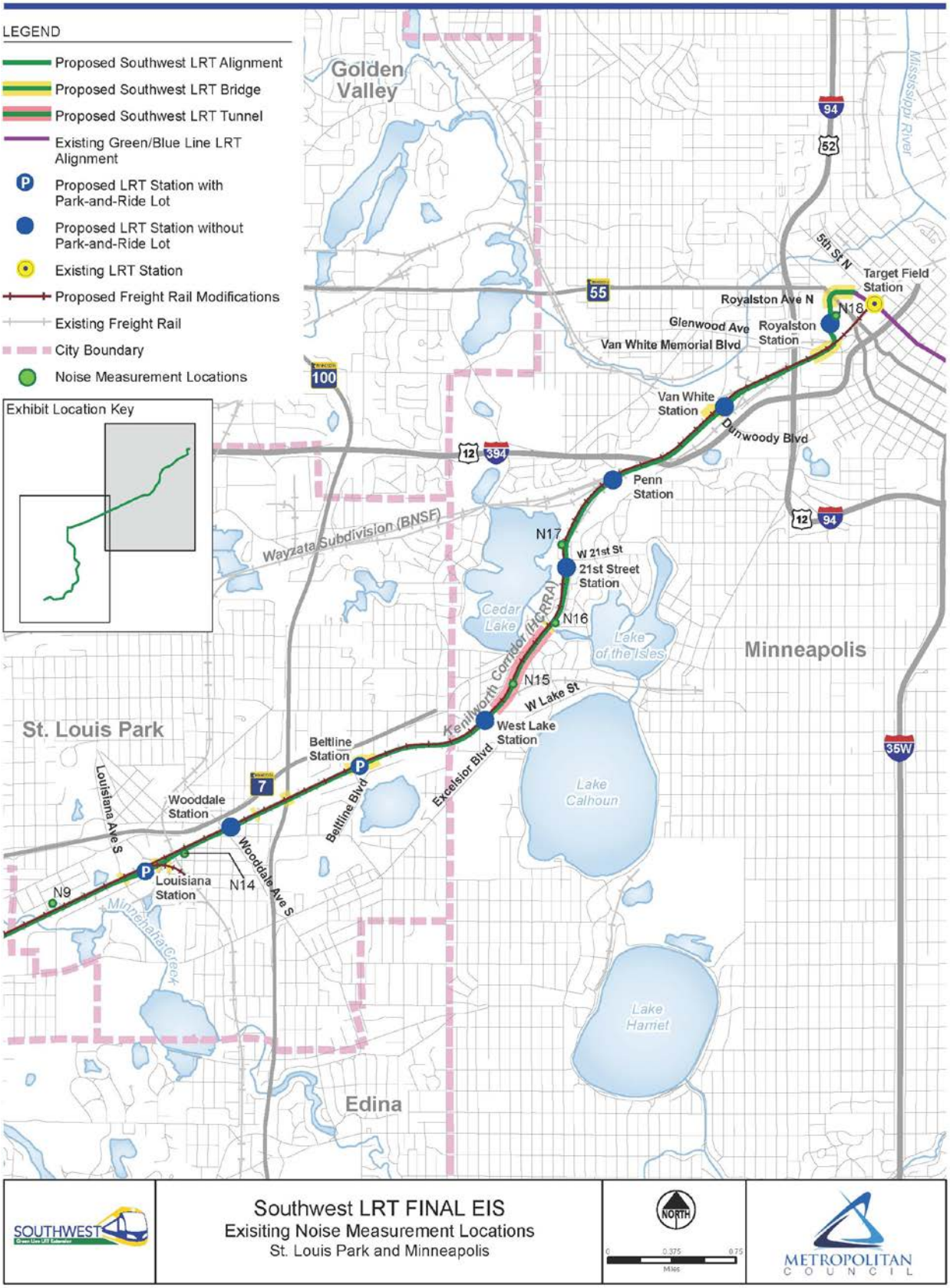


EXHIBIT 3.12-5
Noise Impact Locations without Mitigation in Eden Prairie, Minnetonka, and Hopkins

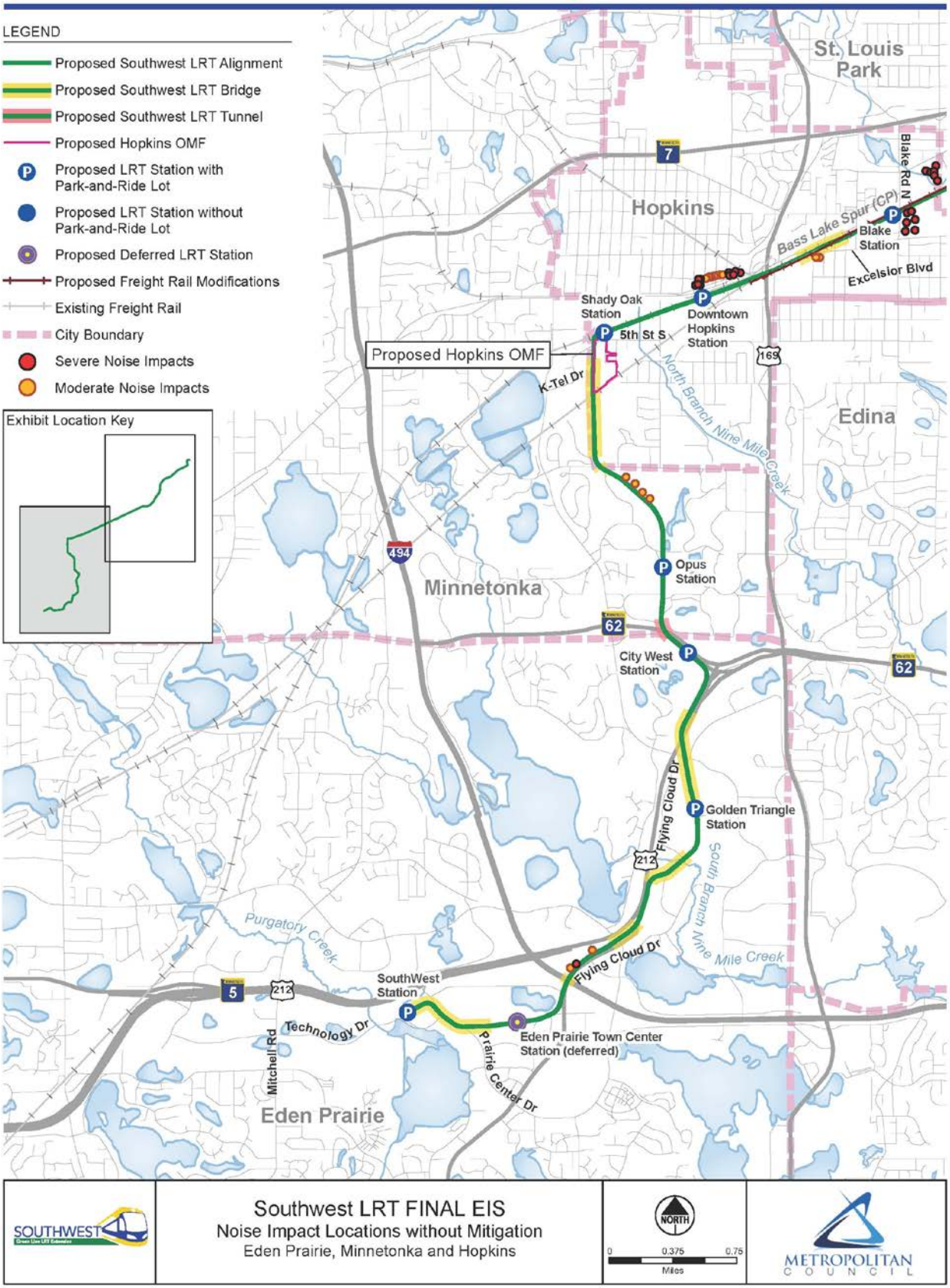


EXHIBIT 3.12-6
Noise Impact Locations without Mitigation in St. Louis Park and Minneapolis

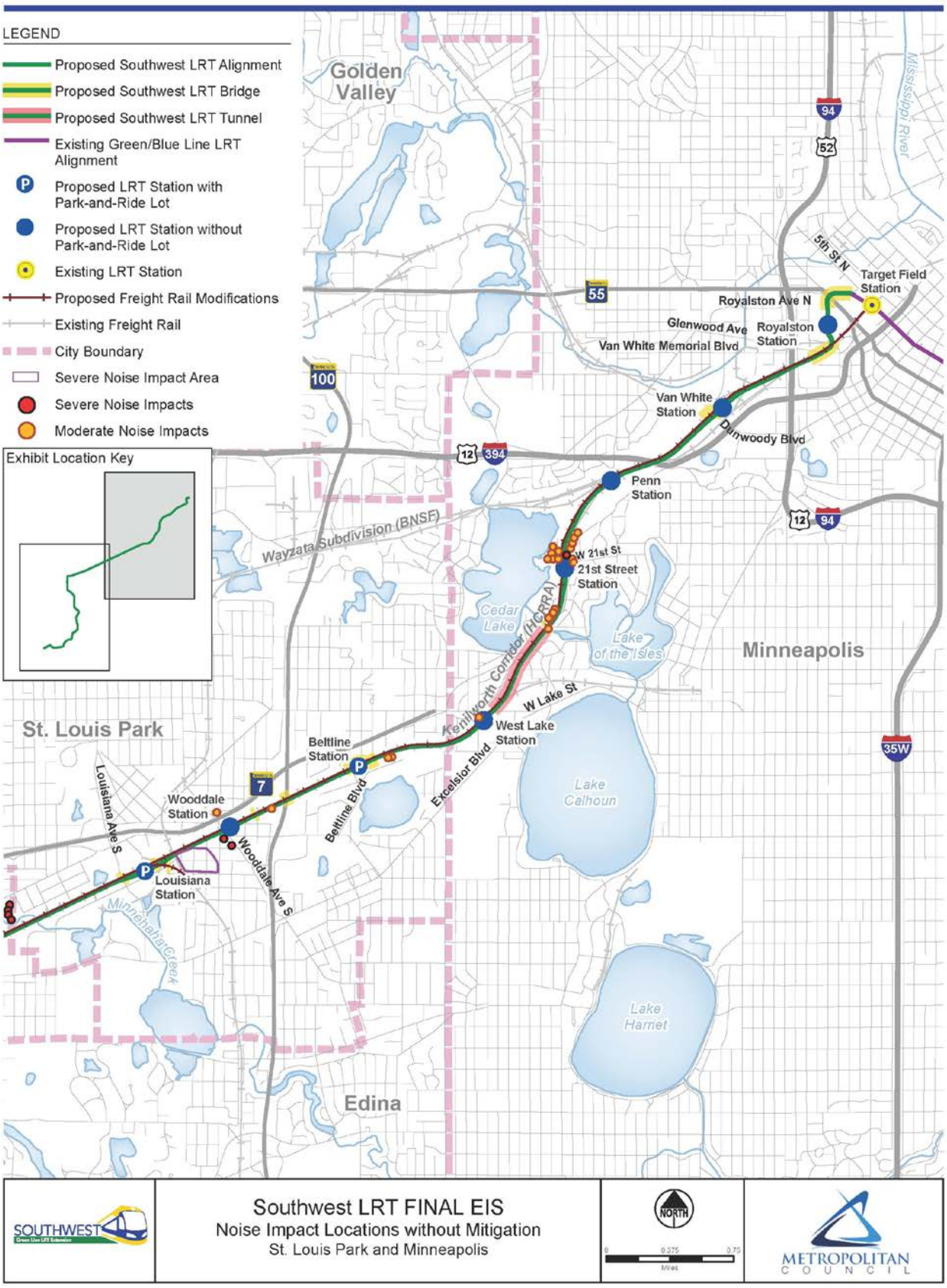


TABLE 3.12-5
Summary of Noise Assessment and Impacts for Category 2, Residential Land Use (without mitigation)

Location	City	Side of Track	Distance from near LRT Track Centerline (feet)	LRT Speed (mph)	Existing Noise Level, Ldn (dBA)[a]	Project Noise Levels, Ldn (dBA)[a]			Type and # of Impacts	
							FTA Impact Criteria			
						Project	Mod	Sev	Mod	Sev
Southwest Station Condos	Eden Prairie	W	125	20	71	62	65	70	0	0
Water Tower Apartments	Eden Prairie	E	100	35	62	55	59	64	0	0
Lincoln Parc Apartments	Eden Prairie	E	125	25	62	58	59	64	0	0
Extended Stay America	Eden Prairie	W	470	40	61	48	58	64	0	0
Town Place Suites	Eden Prairie	E	550	40	61	46	58	64	0	0
Residence Inn	Eden Prairie	W	40	40	61	65	58	64	1 bldg	1 bldg
Baymont Inn	Eden Prairie	W	80	40	61	61	58	64	1 bldg	0
Marriott	Eden Prairie	E	500	40	61	48	58	64	0	0
Claremont Apartments	Minnetonka	E	80	45	57	58	56	62	4 bldgs (126 units)	0
Greenfield Apartments	Hopkins	E	200[b]	55	57	54	56	62	0	0
Deer Ridge	Minnetonka	E	300	55	57	56	56	62	0	0
Parkside Apartments	Hopkins	W	780	65	65	46	61	66	0	0
Mayfair Apartments	Hopkins	W	720	65	65	47	61	66	0	0
11th Avenue	Hopkins	W	640	65	65	48	61	66	0	0
Royal Apartments	Hopkins	W	610	65	65	48	61	66	0	0
Hopkins Plaza Apartments	Hopkins	W	350	20	65	71	61	66	0	5 bldgs (71 units)
7th Avenue	Hopkins	W	430	35	65	66	61	66	2	0
Sonoma Apartments	Hopkins	W	350	45	65	66	61	66	1 bldg (12 units)	0
6th Avenue	Hopkins	W	400	45	65	65	61	66	5	0
Town Terrace Apartments	Hopkins	W	250	55	65	68	61	66	0	5 bldgs (68 units)
Monroe Avenue	Hopkins	E	200	55	58	59	57	63	2	0
Westside Apartments	Hopkins	E	125	35	60	78	58	63	0	6 bldgs (171 units)
Creekwood Estates	Hopkins	W	270	55	57	68	56	62	0	6 bldgs (72 units)
Edgebrook Drive	St. Louis Park	W	250	55	57	53	56	62	0	0

Location	City	Side of Track	Distance from near LRT Track Centerline (feet)	LRT Speed (mph)	Existing Noise Level, Ldn (dBA)[a]	Project Noise Levels, Ldn (dBA)[a]			Type and # of Impacts	
							FTA Impact Criteria			
						Project	Mod	Sev	Mod	Sev
Railroad Avenue	St. Louis Park	E	50	55	58	82	57	62	0	42 bldgs (44 units)
Village in the Park Condos	St. Louis Park	E	150	35	65	76	61	66	0	2 bldgs (64 units)
TowerLight	St. Louis Park	E	355	20	65	73	61	66	0	1 bldg (66 units)
35th Street Apartments	St. Louis Park	W	540	35	65	65	61	66	1 bldg (16 units)	0
Hoigaard Village	St. Louis Park	E	50	55	65	64	60	66	1 bldg (32 units)	0
Cityscape Apartments	St. Louis Park	W	125	55	65	58	60	66	0	0
Park Glen Townhomes	St. Louis Park	E	113	45	65	61	60	66	16	0
Inglewood Trails Apartments	St. Louis Park	W	250	45	65	51	60	66	0	0
Ewing Avenue South	Minneapolis	W	100	45	65	57	60	66	0	0
Lake Citihomes	Minneapolis	W	88	20	65	62	60	66	1 bldg (7 units)	0
Chowen Avenue South	Minneapolis	E	75	35	65	58	60	66	0	0
St. Louis Avenue	Minneapolis	W	63	45	65	57	60	66	0	0
Benton Boulevard	Minneapolis	E	88	45	61	55	58	64	0	0
South Upton Avenue	Minneapolis	E	100	45	61	57	58	64	0	0
Thomas Lane	Minneapolis	E	130	35	56	53	56	62	0	0
Burnham Road South	Minneapolis	W	100	45	61	56	58	64	0	0
Burnham Road North	Minneapolis	W	50	45	61	63	58	64	5	0
Thomas Avenue South	Minneapolis	E	50	35	56	66	56	62	3	1
Sheridan Avenue South	Minneapolis	E	135	45	56	59	56	62	3	0
South Upton Avenue	Minneapolis	W	125	40	56	57	56	62	6	0
Kenwood Parkway	Minneapolis	E	140	45	56	54	56	62	0	0
Catholic Charities	Minneapolis	W	50	55	74	63	65	72	0	0
Mary's Place	Minneapolis	E	40	20	74	60	65	72	0	0
Total Buildings/(Units):									52/237	69/558

[a] The Project noise level and the existing noise level are independent values. The existing noise level represents the current noise without the Project. The Project noise level is the noise from the Southwest LRT Project only (not the future noise level), which is used to determine impact. Because they are independent values, the Project noise can be higher or lower than the existing noise.

[b] The distance measurement provided represents a building with the greatest increase (change) in noise levels over ambient conditions. There is another building within the complex where the distance from the LRT alignment is closer than this distance (approximately 125 feet); however, the noise level increase at that building is lower so the distance provided (approximately 200 feet) is representative of the noise level increase at this location.

Notes:
The "Type and # of Impacts" column identifies whether the LRT noise level exceeds FTA's moderate or severe noise impact criteria thresholds, which are found under the "Project Noise Levels" column. It also reports the number of buildings or units that experience a moderate or severe noise impact.

The "Project Noise Levels" column represents the highest noise level at each location.

The impact assessment at the Water Tower and Lincoln Parc Apartments includes the deferred Eden Prairie Town Center Station. Under both conditions, with our without the Eden Prairie Town Center Station, there are no impacts at the two locations.

The reported noise levels are rounded to the nearest decibel.

Acronyms: bldg = building; Mod = moderate; Sev = severe.

As shown in Table 3.12-6, the Project will result in one moderate noise impact at the Kenilworth Channel. The Kenilworth Channel was assessed as a Category 3 land use, which represents parks and other similar uses. The lagoon bank at the Kenilworth Channel was assessed as a Category 1 land use, which represents locations with very high sensitivity to noise. A summary of the noise impacts is contained in Appendix K.

TABLE 3.12-6
Summary of Noise Impacts for Category 3, Institutional Land Use (without mitigation)

Location	City	Side of Track	Distance from near LRT Track Centerline (feet)	LRT Speed (mph)	Existing Noise Level, Leq (dBA)	Project Noise Levels, Leq (dBA)			Type and # of Impacts	
							Criteria			
						Project	Mod	Sev	Mod	Sev
Purgatory Creek Park[b]	Eden Prairie	W	270	25	54	47	60	66	0	0
Fox 9 Studios	Eden Prairie	E	450	45	61	45	58	64	0	0
Eagle Ridge Academy	Eden Prairie	E	225	35	65	51	66	71	0	0
ShopHQ Outdoor Studio	Eden Prairie	E	100	35	53	52	54	60	0	0
Sunrise International Montessori School	Minnetonka	E	300	40	65	49	66	71	0	0
Hearing Care Specialists (Audiologist)	Hopkins	E	70	35	See Appendix K				0	0
Lilac Park[b]	St. Louis Park	W	150	55	56	53	61	66	0	0
Kenilworth Channel	Minneapolis	E	20	45	54	64	60	66	1	0
Kenilworth Lagoon Bank[a]	Minneapolis	E	200	45	54	54	55	61	0	0
Total:									1	0

[a] This receptor was analyzed as a Category 1 land use.

[b] Passive use identified within park, see Appendix K for more information.

Notes:

The reported noise levels are rounded to the nearest decibel.

The sensitive use area of Open Space B in Minnetonka is outside the distance where there is the potential for impact (250 feet) and was not included in the assessment.

Mod = moderate; Sev = severe

3.12.3.2 Long-term Indirect Impacts from Noise

Some indirect noise impacts are likely to occur in the long-term, because of the anticipated increase in development density anticipated around the light rail stations. Local jurisdictions will likely take advantage of better transportation and access following completion of the project by encouraging transit-oriented development/redevelopment of land around the stations, which will result in noise exposure produced by

light rail equipment and park-and-ride facilities. Conversely, an increase in light rail ridership is likely to reduce roadway traffic noise elsewhere in the communities served by light rail.

3.12.3.3 Short-term Impacts from Noise

This section describes the short-term (construction) noise impacts.

Construction noise levels are subject to local noise ordinances and noise rules administered by the MPCA (Minnesota Rules Chapter 7030). MPCA administers these noise rules to establish maximum allowable noise levels; where applicable, MPCA procedures allow for the issuance of noise variances. To address both the applicable local noise ordinances and the MPCA noise rules, the Council will develop a Noise Control Plan. The Noise Control Plan will contain information regarding when advanced notice of construction activities will be provided to affected communities. The Noise Control Plan will also contain other stipulations to help avoid or minimize construction noise impacts. For example, the Noise Control Plan will require that construction equipment used by contractors be properly muffled and in proper working order. Most of the construction will consist of site preparation and laying new tracks, which should occur primarily during daytime hours, except when required and allowable within local noise ordinance procedures.[69]Construction noise varies greatly depending on the type of construction activities (see Section 2.1.1.3), equipment used, staging of the construction process, the layout of the construction site and the distance to sensitive receptors. Elevated noise levels during construction are, to a degree, unavoidable for this type of project, and short-term noise during construction of the Project can be intrusive to residents near the construction sites. 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. At some locations, more extensive work will occur, such as pile driving for elevated structures and retaining walls, vibratory hammers, and hydraulic "press-in" machinery for excavation support installation and excavation for the tunnels in the Kenilworth Corridor and at Highway 62. Typically, the contractor will provide specific information on equipment and methods as a part of the noise control plan for construction on the Project.

As previously noted, construction will occur within daytime hours, but night construction may sometimes be required, for example to minimize traffic impacts or to improve safety. If nighttime construction is deemed necessary, a nighttime construction mitigation plan will be developed during the Project's final design and construction stages.

For residential land use, short-term at-grade track construction noise impact can extend to approximately 120 feet from the construction site. However, if nighttime construction is conducted, short-term noise impacts from at-grade construction can extend to approximately 380 feet from the construction site. See Appendix K for more information on the construction noise impact assessment.

See Section 3.12.4.2 for more information regarding the approach to construction noise mitigation.

3.12.4 Mitigation Measures

This section describes the measures the Council will implement to mitigate the Project's long-term and short-term noise impacts.

For long-term operational noise, the Project will never exceed the MPCA standards and no mitigation will be required under the standards. The FTA criteria and mitigation methods for long-term operational noise are more protective than the MPCA standards and have been used to determine mitigation locations. FTA guidance states that severe operational noise impacts need to be mitigated, unless there are no feasible or practical means to do so (FTA, 2006). For moderate impacts, discretion and project-specific factors are used when considering mitigation. The project-specific factors can include both the existing noise levels and the projected increase in noise levels (e.g., 3 dB above existing noise level); the types and number of noise-sensitive land uses with impacts; existing sound insulation of buildings; and the cost-effectiveness of providing noise mitigation. The Project will mitigate severe and moderate impacts, where the existing noise

[69] Approval of a noise-related waiver from the applicable local jurisdiction may also be required for some nighttime construction to occur.

levels exceed 65 dBA Ldn or where there is an increase in noise due to the Project of three dB or greater, where *reasonable and feasible*. Greater detail on the mitigation methodology is included in Appendix K and Appendix D.

For short-term construction noise impacts, the Project is subject to local noise ordinances and, based on coordination with MPCA, local noise ordinances are reasonable measures intended to protect against violations of the MPCA noise standards.

3.12.4.1 Long-term Mitigation Measures

Impact. LRT horns and bells at high speed and/or FRA shared crossings, proximity to the light rail alignment, proximity to rail crossovers, and the presence of and proximity to elevated light rail structures.

Mitigation. Several noise mitigation measures have been evaluated based on the source, path or receiver, which are further described in Appendix K. Additionally, Table 3.12-7 provides a summary of the mitigation measures that will be implemented. At select locations, more detailed descriptions of the noise mitigation measures are provided in Appendix K.

In addition to the specific noise mitigation measures listed below, the Project will employ several best practice methods to minimize noise project-wide. These measures include using wheel skirts (panels over the wheels) to reduce wheel/rail noise and continuously welded rail to eliminate gaps in the tracks that generate additional noise. Wheel truing (to keep the wheels smooth and round) and rail grinding (to remove corrugations) will also be conducted on a regular basis, which helps to control the noise and vibration levels for the system. Where appropriate and as needed, lubrication may be employed to limit noise. Throughout the design process noise generating elements (e.g., crossovers) have been located, where possible, away from sensitive locations. Finally, the quiet zones identified below would also have the added benefit of eliminating horn blowing from the existing freight trains in the corridor.

The results shown in Table 3.12-7 indicate that residential noise impacts that meet the thresholds for mitigation (outlined Appendix K), will be eliminated with the noted mitigation measures. At several locations, the mitigation threshold is not met; therefore, mitigation is not included and residual noise impacts will occur at the respective locations. Quiet zones allow for the use of LRV bells instead of horns at at-grade crossings and will eliminate most noise impacts. Additionally, quiet zones, if implemented, will have the added benefit of eliminating the sounding of freight horns.

3.12.4.2 Short-term Mitigation Measures

Impact. Temporary noise impacts from construction activities.

Mitigation. A detailed Noise Control Plan will be prepared for the Project's construction duration. A noise control engineer or acoustician will work with the contractor(s) to prepare the plan in conjunction with the contractor's specific equipment and methods of construction. Key elements of this plan will include:

- Contractor's specific equipment types
- Schedule and methods of construction
- Maximum noise limits for each piece of equipment with certification testing
- Prohibitions on certain types of equipment and processes during the nighttime hours without local agency coordination and approved variances
- Identification of specific sensitive sites where near construction sites
- Methods for determining construction noise levels
- Implementation of noise control measures where appropriate
- Include a 24-hour construction hotline

TABLE 3.12-7
Summary of Mitigation Measures and Residual Impacts for Residential and Institutional Locations

Location	City	Side of Track	Moderate Impacts without Mitigation	Severe Impacts without Mitigation	Noise Level Increase (dB)[a]	Mitigation Measure[b, c]	Residual Impacts	
							Mod	Sev
Residence Inn	Eden Prairie	W	1 bldg	1 bldg	5.9	Sound insulation improvements at nearest building	0	0
Baymont Inn	Eden Prairie	W	1 bldg	0	3.0	Interior noise levels meet interior criterion – No mitigation required	0	0
Claremont Apartments	Minnetonka	E	4 bldgs (126 units)	0	3.7	8' high noise barrier extending 1,800 feet	0	0
Hopkins Plaza Apartments	Hopkins	W	0	5 bldgs (71 units)	6.6	Quiet zone eliminating LRT horns, LRT bells only	0	0
7th Avenue	Hopkins	W	2	0	3.5	Quiet zone eliminating LRT horns, LRT bells only	0	0
Sonoma Apartment	Hopkins	W	1 bldg (12 units)	0	3.7	Quiet zone eliminating LRT horns, LRT bells only	0	0
6th Avenue	Hopkins	W	5	0	3.2	Quiet zone eliminating LRT horns, LRT bells only	0	0
Town Terrace Apartments	Hopkins	W	0	5 bldgs (68 units)	4.7	Quiet zone eliminating LRT horns, LRT bells only	0	0
Monroe Avenue	Hopkins	E	2	0	3.2	3' high parapet barrier extending 500 feet on elevated structure over Excelsior Boulevard	0	0
Westside Apartments	Hopkins	E	0	6 bldgs (171 units)	17.4	Quiet zone eliminating LRT horns, LRT bells only	0	0
Creekwood Estates	Hopkins	W	0	6 bldgs (72 units)	12.1	Quiet zone eliminating LRT horns, LRT bells only	0	0
Railroad Avenue	St. Louis Park	E	0	42 bldgs (44 units)	24.0	Quiet zone eliminating LRT horns, LRT bells only + 8' to 11' noise barrier extending 760 feet	0	0
Village in the Park Condos	St. Louis Park	E	0	2 bldgs (64 units)	12.0	Quiet zone eliminating LRT horns, LRT bells only	0	0
TowerLight	St. Louis Park	E	0	1 bldg (66 units)	8.8	Quiet zone eliminating LRT horns, LRT bells only	0	0
35th Street Apartments	St. Louis Park	W	1 bldg (16 units)	0	3.0	Quiet zone eliminating LRT horns, LRT bells only	0	0
Hoigaard Village	St. Louis Park	E	1 bldg (32 units)	0	2.3	No mitigation required[d]	1 bldg (32 units)	0
Park Glen Townhomes	St. Louis Park	E	16	0	1.5	No mitigation required[d]	16	0
Lake Citihomes	Minneapolis	W	1 bldg (7 units)	0	1.8	No mitigation required[b]	1 bldg (7 units)	0

Location	City	Side of Track	Moderate Impacts without Mitigation	Severe Impacts without Mitigation	Noise Level Increase (dB)[a]	Mitigation Measure[b, c]	Residual Impacts	
							Mod	Sev
Kenilworth Channel	Minneapolis	E/W	1	0	7.2	2' high parapet wall and rail dampers 300'	0	0
Burnham Road North	Minneapolis	W	1	0	4.4	Interior testing[e]	0	0
Burnham Road North	Minneapolis	W	4	0	2.9	No mitigation required[d]	4	0
Thomas Avenue South	Minneapolis	E	3	1	8.4	Wayside bell eliminating one impact, plus interior testing[e]	0	0
Sheridan Avenue South	Minneapolis	E	3	0	3.7	Wayside bell	0	0
South Upton Avenue	Minneapolis	W	6	0	3.6	Wayside bell	0	0
Total:			52/238	69/558			22/59	0

[a] The noise level increase represents the total change in noise level (without mitigation) from the existing to the future noise level with the introduction of the Project.

[b] If the noise mitigation guidelines, as contained in the Regional Transitway Guidelines (March 2016) (see Appendix D), are found to not meet reasonable criterion or if the property owner(s) does not approve sound insulation, the Project will result in additional residual noise impacts.

[c] Quiet zones are locations, at least one-half mile in length, where the routine sounding of horns has been eliminated because of safety improvements at at-grade crossings, including modifications to the streets, raised median barriers, four quadrant gates, and other improvements designed and implemented by the Project and consistent with quiet zone readiness. Horns are sounded in emergency situations at these locations. Municipalities must apply to FRA for approval of quiet zones. If the municipality fails to apply for a quiet zone or FRA fails to approve the quiet zone, the Project may result in residual noise impacts.

[d] The moderate impacts at these locations do not meet the threshold for mitigation (e.g., impact does not meet 3-dB increase threshold) as defined in the Regional Transitways Guidelines (March 2016) (see Appendix D).

[e] The Council has determined that a noise barrier at these locations would not meet the noise mitigation guidelines for reasonable and feasible criteria contained in the Regional Transitway Guidelines (March 2016) (see Appendix D). As such, no noise barrier will be constructed to mitigate impacts to these residences. Final determination of mitigation measures for these residences will be assessed with on-site testing to determine if the residences meet the interior noise level criteria (defined in Appendix K). Based on the results, the Council will identify the noise mitigation to be implemented for these residences during Engineering and once on-site measurements are completed. If an exceedance of interior noise level is identified at these locations, the Council will work with property owners on applicable mitigation. This could include implementation of sound insulation, which would still require approval by the property owner(s).

3.13 Vibration

This section describes the long-term direct and indirect and short-term (construction) direct and indirect vibration effects of the Project (see Sections 3.17 for cumulative impacts). This section provides an overview of the regulatory context and methodology used for the analysis; an assessment of existing vibration conditions; a description of the anticipated impacts related to vibration; and a description of mitigation measures, as applicable, to implement with the Project. A technical report has been prepared in support of this section (see Appendix K).

3.13.1 Regulatory Context and Methodology

This section describes the approach that was used to forecast vibration impacts for the Final EIS and to develop vibration mitigation strategies. Vibration has been assessed in accordance with guidelines specified in the FTA's *Transit Noise and Vibration Impact Assessment* guidance manual (FTA, 2006).

The FTA guidance manual on noise and vibration is the primary source for the vibration methodology. The Final EIS uses a Detailed Vibration Assessment methodology, as described in Chapter 11 of the FTA guidance manual. The Southwest LRT Draft EIS used the FTA General Vibration Assessment methodology, as described in Chapter 10 of the FTA guidance manual; therefore, the Final EIS vibration results are much more precise

and reflect the actual soil conditions and vehicle characteristics, as opposed to the estimates used in the Draft EIS.

The Detailed Vibration Assessment involved the following steps:

- Identify vibration-sensitive land uses in the corridor using aerial photography, GIS data, and field surveys, typically within 300 feet of the alignment.
- Measure vibration-propagation characteristics of the soil in the corridor at sensitive receptors (see Section 3.13.2.2).
- Forecast project vibration levels from transit operations and information on speeds, headways, track type, and vehicle vibration characteristics. Details regarding the information used to predict future project vibration levels can be found in Appendix K.
- Assess the impact from transit by comparing the Project vibration forecasts with the FTA vibration impact criteria in Chapter 8 of the FTA guidance manual.
- Recommend mitigation at locations where project vibration levels exceed FTA impact criteria.

3.13.1.1 Understanding Vibration

Ground-borne vibration is the motion of the ground transmitted into a building that can be described in terms of displacement, velocity or acceleration. Vibration velocity is used in transit and freight rail, and is defined by the following:

- **Level.** Vibration is expressed in terms of vibration velocity level, using vibration decibels (VdB), with a reference of one micro-inch per second. The level of vibration represents how much the ground is moving. The threshold of human perception to transit and freight rail vibration is approximately 65 VdB, and annoyance begins to occur for frequent events at vibration levels over 70 VdB.
- **Frequency.** Vibration frequency is expressed in Hertz (Hz). Human response to vibration is typically from about six Hz to 200 Hz.
- **Time Pattern.** Environmental vibration changes all the time and human response is roughly correlated to the number of vibration events during the day. The more events that occur, the more sensitive humans are to the vibration.

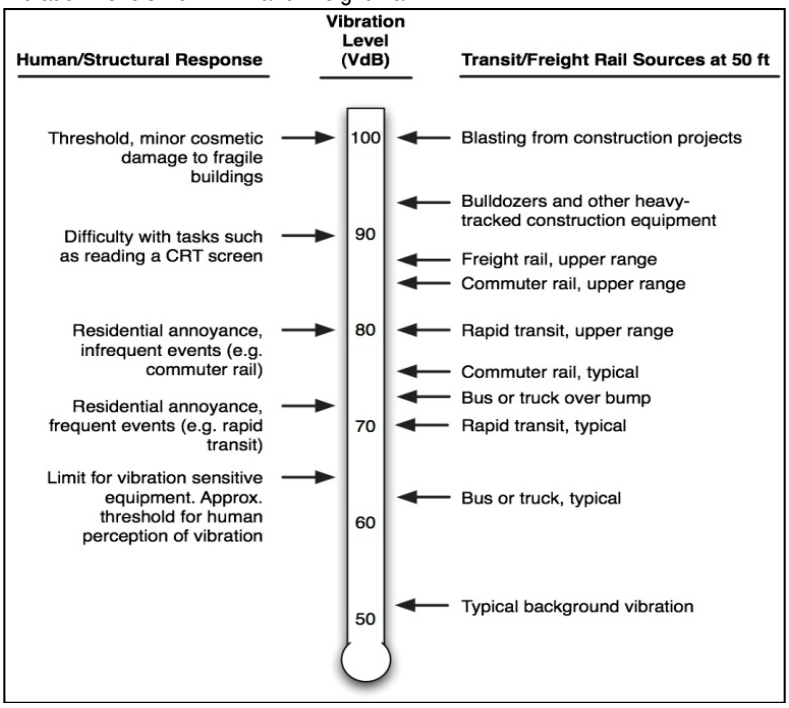
Exhibit 3.13-1 illustrates typical ground-borne vibration levels for transit and freight projects, as well as the corresponding human and structural responses to vibration.

Ground-borne noise is a low-frequency noise that is radiated from the motion of room surfaces, such as walls and ceilings in buildings, due to ground-borne vibration. Ground-borne noise is defined in terms of dBA, which emphasizes middle and high frequencies, which are more audible to human ears.

3.13.1.2 Vibration Criteria

The vibration impact criteria used for the assessment are based on the information contained in Chapter 8 of the FTA noise and vibration guidance manual. The criteria for a general vibration assessment are based on land use and train frequency, as shown in Table 3.13-1. Some buildings, such as concert halls, recording studios, and theaters, can be especially sensitive to vibration (or ground-borne noise) but do not fit into the three categories listed in Table 3.13-1. Because of the sensitivity of these buildings, special attention is paid to these buildings during the vibration assessment. Table 3.13-2 shows the FTA criteria for acceptable levels of vibration for several types of special buildings.

EXHIBIT 3.13-1
Vibration Levels from LRT and Freight Rail



Source: FTA, 2006.

TABLE 3.13-1
Ground-Borne Vibration and Ground-Borne Noise Impact Criteria for General Assessment

Land Use Category	Ground-Borne Vibration Impact Levels (VdB re 1 micro-inch/sec)			Ground-Borne Noise Impact Levels (dBA re 20 micro Pascals)		
	Frequent Events[a]	Occasional Events[b]	Infrequent Events[c]	Frequent Events[a]	Occasional Events[b]	Infrequent Events[c]
Category 1: Buildings where vibration will interfere with interior operations.	65[d]	65[d]	65[d]	N/A[e]	N/A[e]	N/A
Category 2: Residences and buildings where people normally sleep.	72	75	80	35	38	43
Category 3: Institutional land uses with primarily daytime use.	75	78	83	40	43	48

[a] "Frequent Events" are defined as more than 70 vibration events of the same source per day. Most rapid transit projects fall into this category.

[b] "Occasional Events" are defined as between 30 and 70 vibration events of the same source per day. Most commuter trunk lines have this many operations.

[c] "Infrequent Events" are defined as fewer than 30 vibration events of the same kind per day. This category includes most commuter rail branch lines.

[d] This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. Vibration-sensitive manufacturing or research will require detailed evaluation to define the acceptable vibration levels. Ensuring lower vibration levels in a building often requires special design of the HVAC systems and stiffened floors.

[e] Vibration-sensitive equipment is generally not sensitive to ground-borne noise.

Source: FTA, 2006.

TABLE 3.13-2
Ground-Borne Vibration and Ground-Borne Noise Impact Criteria for Special Buildings

Type of Building or Room	Ground-Borne Vibration Impact Levels (VdB re 1 micro-inch/sec)		Ground-Borne Noise Impact Levels (dBA re 20 micro Pascals)	
	Frequent Events[a]	Occasional or Infrequent Events[b]	Frequent Events[a]	Occasional or Infrequent Events[b]
Concert Halls	65	65	25	25
TV Studios	65	65	25	25
Recording Studios	65	65	25	25
Auditoriums	72	80	30	38
Theaters	72	80	35	43

[a] "Frequent Events" is defined as more than 70 vibration events per day. Most rapid transit projects fall into this category.

[b] "Occasional or Infrequent Events" is defined as fewer than 70 vibration events per day. This category includes most commuter rail systems.

If the building will rarely be occupied when the trains are operating, there is no need to consider impact. As an example, consider locating a commuter rail line next to a concert hall. If no commuter trains will operate after 7 pm, it should be rare that the trains interfere with the use of the hall.

Source: FTA, 2006.

Tables 3.13-1 and 3.13-2 include additional criteria for ground-borne noise, which is a low-frequency noise that is radiated from the motion of room surfaces, such as walls and ceilings in buildings due to ground-borne vibration. Ground-borne noise is defined in terms of dBA, which emphasizes middle and high frequencies, which are more audible to human ears. The criteria for ground-borne noise are much lower than for airborne noise to account for the low-frequency character of ground-borne noise. However, because airborne noise typically masks ground-borne noise for aboveground (at-grade or elevated) transit systems, ground-borne noise is only assessed for operations in tunnels, such as in the Kenilworth Corridor, where airborne noise is not a factor, or at locations such as recording studios, which are well insulated from airborne noise.

The criteria for a Detailed Vibration Assessment are illustrated on Exhibit 3.13-2, and descriptions of the curves are shown in Table 3.13-3. The curves on Exhibit 3.13-2 are applied to the predicted vibration spectrum for the transit project. If the vibration level at any one frequency exceeds the criteria, there is an impact. Conversely, if the predicted vibration spectrum of the transit project is below the curve, there will be no impact.

For the Southwest LRT Project, the general vibration assessment criteria are used to assess light rail ground-borne noise in the tunnel section. The detailed vibration assessment criteria will be used to assess light rail ground-borne vibration.

3.13.2 Affected Environment

This section describes vibration-sensitive land uses and existing vibration measurements within the Project study area.

3.13.2.1 Vibration-Sensitive Land Uses

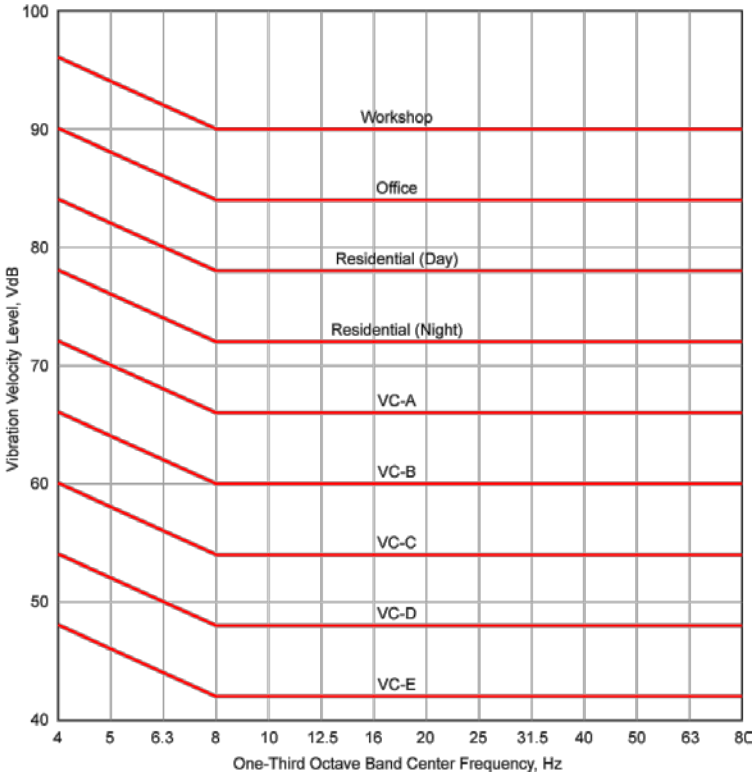
Vibration-sensitive land uses for the Final EIS were identified based on aerial photography, project drawings, project outreach to businesses to identify sensitive uses within buildings, and a site survey. Information regarding vibration-sensitive land uses by city can be found in Appendix K.

3.13.2.2 Existing Vibration Measurements

Vibration measurements, conducted at select sites in July 2013 and August 2015, were used to characterize the response of soil and/or building foundations along the project corridor. At each site, vibration propagation tests were conducted by impacting the ground with an instrumented weight and measuring the response of the soil and/or the building foundations at various distances. The results of the vibration propagation tests were combined with the force density (vehicle input force) to predict vibration levels from the operations of light rail vehicles at representative locations along the proposed light rail alignment.

The locations of the ten vibration measurement sites are shown in Table 3.13-4 and on Exhibits 3.13-3 and 3.13-4. Additional information regarding the existing vibration measurements is described in Appendix K.

EXHIBIT 3.13-2
Detailed Vibration Criteria



Source: FTA, 2006.

TABLE 3.13-3
Interpretation of Vibration Criteria for Detailed Analysis

Criterion Curve (See Exhibit 3.13-2)	Max Level (VdB)[a]	Description of Use
Workshop	90	Distinctly feelable vibration. Appropriate to workshops and non-sensitive areas.
Office	84	Feelable vibration. Appropriate to offices and non-sensitive areas.
Residential Day	78	Barely feelable vibration. Adequate for computer equipment and low-power optical microscopes (up to 20X).
Residential Night, Operating Rooms	72	Vibration not feelable, but ground-borne noise may be audible inside quiet rooms. Suitable for medium-power optical microscopes (100X) and other equipment of low sensitivity.
VC-A	66	Adequate for medium- to high-power optical microscopes (400X), microbalances, optical balances, and similar specialized equipment.
VC-B	60	Adequate for high-power optical microscopes (1000X), inspection and lithography equipment to 3 micron line widths.
VC-C	54	Appropriate for most lithography and inspection equipment to 1 micron detail size.
VC-D	48	Suitable in most instances for the most demanding equipment, including electron microscopes operating to the limits of their capability.
VC-E	42	The most demanding criterion for extremely vibration-sensitive equipment.

[a] As measured in one-third-octave bands of frequency over the frequency range eight to 80 Hz.
Source: FTA, 2006.

EXHIBIT 3.13-3
Vibration Propagation Measurement Locations and Vibration Impact Locations without Mitigation, Eden Prairie, Minnetonka and Hopkins

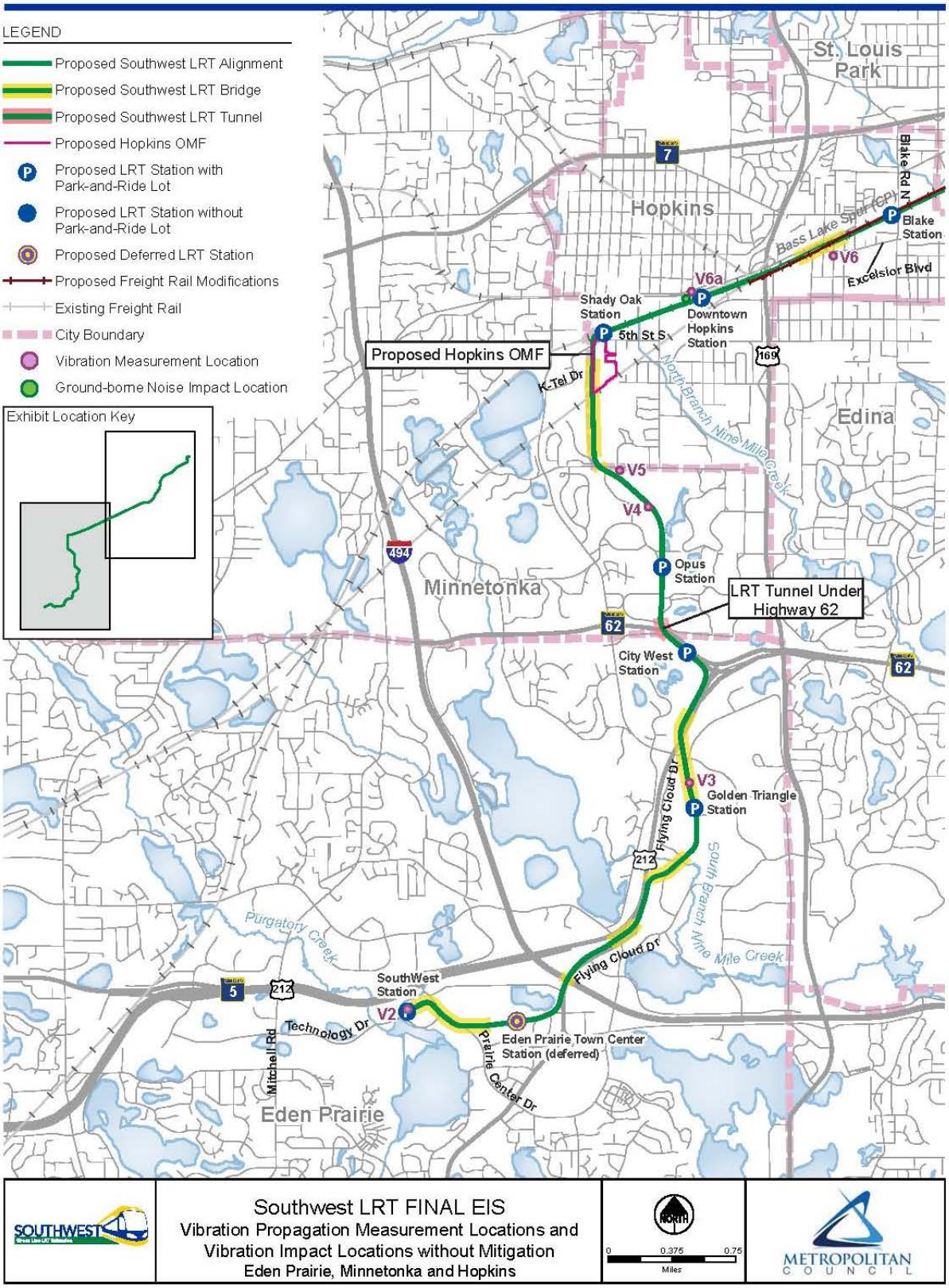


EXHIBIT 3.13.4
Vibration Propagation Measurement Locations and Vibration Impact Locations without Mitigation, St Louis Park and Minneapolis

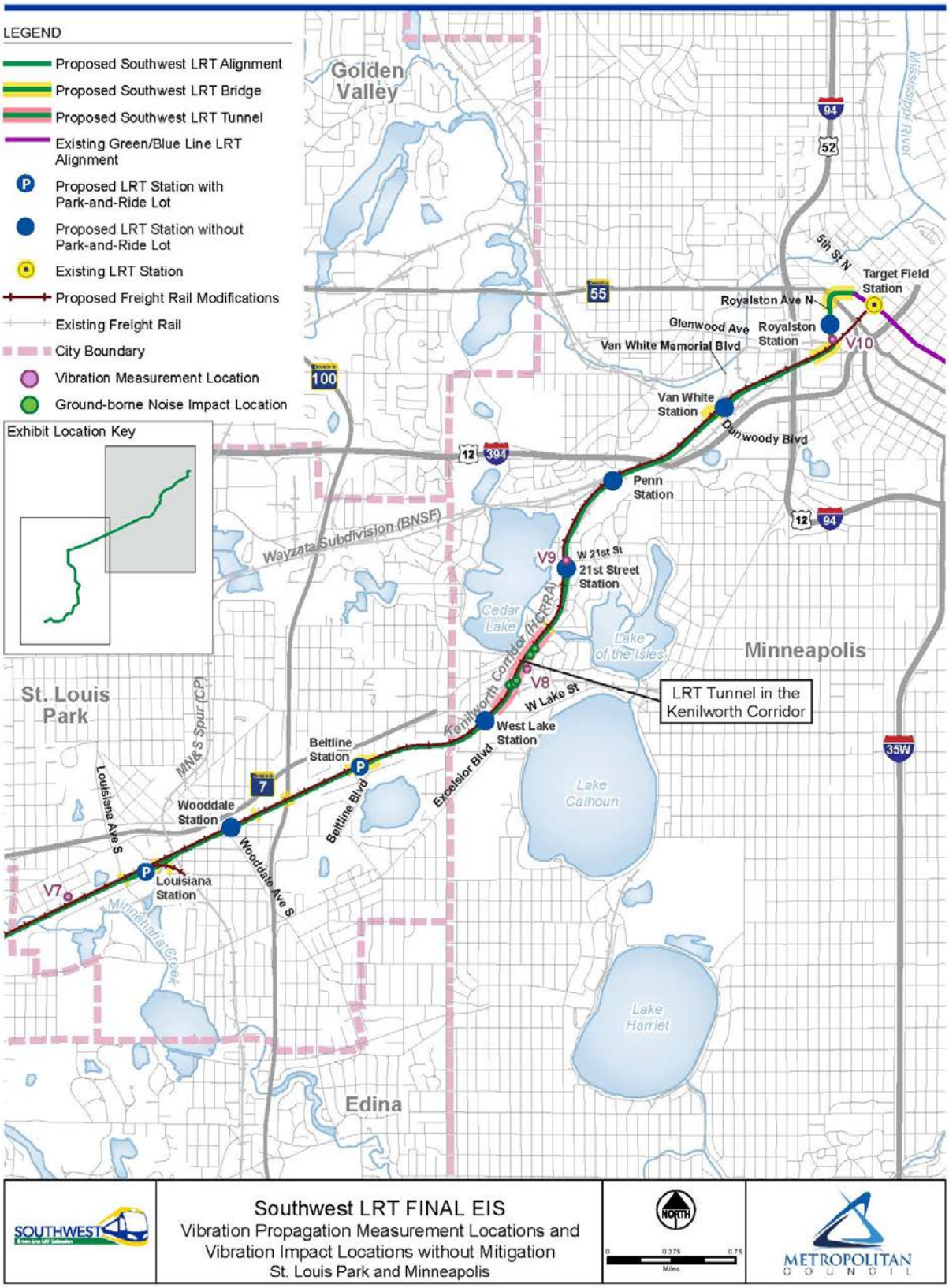


TABLE 3.13-4
Vibration Propagation Measurement Locations

Site No.[a]	City	Measurement Location	Type	Date
V2	Eden Prairie	SouthWest Transit Station	Vibration Propagation	July 2013
V3	Eden Prairie	ShopHQ	Site-specific Building	July 2013
V4	Minnetonka	AMS	Site-specific Building	July 2013
V5	Minnetonka	Claremont Apartments	Vibration Propagation	July 2013
V6a	Hopkins	Hearing Care Specialists	Site-specific Building	August 2015
V6	Hopkins	Jackson Avenue South	Vibration Propagation	July 2013
V7	St. Louis Park	Edgebrook Drive	Vibration Propagation	July 2013
V8	Minneapolis	Dean Ct and W 28th Street	Vibration Propagation	July 2013
V9	Minneapolis	21st Street	Vibration Propagation	July 2013
V10	Minneapolis	Royalston Avenue	Vibration Propagation	July 2013

[a] The vibration measurement Site V1 (Eaton) was at a location that was eliminated from the Project during Project Development and is not a part of the current project.

Source: Cross Spectrum Acoustics, Inc., 2015.

3.13.3 Environmental Consequences

This section identifies the long-term and short-term direct and indirect vibration and ground-borne noise impacts from the Project (see Section 2.1.1.2 for a description of construction activities); this includes short-term vibration impacts.

3.13.3.1 Long-term Direct Impacts from Vibration

Project Vibration Levels Assessment

This section describes the long-term direct vibration impacts. The project team conducted a Detailed Vibration Analysis (see Appendix K for more information). Analysis results are summarized in Tables 3.13-5 and 3.13-6 for residential and institutional (e.g., churches and schools) land uses, respectively. The tables include a tabulation of location information for each sensitive receptor group, the predicted future vibration level, the FTA impact criteria, and the number of vibration impacts at each location, without the implementation of mitigation measures.

As shown in Table 3.13-5, the project will result in no vibration impacts for residential land uses (Exhibit 3.13-2). The tunnel slab in the Kenilworth Corridor eliminates the vibration impacts relative to an LRT tunnel system with no slab in the same segment of the corridor.

A general assessment of freight vibration was also conducted for the area near the Kenilworth Channel where the freight tracks will be shifted closer to sensitive receptors to provide room for the LRT tracks. The results of the assessment indicated that there would be no vibration impacts from freight trains due to the shift in freight tracks, due primarily to the very low speeds of the freight trains. More information regarding the freight vibration assessment can be found in Appendix K.

TABLE 3.13-5
Summary of Vibration Assessments and Impacts for Residential Land Uses (without mitigation)

Location	City	Side of Track	Distance from LRT Track Centerline (feet)	LRT Speed (mph)	Max Vibration Velocity Level (VdB) in any 1/3-Octave Band		# of Impacts
					Project	FTA Impact Criterion	
Southwest Station Condominiums	Eden Prairie	W	125	20	51	72	0
Water Tower Apartments	Eden Prairie	E	100	35	56	72	0
Lincoln Parc Apartments	Eden Prairie	E	125	25	53	72	0
Residence Inn	Eden Prairie	W	40	45	63	72	0
Baymont Inn	Eden Prairie	W	80	45	59	72	0
Claremont Apartments	Minnetonka	E	80	45	57	72	0
Greenfield Apartments	Hopkins	E	200	55	46	72	0
Deer Ridge Apartments	Minnetonka	W	250	55	46	72	0
Town Terrace Apartments	Hopkins	W	300	55	55	72	0
Monroe Avenue	Hopkins	E	200	55	46	72	0
Westside Apartments	Hopkins	E	125	35	55	72	0
Creekwood Estates	Hopkins	W	160	55	56	72	0
Edgebrook Drive	St. Louis Park	W	250	55	54	72	0
Railroad Avenue	St. Louis Park	E	50	55	69	72	0
Hoigaard Village	St. Louis Park	E	50	55	62	72	0
Cityscape Apartments	St. Louis Park	W	125	55	58	72	0
Park Glen Townhomes	St. Louis Park	E	113	45	66	72	0
Inglewood Trails Apartments	St. Louis Park	W	250	45	55	72	0
Ewing Avenue South	Minneapolis	W	100	45	56	72	0
Lake Citihomes	Minneapolis	W	88	20	54	72	0
Chowen Avenue South	Minneapolis	E	75	35	57	72	0
St. Louis Avenue	Minneapolis	W	44	45	57	72	0
Calhoun Isle Condos	Minneapolis	E	43	45	57	72	0
Dean Court	Minneapolis	E	45	45	57	72	0
Xerxes Avenue South	Minneapolis	E	45	45	57	72	0
Benton Boulevard	Minneapolis	E	43	45	57	72	0
Thomas Lane	Minneapolis	E	130	45	56	72	0
Burnham Road South	Minneapolis	W	102	45	56	72	0
Burnham Road North	Minneapolis	W	50	45	65	72	0
Thomas Avenue South	Minneapolis	E	50	35	62	72	0
Sheridan Avenue South	Minneapolis	E	130	45	54	72	0
South Upton Avenue	Minneapolis	W	125	40	54	72	0
South Upton Avenue	Minneapolis	E	100	45	57	72	0
Kenwood Parkway	Minneapolis	E	140	45	60	72	0
Catholic Charities	Minneapolis	W	50	55	65	72	0
Mary's Place	Minneapolis	E	40	20	57	72	0
						Total:	0

The vibration levels for each location are the highest levels projected for that location. Vibration projections at other receptors within each location will be lower. The threshold of human perception to LRT and freight rail vibration is approximately 65 VdB or less, and annoyance begins to occur for frequent events at vibration levels over 70 VdB.

The impact assessment at the Water Tower and Lincoln Park Apartments includes the deferred Eden Prairie Town Center. If the station is not built by 2040, there will continue to be no impacts at these locations.

VdB = vibration velocity level is reported in decibels relative to a level of one micro-inch per second.
Impact Criterion = the threshold for a vibration impact under FTA guidance.

As shown in Table 3.13-6, the proposed project will result in no vibration impacts for institutional land uses (Exhibit 3.13-2).

TABLE 3.13-6
Summary of Vibration Impacts for Institutional Land Uses (without mitigation)

Location	City	Side of Track	Distance from LRT Track Centerline (feet)	LRT Speed (mph)	Max Vibration Velocity Level (VdB) in any 1/3-Octave Band		# of Impacts
					Project Vibration Level	FTA Impact Criterion	
Access Genetics	Eden Prairie	E	125	25	53	72	0
Eagle Ridge Academy	Eden Prairie	E	225	35	42	75	0
Sunrise International Montessori School	Minnetonka	E	300	40	52	75	0
American Medical Systems	Minnetonka	W	70	45	58	72	0
						Total	0

The vibration levels for each location are the highest levels projected for that location. Vibration projections at other receptors within each location will be lower. The threshold of human perception to LRT and freight rail vibration is approximately 65 VdB or less, and annoyance begins to occur for frequent events at vibration levels over 70 VdB.

VdB = vibration velocity level is reported in decibels relative to a level of one micro-inch per second.
Impact Criterion = the threshold for a vibration impact under FTA guidance.

Project Ground-Borne Noise Impact

This section describes the long-term direct ground-borne impacts for the Project. The project team conducted a Detailed Vibration Analysis (see Appendix K for more information). Analysis results are summarized in Tables 3.13-7 and 3.13-8 for residential and institutional (e.g., churches and schools) land uses, respectively. The tables include a tabulation of location information (ground-borne noise is only assessed for tunnels and for locations such as studios) for each sensitive receptor group, the predicted future ground-borne noise levels, the impact criteria, and whether there will be ground-borne noise impacts. The tables also show the total number of ground-borne noise impacts for each location, without potential mitigation measures.

As shown in Table 3.13-7, the proposed project will result in ground-borne noise impacts at 54 units (five buildings) for residential land uses in the tunnel section south of the Kenilworth Channel (Exhibit 3.13-2). The tunnel slab, a project features within the Kenilworth Corridor significantly reduces the number and magnitude of the ground-borne noise impacts relative to a tunnel without a slab within the same segment of the corridor.

As shown in Table 3.13-8, the proposed project will result in no impact at the Shop HQ studios (Exhibit 3.13-2). However, there is a ground-borne noise impact projected at the Hearing Care Specialists site in Hopkins; the impact is due to exceedances of the hearing threshold criteria for the sound testing booth inside the audiologist office. Additional information regarding the ground-borne noise impact at this location can be found in Appendix K.

3.13.3.2 Long-term Indirect Impacts from Vibration

Some indirect changes in vibration levels are likely in the long-term with the Project due to the anticipated increase in development density around light rail stations. Local jurisdictions will likely take advantage of better transportation and access following completion of the Project by encouraging transit-oriented development/redevelopment of land around the stations, which will result in exposure to vibrations produced by LRT and freight rail.

TABLE 3.13-7
Summary of Ground-borne Noise Assessments and Impacts for Residential Land Use (without mitigation)

Location	City	Side of Track	Distance from LRT Track Centerline (feet)	LRT Speed (mph)	Ground-Borne Noise Level (dBA)		# of Impacts
					Project Ground-Borne Noise Level	FTA Impact Criterion	
St. Louis Avenue	Minneapolis	W	44	45	37	35	1 bldg (3 units)
Calhoun Isle Condos	Minneapolis	E	43	45	37	35	1 bldg (36 units)
Dean Court	Minneapolis	E	45	45	37	35	1 bldg (6 units)
Xerxes Avenue South	Minneapolis	E	45	45	37	35	1 bldg (8 units)
Benton Boulevard	Minneapolis	E	43	45	37	35	1 unit
Burnham Road South	Minneapolis	W	102	45	25	35	0
Total							5 bldgs (54 units)

The ground-borne noise levels for each location are the highest levels projected for that location. Ground-borne noise projections at other receptors within each location will be lower. Ground-borne noise at the impact criterion of 35 dBA or less is generally acceptable to people for sleeping areas. Ground-borne noise levels are only assessed for tunnel sections.

TABLE 3.13-8
Summary of Ground-borne Noise Assessments and Impacts for Institutional Land Use (without mitigation)

Location	City	Side of Track	Distance from LRT Track Centerline (feet)	LRT Speed (mph)	Ground-Borne Noise Level (dBA)		# of Impacts
					Project Ground-Borne Level	Impact Criterion	
Shop HQ	Eden Prairie	E	100	35	17	25	0
Hearing Care Specialists (Audiologist)	Hopkins	E	See discussion below				1
Total							1

3.13.3.3 Short-term Impacts from Vibration

Vibration related to construction activities (see Section 2.1.1.3) will result from the operation of heavy equipment (pile driving, vibratory hammers, hoe rams, vibratory compaction, and loaded trucks) needed to construct bridges, retaining walls, roads, and park-and-ride facilities. Most limits on construction vibration are based on reducing the effects on nearby structures. Although construction vibrations are temporary, it is appropriate to assess the potential for human annoyance and damage.

Most of the buildings along the project corridor are typical engineered concrete and masonry, or reinforced-concrete, steel or timber construction. In order to provide screening distances for potential monitoring of construction vibration throughout the corridor, a vibration criterion of 102 VdB was used (see Appendix K for more information on construction vibration), and 72 VdB was used to assess the potential for vibration annoyance from construction activities. With the exception of impact pile driving, most of the distances for potential monitoring are within 30 feet of construction activities. The distance for the potential for damage to buildings from impact pile driving is up to 40 feet. See Appendix K for more information on the construction vibration impact assessment.

3.13.4 Mitigation Measures

This section describes the measures the Council will implement to mitigate the Project's long-term and short-term vibration and ground-borne noise impacts.

3.13.4.1 Long-term Mitigation Measures (Vibration)

No mitigation measures are warranted for long-term direct or indirect impacts from vibration due to the absence of any corresponding impacts.

3.13.4.2 Long-term Mitigation Measures (Ground-borne Noise)

Impact. Ground-borne noise impacts due to ground-borne vibration.

> ***Mitigation (Kenilworth Tunnel).*** Highly resilient rail fasteners in the tunnel section (approximately 2,200 feet) to eliminate ground-borne noise impacts. The fasteners will be designed to provide at least 5 dB of reduction in vibration levels at 80 Hz and higher. See Appendix K for more information.
>
> ***Mitigation (Hearing Care Specialists [Audiologist]).*** Replace the existing vibration isolation elements between the floor of the building and the sound booth. The vibration isolation (rubber pads or springs) will have a resonance frequency no greater than 40 Hz and should provide at least 10 dB of reduction in vibration levels at 80 Hz and higher.

3.13.4.3 Short-term Mitigation Measures

Impact. Temporary construction vibration.

> ***Mitigation.*** The most effective methods for minimizing the impact from construction vibration is to limit the use of high-vibration activities, such as impact pile driving and vibratory rolling, and to include vibration limits in the construction specifications. To mitigate vibration impacts from construction activities, the following measures will be applied, where feasible:
>
> - **Limit Construction Hours.** Limit high-vibration activities at night.
> - **Construction Specifications.** Include limits on vibration in the construction specifications, especially at locations where high-vibration activities.
> - **Alternative Construction Methods.** Minimize the use of impact and vibratory equipment, where possible and appropriate.
> - **Truck Routes**. Use truck haul routes that minimize exposure to sensitive receptors and minimizes damage to roadway surfaces, where appropriate.
> - **Pre-Construction Survey.** Perform pre-construction surveys to document the existing conditions of the structures in the vicinity of sites where high-vibration construction activities will be performed.
> - **Vibration Monitoring.** If a construction activity has the potential to exceed the damage criteria at any building, the contractor will be required to conduct vibration monitoring and, if the vibration exceeds the limit, the activity must be modified or terminated.

3.14 Hazardous and Contaminated Materials

This section describes long-term direct and indirect, and short-term (construction) direct and indirect effects of hazardous and contaminated materials resulting from the Project (see Section 3.17 for cumulative impacts). This section includes an overview of the regulatory context and methodology used for the analysis; a description of existing conditions relative to known or suspected hazardous and contaminated materials; a description of anticipated impacts related to hazardous and contaminated materials, and a description of mitigation measures to implement with the Project.

3.14.1 Regulatory Context and Methodology

This section describes regulatory context and methodology for the hazardous and contaminated material evaluation. This section includes a summary of relevant laws and executive orders, an overview of the methodology, and a description of the study area for the hazardous and contaminated material analysis.

The primary federal laws regulating hazardous wastes/materials are the Resource Conservation and Recovery Act of 1976 (RCRA) and the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA). RCRA provides for regulation of wastes, as well as regulating underground storage tanks (USTs), which are a common source of contamination. The purpose of CERCLA, often referred to as Superfund, is to clean up contaminated sites to protect public health and the environment. Other relevant federal laws and regulations include the Community Environmental Response Facilitation Act of 1992; Clean Water Act (1972); Clean Air Act (as amended 1990); Safe Drinking Water Act (as amended 1996); Hazardous Waste Operations and Emergency Response regulations (29 CFR 1910.120 and 29 CFR 1926.65); the Toxic Substances Control Act (as amended 2002); and the Federal Insecticide, Fungicide, and Rodenticide Act (as amended 1988).

The Minnesota Pollution Control Agency (MPCA) oversees the federal and state regulations pertaining to contaminated soil, groundwater, and waste cleanup plan approvals; petroleum UST registration and removal; and National Pollutant Discharge Elimination System (NPDES) permitting.[70] In addition, the Minnesota Department of Health regulates asbestos abatement. Activities that encounter contaminated materials must follow state requirements for safe handling and disposal under the purview of the MPCA. The Occupational Safety and Health Agency (OSHA) specifies federal guidelines for worker safety and health during construction activities.

The analysis of long-term direct and indirect effects includes an evaluation of the potential for soil and groundwater contamination resulting from the operation of the light rail vehicles and related facilities (i.e., operations and maintenance facilities). It also describes the potential for long-term direct and indirect impacts due to soil and groundwater contamination, and the control or cleanup requirements for the project due to potential for hazardous and contaminated materials to be mobilized or released from project activities.

The analysis of short-term direct and indirect effects evaluates the potential risk or likelihood of encountering hazardous and contaminated materials onsite during construction (i.e., Tier 1 sites) or those that have the potential to migrate through the soil or groundwater from nearby sites (i.e., Tier 2 sites), based on the results of the Phase I and Phase II Environmental Site Assessments (ESA)[71] conducted for the Southwest LRT Project. Tier 1 sites will be directly disturbed by construction activities, resulting in short-term direct impacts. Tier 2 sites have contaminated materials which have the potential to migrate to the area of construction through the soil or groundwater, resulting in short-term indirect impacts.

The Phase I ESAs consisted of a review of the following: regulatory databases by a national information vendor; a review of available site reports; a windshield survey; site reconnaissance; interviews with local government officials and watershed district representatives; and a review of historical fire insurance maps, aerial photographs, and topographic maps. The Phase I ESAs identify sites where there is a high, medium, or low risk or likelihood to encounter hazardous and contaminated materials. Phase II ESAs were conducted in areas within or adjacent to high- and medium-risk sites where new right-of-way will be purchased and/or

[70] Under a memorandum of agreement with the USEPA, dated May 2, 1995, the Minnesota Pollution Control Agency (MPCA) is designated the lead agency for voluntary investigation and cleanup program (VIC) sites.

[71] In 2013, Phase I Environmental Site Assessments (ESAs) were conducted for the Project as defined in the Draft EIS. In 2014 and 2015, additional Phase I ESAs were conducted for the adjustments to the Project incorporated since publication of the Draft EIS. Phase II ESAs were completed based on the results of the Phase I ESAs in 2015. Refer to the Hazardous and Contaminated Materials Evaluation Supporting Documentation (see Appendix C for instructions on how to access supporting documentation).

where construction activities are anticipated to occur as a result of the Project. The Phase II ESAs further evaluate site-specific risks and identify actions to minimize or avoid the risks.

There is no single comprehensive source of information available that identifies known or potential sources of environmental contamination. Therefore, to identify and evaluate sites potentially containing hazardous or regulated materials (such as petroleum products) or other sources of potential contamination, a governmental database search was conducted as part of the Phase I ESA work described above. This screening tool identified locations of sites with known or potential environmental liabilities based on information contained in various state government databases, including the *What's In My Neighborhood* internet sites maintained by the MPCA and the Minnesota Department of Agriculture. The databases reviewed are as follows:

- MPCA databases:
  - ***Leaking Underground Storage Tank (LUST).*** Database containing records of active and closed investigations of leaking underground storage, subsurface tank storage incidents, and petroleum releases.
  - ***Master Entity System (MES).*** Database containing many specific databases, including:
    - *Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS).* Database containing locations of Superfund sites that the state is dealing with or has dealt with.
    - *National Priority List (NPL).* Database containing locations of known releases or threatened releases of hazardous substances throughout the United States.
  - ***Permanent List of Priorities (PLP).*** Database containing locations of state Superfund sites in Minnesota where investigation and cleanup are needed, cleanup is underway, or cleanup has been completed and long-term monitoring or maintenance continues.
  - ***Voluntary Investigation and Cleanup Program (VIC).*** Database containing records for sites enrolled in the VIC.
  - ***Resource Conservation and Recovery Act (RCRA).*** Database containing records of facilities, unpermitted dump sites, and no further remedial action planned (NFRAP) sites.
- Minnesota Department of Agriculture database:
  - ***Agricultural Chemical Incidents.*** Database containing locations of agricultural chemical spill and investigation sites, including active and closed spill sites, and the locations of pesticide and herbicide investigations.

The study area for the hazardous and contaminated materials analysis is based on the review area for the Phase I ESAs, which generally includes an area extending 550-feet on either side of the proposed light rail alignment.[72] At a minimum, parcels that fell wholly or partially within the hazardous and contaminated materials study area were assessed; however, historical documentation and environmental database review extended beyond this area where appropriate for more inclusive results.

3.14.2 Affected Environment

This section describes the hazardous and contaminated materials that could be located on parcels that will be disturbed by construction of the Project (i.e., including parcels directly impacted and parcels in close proximity to construction activities where there is potential for contaminated materials to migrate to the

[72] The proposed OMF in the City of Hopkins (see Section 2.1.1) is adjacent to the proposed light rail alignment and all of the parcels that will be acquired for the OMF fall wholly or partially within the 550-foot review area of the light rail alignment.

area of construction through the soil or groundwater). This section describes the affected environment, or existing conditions for the hazardous and contaminated materials study area, and provides context for evaluation of potential short-term (construction) related impacts. Construction impacts are most likely to occur in locations where there is a medium- or high-risk of hazardous and contaminated materials present. Refer to Section 3.14.3.3 for more information on short-term (construction) impacts.

The assessment of potential contaminated sites described in this section is based on the Phase I ESAs completed for this project (see Section 3.14.1). Each of the sites identified through the Phase I ESAs were designated as having high, medium, or low risk potential for soil and/or groundwater contamination using the following definitions:

- **High Risk.** These sites include all active and inactive VIC and Minnesota Environmental Response and Liability Act sites; all active and inactive dump sites; and all active LUST sites.
- **Medium Risk.** These sites include all closed LUST sites, all sites with USTs or aboveground storage tanks, all sites with vehicle repair activities, and all sites with historical demolitions.
- **Low Risk.** These sites include small hazardous waste generators.

Phase I Environmental Site Assessment Sites

The Phase I ESAs identified 396 sites that could potentially affect or be affected by the Southwest LRT Project. Of these, 99 sites are considered to be high risk, 245 sites are identified as medium risk, and 52 sites are considered low risk. Table 3.14-1 provides a summary of the known high, medium, and low risk hazardous/regulated materials sites identified within the hazardous and contaminated materials study area, by municipality. These sites are illustrated within the Phase I ESA reports (refer to the Hazardous and Contaminated Materials Evaluation Supporting Documentation; see Appendix C for instructions on how to access supporting documentation).

TABLE 3.14-1
Hazardous and Contaminated Materials Sites, by Municipality and Level of Risk

Level of Risk	Municipality				
	Eden Prairie	Minnetonka	Hopkins	St. Louis Park	Minneapolis
High Risk	10	3	19	18	49
Medium Risk	52	26	38	63	66
Low Risk	12	1	6	8	25
Total	**74**	**30**	**63**	**89**	**140**

Sources: Short Elliott Hendrickson Inc., *Modified Phase I Environmental Site Assessment, Southwest Light Rail Transit – Segment 3* (2013). Short Elliott Hendrickson Inc., *Modified Phase I Environmental Site Assessment, Southwest Light Rail Transit – Segment 4* (2013). Short Elliott Hendrickson Inc., *Modified Phase I Environmental Site Assessment, Southwest Light Rail Transit – Segment A and Freight Rail Co-location* (2013). Short Elliott Hendrickson Inc., *Modified Phase I Environmental Site Assessment, Southwest Light Rail Transit – Switching Wye* (2014). Short Elliott Hendrickson Inc., *Modified Phase I Environmental Site Assessment, Southwest Light Rail Transit – Eden Prairie* (2014). Short Elliott Hendrickson Inc., *Modified Phase I Environmental Site Assessment, Southwest Light Rail Transit – Minneapolis Adjustments* (2015).

The following describes the general context of the hazardous and contaminated materials study area, moving along the proposed light rail alignment from southwest to northeast. These descriptions include the identification of areas of concern as identified in the Phase I ESAs completed for this project. Areas of concern generally consist of locations where known hazardous and contaminated materials exist and may consist of one or more of the potential hazardous and contaminated material sites identified in the Phase I ESA site identification process. See Table 3.14-1 for a summary of sites per risk category by municipality and see the Phase I ESA reports listed in the Hazardous and Contaminated Materials Evaluation Supporting

Documentation (see Appendix C) for more detailed information on and an illustration of the location of each site.[73]

In **Eden Prairie**, at the western terminus of the proposed light rail alignment, the hazardous and contaminated materials study area consists of mostly commercial and light industrial sites, with interspersed retail shops, residences, apartments, condominiums, and recreational paved trails. The majority of potentially contaminated sites identified in Eden Prairie were originally developed as agricultural fields. Many sites included historical structures and previously low-lying/marshy sites that were filled for development. All of the identified sites sustained surface disturbances at some point in their history, and numerous sites with historic surface disturbances are suspected of having had historic dumping. The majority of site listings include small to minimal quantity hazardous waste generators. The former Best Buy Headquarters [sites 514 and 517] is an area of concern for hazardous and contaminated materials.

Moving northeast to **Minnetonka**, the hazardous and contaminated materials study area is located in an area consisting of mostly commercial sites with interspersed retail shops, residences, apartments, and condominiums, as well as recreational paved trails. The majority of the present-day structures along the Project in Minnetonka were constructed after 1960 on former farm fields and scattered ponds or marshy ground.

In **Hopkins**, the hazardous and contaminated materials study area overlaps with an active freight railway. There are a variety of environmental concerns associated with railroads and from property uses directly associated with railroad activities and surrounding industry. Common railroad facilities include paint shops, car and locomotive washing facilities, foundries, gas works, creosoting plants, fuel storage, battery shops, and laundries. Railroad property is often contaminated with heavy metals and polycyclic aromatic hydrocarbons (PAH) associated with the transport of coal and other industrial products. In addition, railroads are known to use chemicals associated with controlling encroaching vegetation along the railroad.

Properties adjacent to the Project in Hopkins include heavy/light industrial, commercial, and retail businesses with pockets of residential and multi-tenant dwellings. The area also includes former railways, which have been converted into trails. This includes portions of the Bass Lake Spur and Minneapolis Northfield and Southern (MN&S) Railroad, as well as the Minnesota River Bluffs and Cedar Lake trails. Areas of concern include the Hopkins Sanitary Landfill [site 402], the former Honeywell facilities [sites 008 and 407], the Hopkins Tech Center [site 006], and Napco [site 012].

Moving east along the proposed light rail alignment, the Phase I ESA identified the St. Louis Park/Edina/Hopkins Groundwater Plume, generally between Highway 169 in Hopkins and Highway 100 [sites 034, 038-118] as an area of concern. Volatile organic compounds (VOCs) and benzene soil vapors associated with the plume have been identified. Known and potential sources of the solvent plume are identified as machine shops and related industrial land uses between Louisiana Avenue and Wooddale Avenue. The chlorinated solvent plume affects surficial glacial drift aquifers, as well as the Prairie du Chien/Jordan and St. Peter bedrock aquifers. Groundwater analytical results identified tetrachloroethene (PCE), trichloroethene (TCE), 1,2-dichloroethene (DCE), and vinyl chloride as the contaminants of concern in groundwater.

In addition, soil vapors were identified in residential areas adjacent to industrial sites between Louisiana Avenue and Wooddale Avenue. Soil vapor samples collected within the hazardous and contaminated materials study area indicate maximum benzene and VOC detections at approximately 10 times and 1,000 times the screening values, respectively. One particular area of concern is located within the

[73] Areas of concern were identified within the Phase 1 ESA reports. These areas may encompass all or part of one or multiple high, medium, and low risk sites as identified in preliminary site identification process. Refer to Contaminated Materials Evaluation Supporting Documentation (see Appendix C for instructions on how to access supporting documentation).

hazardous and contaminated materials study area [site 094], southeast of the intersection of Oxford Street and Edgewood Avenue South.

In **St. Louis Park**, the hazardous and contaminated materials study area is generally aligned with current single-track active railways and former railways, which have been converted into trails, including portions of the Bass Lake Spur, the MN&S Spur, and the Cedar Lake Trail. Properties adjacent to the railway within St. Louis Park include primarily industrial and commercial structures with areas of residential homes and multi-dwelling structures. The MN&S Spur intersects the Bass Lake Spur east of Louisiana Avenue in St. Louis Park. Canadian Pacific Railway currently uses the MN&S Spur for local industry trains, primarily for rail cars going to various Bloomington industries. The service is approximately one train each direction five days per week (SEH, 2013c). The Twin Cities & Western (TC&W) Railroad has operating rights in this area.

During the site reconnaissance conducted as part of the ESA process, it was observed that portions of the railways within St. Louis Park are built up with nonnative fill material, and many areas of dirt piles and tree stumps were observed adjacent to commercial/industrial sites along the railway. The fill in these areas is of unknown origin and there is the potential for the fill to be contaminated and contain debris. Many of these areas were investigated during the Phase II ESA process and the extent of the existing contamination was verified. In general, these railroad corridors are characterized by "Unregulated Fill" and "Urban Fill." Unregulated fill is defined as uncontaminated material based on MPCA definitions, and urban fill is defined as widespread low-level contaminated material typical of historic urban/industrial areas with key indicator parameters (metals, PAHs) and debris indicating a diffuse anthropogenic origin. The majority of urban fill in the Project area also includes mixed railbed fill material. Areas of unregulated and urban fill will be managed in accordance with the approved Project Response Action Plans (RAP) (see Section 3.14.4). Areas of note, where the elevation of the track was approximately five to 20 feet higher than the adjacent properties (indicating fill was used), include the following locations[74] (Portions of the railroad listed below are described by north-south-running roadways within the project corridor. These roadways may or may not intersect the railway):

- The portion of railroad (sites 017 and 018) between 15th Avenue South and 11th Avenue South (10 feet)
- The portion of railroad (sites 061, 062, 063, 064, 066, 067, 069, and 070) between Blake Road North and Woodland Drive (five to 15 feet)
- The portion of railroad (sites 069, 070, 072, 073, 074, 076, 077, 078, 081, 082, 084, 085, 086, and 093) between Woodland Drive and the BNSF Railway crossing near Edgewood Avenue South (15 to 20 feet)

In addition to hazardous and contaminated materials from railroad activities, many low-lying areas in the City of St. Louis Park were filled with solid waste or urban fill and reclaimed or developed. The former Reilly Tar/Republic Creosoting Works plant site (located west of Louisiana Avenue, south of 32nd Street, east of Pennsylvania Avenue, and north of Walker Street) is one site that has been redeveloped since onsite industrial dumping ceased. The Reilly site totaled approximately 80 acres of land; however, plant-associated operations affecting soil and/or groundwater extended beyond the boundaries previously established by the Superfund program. From 1918 to 1972, the site operated as a coal tar distillation facility and wood preserving plant. Reilly's primary production was creosote, and it also treated railroad ties, timbers, poles, piling, and other heavy-duty products. The Reilly site has since been redeveloped as a city park, condominiums, and business center. The chemical compounds associated with these onsite processes are PAH, phenolics and pentachlorophenol (PCP). Based on the investigations conducted as part of the Phase I ESA, an onsite well was contaminated with these materials, which penetrated the Mt. Simon/Hinckley Aquifer (approximately 900 feet below the ground surface). In addition, wastes containing coal tar and its

[74] Refer to the Phase I ESA reports listed in the Hazardous and Contaminated Materials Evaluation Supporting Documentation (see Appendix C for instructions on how to access supporting documentation) for an illustration of the location of each site.

distillation byproducts were discharged over the ground surface into a network of ditches that emptied into a peat bog south of the site. Although the former Reilly site is outside of the hazardous and contaminated materials study area and wasn't investigated as an ESA site, there is an approximately 1,000-acre contaminated groundwater plume associated with this site that reaches into the hazardous and contaminated materials study area.

The National Lead Industries site (also known as Taracorp/Golden Auto) is also located in the City of St. Louis Park, in the southeast quadrant of Louisiana Avenue and Highway 7 [site 086]. The site was a metal refining and re-fabricating site listed for the following wastes: sulfates, dissolved solids, lead, battery fragments, lead-bearing debris, and slag. The source of onsite contamination was the discharge of liquid waste through the process sewers, which ran to the municipal sewer system. Groundwater and offsite soil associated with the National Lead Industries site may be contaminated. A lead smelter was active on about 10 acres of the site from the 1930s to August 1979. Large amounts of lead slag from the plant's early operations were buried on portions of the site. Air monitoring conducted by the state in 1979 revealed that lead standards were frequently violated when the plant was in operation, which is believed to be a concern for other properties in the area. The site has been delisted from the NPL, the Minnesota PLP, and the CERCLA database.[75]

Continuing east, the hazardous and contaminated materials study area in Minneapolis is generally aligned with an active railroad in the vicinity of four former rail yards that have since been redeveloped with industrial/commercial properties and recreational parks and trails. Historic uses include heavy industrial/ machining, bulk fuel storage facilities, and other uses. Properties along the hazardous and contaminated materials study area in Minneapolis include primarily heavy/light industrial, commercial and retail businesses with recreational facilities/grounds on the west side; outdoor storage/stockpiling on the east side; and residential and recreational properties in southwest Minneapolis, with several wooded, residential, and recreational areas and beaches adjacent to Cedar Lake. Currently, Hennepin County Regional Railroad Authority owns the adjacent Kenilworth Corridor, which has one track that TC&W uses to access the BNSF Wayzata Subdivision track and other railroads in the Twin Cities.

The hazardous and contaminated materials study area parallels the BNSF Railway track after both crossovers of the I-394 corridor in Minneapolis. This area includes the current City of Minneapolis rock crushing and outdoor storage areas, a bus garage, and an impound lot, as well as Xcel and CenterPoint Energy facilities. Historic features include the Bassett Creek/Irving Avenue Dump and rail yard, fuel companies/storage facilities, machine/repair shops, fuel stations, painting operations, and other facilities. The former Bassett Creek/Irving Avenue Dump is a Superfund site (site 315). This area also has listings for EPA Brownfield sites (sites 315 and 323), cleanup sites (sites 348, 352, and 355), and other sites. The Bassett Creek/Irving Avenue Dump Superfund site was added to the EPA PLP because of debris-containing fill material up to 20 feet below the ground surface, and because of PAH and VOC impacts on soil, soil gas, and groundwater.

The portion of the hazardous and contaminated material study area within downtown Minneapolis has undergone major redevelopment in the past five to 10 years, and redevelopment continues through the present. The Northstar Commuter Rail, the existing Target Field Station (serving the existing Green and Blue light rail lines), Hennepin Energy Recovery Center, and the Target Field Stadium are among the most recent construction activities with recent or ongoing projects in state/federal regulatory programs. Private properties surrounding these public facilities have also undergone recent or current redevelopment. This general area is known to have historic/present debris, metals, VOCs, PAH, and benzo(a)pyrene equivalent impacts on soil and/or groundwater.

[75] A site is "delisted" if it is determined that no further response is required to protect human health or the environment after meeting criteria established by the EPA.

Phase II Environmental Site Assessment Sites

Phase II ESAs, were completed to further investigate the potential risk of encountering contaminants at high- and medium-risk sites as identified in the Phase I ESAs. Phase I ESA investigations typically involve review of site information, regulatory files, a site inspection, and interviews with owners and operators. Phase II ESA investigations generally include collecting soil and/or groundwater samples for laboratory analysis.

The purpose of the Phase II ESAs was to verify the presence of contamination, and to characterize the extent and magnitude of contamination where appropriate. The Phase II ESA investigations also identify any restrictions in potential soil reuse, based on MPCA guidance. There are two types of soil reuse restrictions identified in the Phase II ESAs:

- **Exceeds Unrestricted Use.** Indicates that soil contains debris or other field indications of contamination, and/or soil laboratory analytical results exceed the Tier 2 Residential Soil Reference Value (SRV); soil is considered impacted and may not be used on other sites at the discretion of the contractor, but may be reused on-site (i.e., within the same ESA site) with proper permitting
- **Exceeds Tier 2 Industrial SRV.** Indicates that soil laboratory analytical results exceed the Tier 2 Industrial SRV; soil is impacted. If removed, disposal at a landfill permitted to accept special waste is necessary.

A total of 171 high- or medium-risk sites within the hazardous and contaminated materials study area were investigated through Phase II ESAs. Of these, 61 sites exceed the thresholds for unrestricted soil reuse based on the Phase II ESAs. Twenty one of those sites also exceed the Tier 2 Industrial SRV threshold. These sites (i.e., exceeds unrestricted soil reuse and exceeds Tier 2 Industrial SRV) are considered to be impacted by hazardous and contaminated material. Impacted sites are illustrated on Exhibits 3.14-1 and 3.14-2. A summary of the rationale for the risk designation for each site is included in the Southwest LRT Phase II ESA Site Summary (see Appendix C). For additional detail, refer to the full Phase II ESA reports (see Hazardous and Contaminated Materials Evaluation Supporting Documentation; see Appendix C for instructions on how to access supporting documentation).

In order to determine the appropriate remediation for impacted sites, RAPs will be developed prior to construction. The RAPs are subject to approval by the MPCA prior to the start of any project construction activities within the affected area. Refer to Section 3.14.3.3 for more information on potential impacts related to construction activities, including RAPs.

3.14.3 Environmental Consequences

This section identifies the long-term and short-term direct and indirect impacts related to hazardous and contaminated materials from the Project.

3.14.3.1 Long-term Direct Impacts from Hazardous and Contaminated Materials

Long-term direct hazardous and contaminated materials impacts relate to the generation and storage of hazardous materials or regulated wastes. In general, no adverse long-term direct hazardous or contaminated material impacts are expected as a result of the Project. This is due to the fact that operation of the light rail vehicles will not generate hazardous materials or regulated wastes. In addition to impacts resulting from pre-existing contamination in the study area, the operation and maintenance of the Project could be associated with petroleum releases from the equipment and materials stored at the Hopkins OMF site. The long-term operation of the proposed Hopkins OMF will require responsible management and containment of hazardous materials that are used and stored onsite, consistent with applicable regulatory standards (principally Minnesota Rules Chapter 7045). The collection and disposal of oils, grease, and other waste materials generated during vehicle maintenance and repair activities would be accomplished in accordance with industry BMPs for rail transit maintenance facilities at the Hopkins OMF.

EXHIBIT 3.14-1
Hazardous and Contaminated Materials Sites

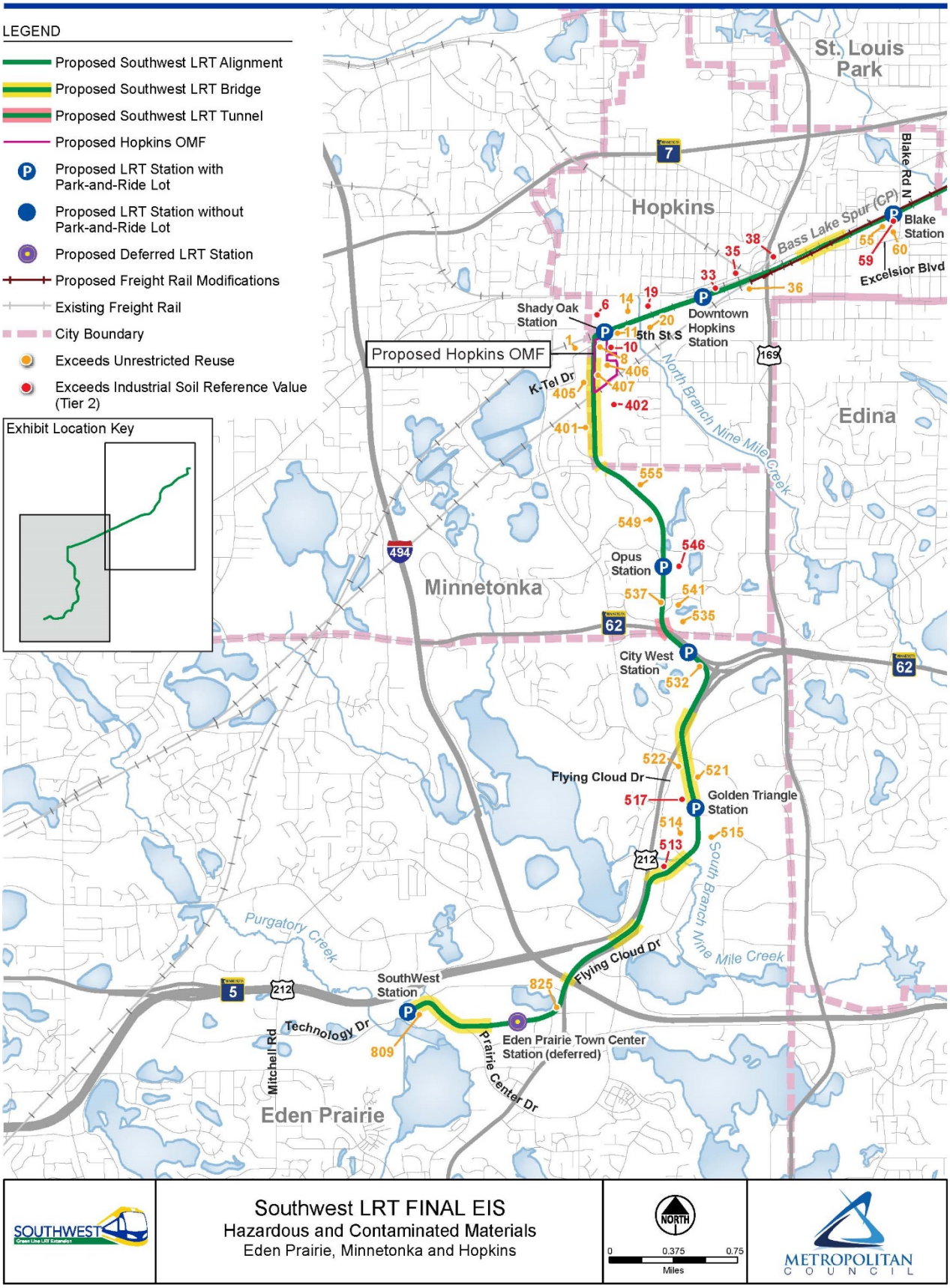
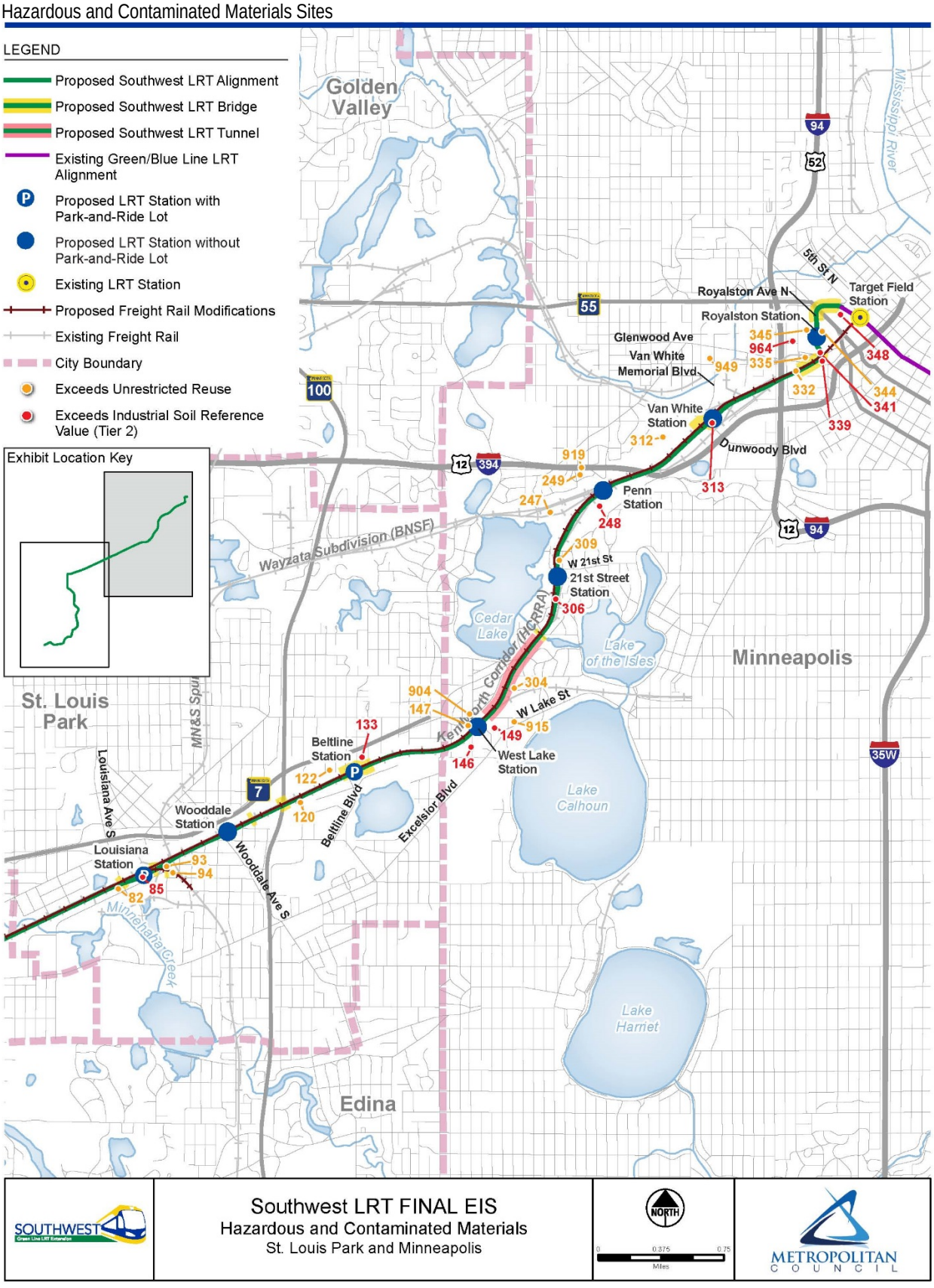


EXHIBIT 3.14-2
Hazardous and Contaminated Materials Sites



The Hopkins OMF will be defined as a Hazardous Waste Generator and required to obtain a Generator License through Hennepin County. It will comply with applicable requirements for annual reporting/licensing, storage, shipping, record keeping, emergency planning, and disposal requirements. In addition, the proposed Hopkins OMF will be constructed with engineering controls to limit and contain releases and spills, should these occur. This includes the development of a Spill Prevention, Control, and Countermeasure (SPCC) plan to minimize potential long-term effects related to accidental spillage of petroleum products stored onsite.[76] The SPCC plan will be developed by the Council in accordance with the Clean Water Act and will include control measures to prevent oil spills from entering waters and countermeasures to contain cleanup and mitigate the effects of an oil spill related to aboveground petroleum storage tanks. All required permits will be obtained prior to construction (see Section 3.9 for more details on NPDES permit).

Through compliance of regulatory requirements and implementation of best management practices, the long-term direct impacts (i.e., releases) from project operation and maintenance activities will be very low and no adverse long-term direct hazardous or contaminated material impacts are expected as a result of OMF operations.

At some locations along the proposed light rail alignment, implementation of the Project will result in a permanent beneficial effect of removing existing hazardous and contaminated soils not related to the Project, to meet MPCA risk-based guidance and/or the capping of known contaminated sites related to construction of the Project. Refer to Section 3.14.3.2 for a summary of potential long-term indirect impacts related to construction of the Project.

The proposed light rail tunnel in the Kenilworth Corridor would pass through an area of high groundwater due to shallow groundwater depth in combination with the highly permeable nature of the soils. Despite these conditions, the potential for contamination to groundwater from operation of the light rail tunnel would be low because the light rail trains would be electric and there are no activities associated with train operations in the tunnel that would generate pollutants that could contaminate groundwater (refer to *Southwest Light Rail Transit: Kenilworth Shallow LRT Tunnels Water Resources Evaluation,* located in Appendix D for more information). Water entering the tunnel could come from groundwater entering via small cracks or joints in the concrete walls, floors, and ceilings, which is expected to be minimal due to waterproofing measures for the tunnel. The small amount of water that may leak into the tunnel will have no effect on the level of the groundwater table. The Phase II ESA results indicate that groundwater in the vicinity of the proposed tunnel is not contaminated. In the unlikely event that groundwater that leaks into the tunnel has come into contact with contaminated soils prior to entering the tunnel, plans are in place to manage all groundwater entering the tunnel, including water collected in the tunnel, which will be treated, if required, and pumped to the adjacent sanitary sewer systems owned by either the City of Minneapolis or Metropolitan Council Environmental Services, preventing hazardous materials or contaminated stormwater in the tunnel from being released into the groundwater.

3.14.3.2 Long-term Indirect Impacts from Hazardous and Contaminated Materials

The Phase II ESA investigations evaluated long-term risks associated with possible exposure to groundwater contamination; however, the Project will not require permanent pumping of groundwater, and, therefore, there is no potential for long-term indirect impacts related to permanent groundwater pumping in zones of remaining contaminated groundwater. Refer to Section 3.8 “Geology and Groundwater Resources” for additional discussion related to groundwater.

Long-term management of methane-related indirect impacts on the proposed Hopkins OMF site from the Hopkins Sanitary Landfill may be necessary to limit potential worker exposure to methane. OSHA guidelines

[76] The Clean Water Act requires a SPCC plan for storage tanks with capacity to store at least 1,320 gallons of petroleum above ground.

will be followed in the operation of the OMF. This issue will be further evaluated as part of the Engineering process, prior to construction.

A potential beneficial long-term indirect effect of properties being on or in the vicinity of proposed light rail stations is that known and unknown hazardous and contaminated properties may be cleaned up as redevelopment occurs. Areas encountered during construction of the Project that contain hazardous and contaminated materials that are within the Project's limits of disturbance will be cleaned up as part of the Project, in accordance with the Project's RAP and CCP (see Section 3.14.4). See Appendix E for the preliminary engineering plans that illustrate the Project's limits of disturbance.

3.14.3.3 Short-term Impacts from Hazardous and Contaminated Materials

Short-term direct and indirect impacts typically result from earthwork or other disturbance at or in proximity to contaminated areas that might mobilize or result in the release of hazardous and contaminated materials. Short-term construction impacts can also result from spills of hazardous materials during construction.

The Council conducted Phase II ESAs to further investigate the potential risk of encountering contaminants within the area of construction (direct effect) and those that have the potential to migrate through the soil or groundwater from nearby sites (indirect effect). Refer to Section 3.14.3 for more information on the environmental site assessment process. In cases where the presence of contamination was verified through the Phase II ESAs (i.e., sites which exceed unrestricted use and Tier 2 Industrial SRV standards), RAPs for remediation will be developed. RAPs are subject to MPCA approval prior to the start of any project construction activities. Refer to Section 3.14.4.2 for more information on the response plans upon encountering unanticipated contamination.

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. OSHA guidelines will be followed during construction. Exposures to passersby would likely be limited to inhalation of contaminant vapors emanating from freshly uncovered contaminants. Public exposure through physical contact with a contaminated material or contaminant ingestion would be prevented by site access barriers.

The project will use engineering controls and BMPs to avoid spills of hazardous materials during construction. This includes preparation and adherence to a SWPPP that follows MPCA, Minnesota Department of Natural Resources and MnDOT guidelines and best management practices, to limit and contain releases and spills to minimize the likelihood of soil and groundwater contamination during construction.

3.14.4 Mitigation Measures

This section describes the measures the Council will implement to mitigate the Project's long-term and short-term impacts related to hazardous and contaminated materials. For each mitigation measure or set of associated mitigation measures, this section generally notes the anticipated impact or associated impacts that the mitigation measures will address (see Sections 3.14.3.1, 3.14.3.2, and 3.14.3.3 for additional information on the identified hazardous and contaminated material impacts and avoidance measures).

3.14.4.1 Long-term Mitigation Measures

No mitigation measures are warranted for long-term hazardous and contaminated materials impacts, because there will be no adverse impacts due to the effectiveness of identified avoidance measures.

3.14.4.2 Short-term Mitigation Measures

As the Project advances, it will be further refined to avoid disturbance to properties with known contaminants, as possible. In cases where the disturbance of hazardous and contaminated material cannot be avoided, the Council will conduct site remediation in accordance with the MPCA Brownfield Program regulatory framework and the approved RAPs for the Project.

Impact. Short-term direct and indirect impacts will result from earthwork or other disturbance at or in proximity to contaminated areas that might mobilize or result in the release of hazardous and contaminated materials. Short-term construction impacts can also result from spills of hazardous materials during construction.

Mitigation. In cases where the disturbance of hazardous and contaminated material cannot be avoided, the Council will identify mitigations for potential short-term (construction) hazardous and contaminated materials impacts within the guidelines of the MPCA Brownfield Program regulatory framework. The Project entered in the Brownfield Program on September 8, 2014, and has received site identification numbers PB4648/VP31670 from the MPCA. All mitigation measures will be implemented in accordance with commitments made as part of the MPCA's oversight of the Brownfield Program and the Project's participation in it. Implementation of these measures will result in controlled management of hazardous and contaminated materials and a low risk of human exposure to unhealthy contaminants. The following are specific mitigation measures that will be implemented with the Project:

- **Response Action Plans (RAPs)**. RAPs were developed by the Council and approved by MPCA to address the risks identified in the Phase I and Phase II environmental site assessments. Cleanup of identified contamination will begin prior to, or at the same time as, project excavation and/or drilling activities, in accordance with the approved RAPs. All cleanup activities will be conducted with prior MPCA approval and in accordance with the approved Site Health and Safety Plans (HASP).[77] Qualified inspectors will monitor cleanup activities. A final report will be prepared and submitted to the MPCA documenting all removal and disposal activity.
- **Construction Contingency Plan (CCP)**. It is reasonable to expect that previously undocumented soil or groundwater contamination may be encountered during construction. The Council has prepared a CCP to address the discovery of unknown contamination. The CCP was approved by MPCA and includes outlines of procedures for initial contaminant screening; soil and groundwater sampling; laboratory testing; and removal, transport, and disposal of contaminated materials at licensed facilities. Contaminated material removal and disposal will be in accordance with this plan, monitored by qualified inspectors, and documented in final reports for submittal to MPCA.
- **Hazardous Building Material Surveys**. In addition to contaminated soil and groundwater, the potential exists for structures on acquired land to contain asbestos, lead paint, or other hazardous materials. Any existing structures on acquired land will be surveyed for the presence of hazardous/regulated materials prior to their demolition or modification. Potentially hazardous materials will be handled and managed in compliance with all applicable regulatory standards and will be disposed in accordance with all Hazardous Materials Abatement Plans for in-place hazardous/regulated materials, and the RAP/CCP for hazardous/regulated materials in the site soils.
- **Regulated Waste Assessments**. Regulated Waste Assessments were completed for existing bridge structures that will be modified or demolished as part of the Project. The purpose of the work is to assess the presence and quantity of asbestos and regulated waste at the seven bridges and two pier protection locations along the Southwest LRT alignment (see Appendix E for the Project's preliminary engineering plans). The effort includes documenting and sampling suspect regulated waste, including asbestos, lead-based paint, PCB containing caulk, and mercury-containing light bulbs and ballasts. Potentially hazardous materials will be handled and managed in compliance with all applicable regulatory standards and will be disposed of in

[77] HASPs will be developed by the individual contractors as a requirement of the Project's contract specifications. Contractors will also be responsible for implementation of HASPs.

accordance with the Hazardous Materials Abatement Plans for in-place hazardous/regulated materials, and the RAP/CCP for hazardous/regulated materials in the site soils.

3.15 Electromagnetic Fields, Electromagnetic Interference, and Utilities

This section describes the long-term direct and indirect effects and short-term (construction) direct and indirect effects of the Project from electromagnetic fields (EMF) and electromagnetic interference (EMI), and on public and private utilities. (See Section 3.17 for cumulative impacts.) This section includes an overview of the regulatory context and methodology used for the analysis; an assessment of the existing EMF/EMI and utilities environment; a description of the anticipated impacts related to EMF/EMI and impacts on utilities; and a description of mitigation measures to implement with the Project.

3.15.1 Regulatory Context and Methodology

3.15.1.1 Electromagnetic Fields and Electromagnetic Interference

Neither the federal government nor the State of Minnesota have set standards for EMF exposure and/or EMI levels for electrical equipment. Federal guidelines are under consideration by the United States Food and Drug Administration, Federal Communications Commission, U.S. Department of Defense, and EPA. However, international EMF exposure guidelines have been adopted that can be used for reference.

FTA has published a guidance document for the evaluation of EMI produced by transit projects (FTA, 2008). This document contains the statement, "This guidance focuses on approaches to preventing and reducing community environmental, health, and safety impacts from transit-generated EMF and electromagnetic radiation (EMR)." The analysis described in this section follows the guidance in the FTA document.

EMF occurs wherever electricity is produced and used. Electric fields are produced by charges. Magnetic fields are produced by the flow of electric current. The greater the electric charge, the greater the electric field. Similarly, the greater the electric current, the greater the magnetic field. EMF surrounds all electrical equipment and facilities, including the electrical conveyance lines and electrical devices as proposed in the Project. Electromagnetic fields can result in electromagnetic interference which can cause disruptions and possibly malfunctions in certain types of sensitive equipment found in hospitals, large medical clinics, and university and industrial scientific laboratories.

The EMF/EMI study area is the area along the alignment where EMF/EMI from the Project may interfere with potentially sensitive electronic equipment. This includes the portion of the Project where the LRT will draw the maximum amount of electrical power to accelerate or decelerate.

Several studies have been conducted to assess the potential impact of LRT operations on nearby facilities that may be sensitive to EMF/EMI. An evaluation was performed of potential EMI interference from the Maryland Transit Authority proposed Purple Line LRT passing through the campus of the University of Maryland campus in College Park, Maryland (University of Maryland, 2010). This study demonstrates that EMI effects on sensitive receptors disappear within a distance of 300 feet. The Purple Line evaluation includes references to seven other university studies that also evaluated possible EMI interference from passing light rail trains. The overall conclusion of these collective studies was that interference with sensitive university laboratory equipment at distances greater than 150 feet is either not observed at all or can be mitigated. As a result of these studies of similar light rails systems, a distance of 300 feet on both sides of the centerline of the tracks was selected as the boundary of the EMF/EMI study area.

The EMF/EMI study area was surveyed for the presence of facilities that could be sensitive to EMF/EMI exposure. The specific location for each facility was evaluated using information found through publicly available information sources (such as general internet search engines and business-specific websites) and the submittal of questions to the users of identified facilities (listed in Section 3.15.2.1). In addition, a final check on the presence of EMF/EMI-sensitive equipment was made, based on availability and access, during site visits within the EMF/EMI study area.

3.15.1.2 Utilities

The following list summarizes representative federal and state laws, regulations, and guidelines that are associated with utility relocation and accommodation.

- Federal
  - U.S.C., Title 23, Sections 123 and 109(l)(1)
  - U.S.C., Title 23, CFR 645, Chapter I, Subchapter G, Part 645, Subparts A and B (FHWA, 2003)
  - FTA Project and Construction – Management Guidelines (2003), Appendix C – Utility Agreements
- State of Minnesota
  - MnDOT Policy Utility Accommodation on Highway Right-of-Way
  - MnDOT Policy Accommodation of Wireline on Freeway Right-of-Way
  - Minnesota State Constitution – Article 1, Section 13
  - Minnesota Statute Section 161.20, Subdivision 1
  - Minnesota Statute Section 161.20, Subdivision 2
  - Minnesota Statute Section 161.45
  - Minnesota Statute Section 161.46
  - Minnesota Statute Section 216B, Public Utilities
  - Minnesota Statute Section 216D.04
  - Minnesota Statute Section 222.37, Subdivision 2
  - Minnesota Rule Parts 8810.3100 through 8810.3600

To identify underground and aboveground utilities that could be affected by the construction of the Project, a review of the major public and private utilities within the utility study area was conducted. The utilities study area is defined as the area where major utilities are located within or immediately adjacent to the limits of disturbance and which may be relocated by the Project. The major utilities inventoried are defined as follows:

- Water mains, 18 inches or greater in diameter
- Sanitary sewer lines, 18 inches or greater in diameter
- Sanitary force mains, 8 inches or greater in diameter
- Storm sewer lines, 24 inches or greater in diameter
- Aboveground or underground electrical transmission lines
- Gas-main substations and gas lines 12 inches or greater in diameter
- Communication infrastructure

The cities of Eden Prairie, Minnetonka, Hopkins, St. Louis Park, and Minneapolis; along with Hennepin County, MnDOT, and Metropolitan Council Environmental Services were contacted to obtain public utility information for water main, sanitary sewer, storm sewer, and electric/communication locations. Private utility information was obtained through the information resources available within the 2015 Gopher State One Call Handbook (gopherstateonecall.org, 2015), in meetings with each private utility and through subsurface utility engineering investigations performed as part of the Project. The locations of major utilities were then compared to the light rail alignment and crossing conflicts were noted. In addition, any utilities within the utilities study area were identified for potential conflicts.

3.15.2 Affected Environment

This section describes the potentially sensitive EMI receptors within the EMF/EMI study area (300 feet), and the existing utilities within the utilities study area (study areas are defined in Sections 3.5.1.1 and 3.5.1.2, respectively).

3.15.2.1 Electromagnetic Interference and Electromagnetic Fields

The Project will operate on 750-volt direct current (DC) traction power. The use of this DC power will generate low-level DC electric and magnetic fields (i.e., EMF) on and adjacent to light rail vehicles, including in passenger station areas.

EMI could be produced by the moving light rail trains from a pantograph[78] sliding along the overhead catenary wires or from electric noise produced by motors and controls on board the trains. When light rail trains are traveling, their pantographs slide along the overhead catenary wires and their motors and controls produce electronic noise, both of which can generate EMI. Also the LRT, which contains large masses of ferromagnetic metals, moving through the earth's magnetic field can produce EMI. The EMI could intermittently interfere with the operation of sensitive electronics and electrical equipment along the right-of-way as a train passes. As previously stated, the EMF/EMI study area was surveyed for the presence of facilities that could be sensitive to EMI exposure, which are listed in Table 3.15-1.

TABLE 3.15-1
Potential EMI Sensitive Receptors

Potential Receptor	Location	Type of Business	Approximate Distance from Center of LRT Alignment	Sensitive to EMF/EMI from LRT?
Optum Insight	12125 Technology Dr, Eden Prairie	Data processing	460 feet	No
Access Genetics	7400 Flying Cloud Dr, Eden Prairie	DNA testing	130 feet	No
American Medical Systems	10700 Bren Rd, Minnetonka	Medical equipment manufacturer	70 feet	No

Source: Council, 2015.

3.15.2.2 Utilities

The activities associated with the construction of an LRT system often require significant excavation and the erection of bridges, catenary systems, tunnels, and other vertical infrastructure. Excavation can occur in areas where existing underground utilities are in place; in these situations, the utilities would need to be reconstructed and/or relocated. Similarly, vertical infrastructure components could interfere with overhead utilities, especially electrical transmission and distribution lines.

To identify underground and aboveground utilities that could be affected by the construction of the Project, a review of the major public and private utilities within the utilities study area was conducted. Underground utilities present within the utilities study area include water, sewer, stormwater, and natural gas pipes and pipelines and electrical distribution and communication wires and cables. Aboveground utilities include electrical transmission or distribution lines and communication (telephone and cable TV) lines. In general, there is a greater concentration of utilities in the more densely developed portions of the project. A description of the detailed listing of the public and private utilities located within the utilities study area is provided in *Southwest LRT Utility Impacts – Supporting Information* (instructions on how to access the document are found in Appendix C).

[78] A pantograph is a telescoping apparatus mounted on the roof of an electric rail car that presses an electrode up against an overhead catenary wire to collect power for LRT operation. As the light rail vehicle moves down the tracks, the pantograph electrode slides along and against the catenary wire.

3.15.3 Environmental Consequences

3.15.3.1 Electromagnetic Fields and Electromagnetic Interference

A. Long-term Direct EMI/EMF Impacts

People riding the LRT could be exposed to DC magnetic fields as high as 1,000 milli Gauss, which is well below acceptable international guidelines for public exposure to DC magnetic fields of 400,000 to 1,180,000 milli Gauss (FTA, 2008). People in buildings adjacent to the LRT alignment would be exposed to lower levels of EMF, so there would be no EMF effect from the Project on people either riding the LRT or in buildings adjacent to the light rail alignment.

No long-term direct impacts from EMFs and the resulting EMI are anticipated. Based on the analysis conducted of the EMF/EMI study area and of potential EMI-sensitive receptors, as presented in Section 3.15.2.1 and Table 3.15-1, there is no on-site equipment on the assessed properties sensitive to EMI from the Project.

B. Long-term Indirect EMF/EMI Impacts

No long-term indirect impacts from EMFs and the resulting EMI are anticipated. Based on the analysis conducted of the EMF/EMI study area and of potential EMI-sensitive receptors, as presented in Section 3.15.2.1 and Table 3.15-1, there is no on-site equipment on the assessed properties sensitive to EMI from the Project.

C. Short-term EMF/EMI Impacts

No short-term impacts are anticipated to EMF/EMI-sensitive receptors related to Project construction.

3.15.3.2 Utilities

A. Long-term Direct Impacts on Utilities

No adverse long-term direct impacts to utilities are anticipated because all conflicting utilities will be relocated and services maintained, in accordance with the Southwest LRT Utility Relocation and Management Plan. Site-specific conflicts will be addressed by design measures such as relocating utilities, as appropriate.

To minimize the potential for long-term damage to existing utilities, short-term conflicts during construction, and disruption of light rail service in the future, a utility-free zone is established based on the project design criteria. An evaluation of potential utility conflicts and whether affected utilities within the utility-free zone would require relocation will be conducted during Engineering. The relocation of a segment of a conflicting utility line beyond the limits of construction will prevent conflicts with construction of the LRT alignment and minimize future disturbances to the route during maintenance of the underground utilities.

Overhead electric and communication lines will be adjusted horizontally and/or vertically, as necessary, to provide adequate vertical clearance for the light rail vehicles and the overhead catenary system. For example, in some cases, aboveground utilities located on poles could be relocated to taller poles or a different type of pole to address vertical clearance requirements.

Underground utilities[79] were evaluated to determine their condition and potential reaction to the added weight loading from the light rail and freight rail and to verify that the utility line is buried deep enough to meet the vertical clearance requirements for the utility owner(s), MnDOT, BNSF, and Canadian Pacific. Utility conflicts will be resolved through a variety of appropriate techniques, such as lowering the existing utility, encasing the utility line for additional protection, or relocation of the line away from the LRT alignment corridor. Manholes and vaults that are in conflict with the LRT corridor and that limit access to

[79] The underground utilities evaluated for this analysis include water, sewer, stormwater, and natural gas pipes and pipelines and electrical distribution and communication wires and cables within or crossing the utilities study area (see Section 3.15.2.2)

the underground utilities will require relocation to provide adequate access. Relocating water mains could temporarily affect access to and use of fire hydrants, but no long-term effects are expected.

B. Long-term Indirect Impacts on Utilities

No adverse long-term indirect impacts to utilities are anticipated because conflicting utilities will be relocated and services maintained, in accordance with the *So*uthwest LRT Utility Relocation and Management Plan. Site-specific conflicts will be addressed by design measures such as relocating utilities, as appropriate.

The light rail overhead catenary system will operate by supplying electrical energy to the train with the return current flowing through the rails. This return current can also flow through underground metal utility pipes and cable lines near the LRT alignment. The potential for long-term indirect impacts, such as corrosion of existing metal utility pipes and cables due to stray current from the light rail electrification systems was evaluated. The project will include measures to minimize stray current and reduce the amount of corrosion due to stray current in accordance with Project's design criteria.[80] Therefore, no long-term indirect impacts related to stray current are anticipated.

The electric energy demands for LRT alignment operation could also require upgrades to electrical transmission systems along the corridor, which could involve increasing the capacity of transmission lines, replacing poles or towers, and improving electrical substations. Necessary improvements will be determined through consultation with Xcel Energy prior to construction but will likely involve upgrading existing transmission facilities rather than creating new facilities. Refer to Section 3.16 for additional information on the potential energy-related impacts of the Project.

C. Short-term Impacts on Utilities

Short-term (construction) impacts to utilities will occur during excavation and grading activities, placement of structural foundations, and during work that requires large-scale equipment that will affect overhead utilities. Short-term utility service disruptions will occur throughout construction to facilitate utility relocations. It is anticipated that these disruptions will be minimal, with temporary connections provided to customers prior to permanent relocation activities. Utility owners will ultimately decide when and if disruptions to service are to be allowed.

Prior to construction, affected area utility companies and utility agencies will be contacted and requested to provide line relocation measures and approval of the proposed alteration of utility lines. In addition, utility location excavations and preconstruction surveys in general accordance with the *MnDOT Utility Accommodation Policy* (MnDOT, 2014) will help minimize unintended utility service disruptions.

Through construction specifications, the Council will require the appropriate construction contractor(s) to notify affected businesses and residences of planned disruption of service due to construction activities. Utility locations that are uncertain or misidentified can be unintentionally damaged during construction. The large number of utilities present within the utilities study area increases the likelihood of encountering previously unidentified utilities. Should utilities be discovered during construction that were not identified in the contract documents the appropriate utility companies and agencies will be contacted to identify the line(s). The discovered line(s) will not be disturbed until businesses and residences are notified and the utility owner approves the proposed alteration.

Coordination with local and state agencies may be required to relocate specific utilities outside the project corridor. Utilities that are located within rights-of-way owned by cities or county may be subject to an individual franchise agreement as authorized by Minnesota Statue 216B, Public Utilities, which provides the terms for which the utility companies may operate in the public right-of-way. Public and private utilities must conform to *MnDOT Utility Accommodation Policy* (MnDOT, 2014), which requires owners to obtain a

[80] Cathodic protection is a way to prevent corrosion of a pipeline by using special cathodes and anodes to circumvent corrosive damage caused by electrical current.

permit in order to place utility facilities on trunk highway right-of-way. Utility installations on, over, or under railroad property will require review and approval by the railroad, shall conform to requirements contained within the *BNSF Utility Accommodation Policy* (BNSF, 2011) and comparable policies for Canadian Pacific Railway, and may require a Utility License Agreement issued by the railroad.

3.15.4 Mitigation Measures

3.15.4.1 Electromagnetic Fields and Electromagnetic Interference

No mitigation measures are warranted for long-term or short-term direct or indirect impacts from EMF/EMI due to the absence of any corresponding impacts. The LRT startup activities will include a test to verify there are no EMI impacts from the 750 V DC LRT power supply or catenary lines and/or other nearby utilities to the Rail Signal System.

3.15.4.2 Utilities

No mitigation measures are warranted for long-term or short-term direct or indirect impacts to utilities due to the effectiveness of identified minimization measures. Actions will be conducted to facilitate coordination and communication during construction activities (see Section 3.15.3.2.C).

3.16 Energy

This section describes the potential long-term direct and indirect and short-term (construction) direct and indirect effects of the Project on energy consumption (see Section 3.17 for cumulative impacts). This section includes an overview of the regulatory context and methodology used for the analysis; an assessment of existing built environment; and a description of the anticipated long and short term impacts related to energy consumption.

3.16.1 Regulatory Context and Methodology

At the federal level, the Council on Environmental Quality regulations at 40 CFR 1502.16(e) require the consideration of "energy requirements and conservation potential of various alternatives and mitigation measures" of the proposed action.

The energy study area includes the seven-county region of central Minnesota governed by the Metropolitan Council regional governmental agency and planning organization. Within these seven counties, an evaluation of the mode choices made by commuters and riders has been analyzed along with the corresponding consumption of energy used for personal transit. The study area also includes the Xcel Energy electric transmission and distribution facilities that will be affected by the increased use of electricity to power the operation of the Project.

Energy consumption is calculated based on the projected travel forecasts for the energy study area, reported by British thermal units (Btu) per mile as calculated from the VMT. The evaluation of energy consumption factors is based on estimates of average energy consumption rates by general transportation mode (e.g., personal passenger vehicles, light rail vehicle).

The analysis of regional energy consumption includes a measurement of how much energy is used in a given geographic area for each type of transportation activity. Regional energy consumption is based on regional VMT derived from the Council's travel demand model (see Section 4.1 for additional information on the regional model). Transit operating consumption is defined using the following three categories of energy use: vehicle propulsion; operation of stations and ancillary facilities; and maintenance of transit vehicles and track systems.

The impacts of the No Build Alternative and the Project on energy consumption were determined by comparing total forecast energy consumption for these alternatives in 2040. Table 3.16-1 presents the amount of energy used per mile by each mode of transportation in 2012, the latest year data are available. Annual regional energy use was estimated by multiplying these energy-use factors by the total miles traveled for each mode.

TABLE 3.16-1
Energy Consumption Factors by Transportation Mode

Transportation Mode	Energy Consumption Factor (Btu/vehicle mile)
Light Rail Transit	63,469
Heavy Duty Vehicles	21,525
Bus	37,105
Passenger Vehicles[a]	5,667

[a] Passenger vehicles value is weighted average of cars, personal trucks, and motorcycles.

Note: Data for 2012.

Source: U.S. Department of Energy, 2014 Transportation Energy Data Book: Edition 33 – 2014, U.S. Department of Energy Oak Ridge National Laboratory.

3.16.2 Affected Environment

The energy study area is primarily suburban in its western and central portion and urban in its eastern portion within the City of Minneapolis. Existing development along the Project alignment includes an array of residential, business, industrial, institutional, park, and transportation uses. Existing land uses along the proposed alignment options are identified and described in Section 3.1

3.16.3 Environmental Consequences

This section identifies the long-term and short-term direct and indirect impacts on energy from the No Build Alternative and the Project. The total projected long-term annual regional energy consumption for the No Build Alternative and the Project in 2040 is presented in Table 3.16-2 and discussed within this section. Energy consumption was calculated by multiplying the energy-use factors in Table 3.16-1 by the total miles traveled for each transportation mode.[81]

Energy consumption during the short-term construction period is discussed in Section 3.16.3.3.

3.16.3.1 Long-term Direct Impacts on Energy

This section includes an analysis of regional energy consumption based on mode shifts from single-occupant vehicles to transit, along with analysis of potential increases in energy consumption from new development and redevelopment in the light rail station areas.

A. No Build Alternative

The total long-term regional energy consumption for the No Build Alternative would be approximately 232.51 trillion Btu annually. The No Build Alternative would have a slightly higher forecast annual regional energy consumption (109 billion Btu more per year) than the Project. This higher consumption under the No Build Alternative is expected, because no mode shifts from single-occupant vehicles to transit would occur as they would with the Project.

B. Project

The total long-term regional energy consumption for the Project will be approximately 232.40 trillion Btu annually. The Project will have an annual regional energy consumption 109 billion Btu lower than the No Build Alternative.

[81] Btu were calculated using information from the Daily VMT found in Metropolitan Council's 2040 Regional Travel Model using the following steps: (1) Daily VMT was annualized to determine Annual VMT by vehicle type (light rail, heavy-duty vehicles, bus, and passenger vehicles) for the Project. (2) Annual VMTs (calculated in Step 1 were multiplied by Btu using the VMT factors, shown in Table 3.16-1 Energy Consumption Factors, to calculate Btu by vehicle type. (3) The data calculated in Step 2 were summed to determine total Btu for each alternative.

TABLE 3.16-2
Projected Annual Energy Consumption of the No Build Alternative and Project in 2040

Mode	No Build	Project
2040 Annual Vehicle Miles Traveled (in thousands)[a]		
Light Rail Transit	3,232	4,446
Heavy Duty Vehicles	1,116,000	1,116,000
Bus	70,291	71,855
Passenger Vehicles[b]	36,293,914	36,250,920
Total	37,483,437	37,443,222
Total Difference from No Build	N/A	-40,215
2040 Annual Energy Consumption (billions of Btu)[c]		
Light Rail Transit	205	282
Heavy Duty Vehicles	24,022	24,022
Bus	2,608	2,666
Passenger Vehicles	205,678	205,434
Total	232,513	232,404
Total Difference from No Build	-	-109

[a] Source: Miles provided by Metro Transit May 2015 for regional daily VMT for the average weekday in revenue miles by mode. Average weekday VMT multiplied by 365 days per year to achieve annual vehicle miles.

[b] Passenger vehicles value is weighted average of cars, personal trucks, and motorcycles.

[c] Calculated by multiplying the VMT in this table by the energy consumption factors in Table 3.16-1 for each mode.

Note: N/A = not applicable.

Source: Council, 2015.

Under the Project, there will be mode shifts from single-occupant vehicles to transit, which will reduce long-term energy consumption in the study area and in the region as a whole. The projected reduction in single-occupancy VMT is predicted by the Council's travel demand model for this project, as discussed in Section 4.1.

3.16.3.2 Long-term Indirect Impacts on Energy

The Project will result in shifts from single-occupant vehicles to transit (see Section 4.1). As a result, a potential benefit from that mode change would be a projected annual reduction in passenger vehicle miles traveled of 42,994,000, with a resulting reduction in annual energy consumption of 244 billion Btu in the project area and the region over the long term.

New development and redevelopment in the proposed light rail station areas could result in greater demand for electricity in these locations; however, this type of new urban development (e.g., buildings) is typically more energy efficient than existing or less dense development.

3.16.3.3 Short-term Impacts on Energy

For the Project, energy will be used for the production of the raw materials and components used in construction, and for the operation of construction equipment. Energy use as a result of these activities will be localized and temporary and will have little effect on regional energy consumption.

Construction-related energy consumption for the Project was estimated by applying a highway construction energy factor to the total construction cost of the Project. The amount of energy used during construction of a project is roughly proportional to the project cost. Only direct construction costs related to this project were used to calculate energy consumption during the construction period.

The California Department of Transportation (Caltrans) derived energy consumption factors for different light rail transit facilities in *Energy and Transportation Systems* (Caltrans, 1983). These factors are still widely used in the industry today. The following energy consumption factors presented in Table 3.16-3

were used to estimate the energy consumed during project construction. The consumption factors were reported in Btu per dollars of construction spending. Because the Caltrans report was developed using 1973 construction dollars, the energy consumption factors were adjusted to account for the change in construction costs over time. The Turner Construction Company Building Index was used to adjust the factors to second quarter 2015 dollars. The estimated direct project construction costs are presented in Table 3.16-4 for the light rail facility types listed in Table 3.16-3.

Using the factors in Table 3.16-3 and the estimated construction costs in Table 3.16-4, the total energy consumption for the construction of the Project would be 35 billion Btus.

TABLE 3.16-3
Energy Consumption Factors by Light Rail Facility Type

Light Rail Facility Type	Energy Consumption Factor (Btu per dollars of construction spending in Second quarter 2015 dollars)
Track Work	4,710
Structures	4,710
Electric substations	7,238
Signaling	1,981
Stations, stops, and terminals	4,710
Parking	5,792
Maintenance facilities	5,792

Source: *Energy and Transportation Systems* (Caltrans, 1983) and *Turner Construction Company Building Index* http://www.turnerconstruction.com/cost-index.

TABLE 3.16-4
Estimated Project Construction Costs by Light Rail Facility Type

Light Rail Facility Type	Estimated Project Construction Costs
Track Work	$178,412,000
Structures	$216,066,000
Electric substations	$85,963,000
Signaling	$46,492,000
Stations, stops, and terminals	$52,564,000
Parking	$29,466,000
Maintenance facilities	$82,466,000

Source: Metro Transit July 23, 2015.

3.16.4 Mitigation Measures

This section describes the measures the Council will implement to mitigate the Project's long-term and short-term energy impacts. For each mitigation measure or set of associated mitigation measures, this section generally notes the anticipated impact or associated impacts that the mitigation measures will address.

3.16.4.1 Long-term Mitigation Measures

No mitigation measures are warranted for long-term impacts to energy, because there will be no adverse impacts to energy consumption due to a decrease in total annual regional energy consumption as compared to the No Build Alternative. During operation, Southwest LRT will utilize regenerative braking, similar to the Blue and Green Lines currently in operation. Energy generated by LRV braking can be used by another LRV if they are in the same power section at the same time, otherwise the energy will dissipate as heat from the top of the LRV.

Although not required, there are opportunities to reduce energy consumption, which include the construction of energy-efficient structures, such as park-and-ride facilities, light rail stations, and the OMF. An assessment of energy-saving opportunities and appropriate energy-saving measures was conducted by the Council and the following have been incorporated into the Project:

- Follow the State of Minnesota Sustainable Building Guidelines (MSBG- B3)(similar to LEED)
- Use highly efficient LED lighting throughout the Project (street lighting to building lighting)
- Maximize use of daylight at OMF, supplemented with lighting control management software
- Coordinate with Xcel Energy for efficient OMF heating, cooling, and lighting control systems
- Use energy recovery units in the OMF
- Use a high-efficiency chiller at OMF
- Use condensing boilers at OMF
- Use closed-cell cooling tower (free winter cooling)

3.16.4.2 Short-term Mitigation Measures

No mitigation measures are warranted for short-term impacts to energy because the impacts will be localized and minimal in the scale of regional energy consumption.

3.17 Cumulative Impacts

This section identifies the Project's cumulative impacts. Cumulative impacts result from "the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually-minor but collectively-significant actions taking place over a period of time" (40 CFR 1508.7). The purpose of a cumulative impacts analysis "is to ensure that federal decisions consider the full range of consequences of actions" (CEQ, 1997). Cumulative impacts could occur through the combination of the Project's long-term direct and indirect impacts and other development that is not directly related to the Project. Short-term (construction) impacts are temporary and are not considered within the context of cumulative impacts.

This section includes a summary of the regulatory context and methodology used for the cumulative impact analysis; a description of existing conditions that form a context for the cumulative impact analysis; a listing of past, present, and reasonably foreseeable actions included in the cumulative impact analysis; an assessment, by applicable environmental category, of the potential for the Project to result in cumulative impacts and, where applicable, identification of related mitigation measures to implement with the Project. See Chapters 3, 4, and 5 for the long-term direct and indirect and short-term (construction) direct and indirect impacts.

3.17.1 Regulatory Context and Methodology

The cumulative impact assessment is consistent with *Considering Cumulative Effects Under the National Environmental Policy Act* (CEQ, 1997). A combination of analysis methodologies was employed to fully assess and quantify cumulative effects, using readily available information and data, including the following:

- **Trends Analysis.** Used to identify effects occurring over time and to project the future context of land use and environmental resources of interest.
- **Map Overlays.** Quantitative and qualitative analysis using layering of maps showing land use and resource context from various time periods. The patterns of past, existing, and future land use and the effects of development on resources of interest were analyzed to forecast future trends.

Primary data sources for this indirect and cumulative effects analysis included the following:

- 2040 Metropolitan Council Transportation Policy Plan (2015)
- Local capital improvement plans and community development data
- Environmental consequences analyses from each of the environmental categories documented in Chapters 3 and 4

The following steps were used to determine if there would be cumulative impacts as a result of the Project:

- **Identify Categories of Interest.** Categories selected for analysis include those that would be affected directly by the Project, and these categories may be potentially susceptible, resulting in a cumulative effect.
- **Analyze Existing Conditions.** The existing condition of each applicable environmental category in Chapters 3 and 4 of the Final EIS was reviewed and analyzed under the Project (see Tables 3.0-1 and 4.0-1, which describe existing conditions for applicable environmental categories included in the cumulative impacts analysis). The assessment of affected environment conducted for each environmental category, by definition, includes the impact of past actions on the condition of the environmental category. Therefore, the review focused on understanding the status, viability, and historical context of each environmental category to determine the relative vulnerability of the environmental category to cumulative impacts. The affected environment analysis methods used were quantitative and qualitative, depending on the approach used in each relevant Final EIS section.
- **Analyze Project Impacts.** The Project impacts on each applicable environmental category, as described in Chapters 3 and 4 of the Final EIS, were reviewed and analyzed under the Project (See Tables 3.0-1 and 4.0-1, which include a description of the impacts identified for the applicable environmental categories included in the cumulative impacts analysis). To anticipate how the Project may contribute to cumulative impacts, this review focused on outcomes—the state of the resource assuming Project implementation. The understanding of Project impacts combined with existing conditions and past trends was used to provide an understanding of the state of each resource and its likely vulnerability to impacts from other present or reasonably foreseeable future actions.
- **Identify and Analyze Impacts of Other Actions.** Other present actions, reasonably foreseeable future actions, and their characteristics were identified under the Project. These actions are discussed in Section 3.17.2. Most of the reasonably foreseeable future actions are transportation projects or residential or commercial development projects. The understanding of the status of the existing environmental category combined with knowledge of the types of impacts typical from transportation and land development projects provides a general basis for the understanding of the environmental category that likely will be affected.
- **Assess Cumulative Impacts.** The Project assessed the potential for cumulative impacts to applicable environmental categories by considering the combination of existing conditions, Project impacts, impacts of other present actions, and impacts of other reasonably foreseeable future actions. Based on that data, professional judgment was used to reach conclusions as to the anticipated magnitude of cumulative impacts, taking into account the extent of past, present, and anticipated future impacts. The results of the analysis, which are found in Section 3.17.3, are qualitative, reflecting the general lack of quantitative data on past, present, and future actions.

3.17.1.1 Environmental Categories of Interest

Environmental categories selected for analysis include resources that are particularly susceptible to cumulative effects and would be affected directly or indirectly by the Project, as well as one or more other projects over time that, in aggregate, would result in a cumulative effect. Environmental categories addressed in this cumulative impacts analysis include:

- Acquisitions and Displacements
- Cultural Resources
- Parks, Recreation Areas, and Open Spaces
- Visual Quality and Aesthetics
- Geology and Groundwater
- Surface Water Resources (i.e., wetlands, floodplains, public waters/water quality)
- Ecosystems
- Noise

3.17.1.2 Geographic and Temporal Boundaries for the Cumulative Impact Analysis

The cumulative impacts analysis is based on geographic as well as temporal boundaries. These boundaries were determined based on consideration of how far in distance the Project's impacts could be felt and what span of time other past, present, or reasonably foreseeable actions (other than the Project) could result in cumulative impacts.

A. Geographic Boundaries

The primary study area for the cumulative impacts analysis generally includes a one-mile buffer from the center line of the proposed light rail alignment (see Exhibit 3.17-1); however, in some cases, the specific study area for a given environmental category area was used, depending on the location of the environmental category and the degree of impact. Thus, the degree of spatial impact was considered for each environmental category within this basic framework.

B. Temporal Boundaries

The time frames established for the cumulative effects analysis include a past time frame of 1960 to the present (2016) and a future time frame of the present to 2040. Within the analysis, present actions are those defined to occur between 2016 and 2019, the construction period for the Project.

The past cumulative effects time frame was determined by examining population trends and previous key events of influence on land use and transportation in the cumulative effects study area. Beginning with the period of interstate highway construction in the 1960s and '70s, the Twin Cities region has experienced strong population growth between 1960 and 2010. At the end of the first period of interstate highway construction (1970), during which the most miles of interstate highway were constructed, the Twin Cities population was 1.9 million. By 2010 it had increased to 2.9 million (Council, 2014). This growth has influenced the land use and growth patterns of the region since that time. Table 3.17-1 shows the population trends for the State of Minnesota and for Hennepin County[82] from 1960 through 2010.

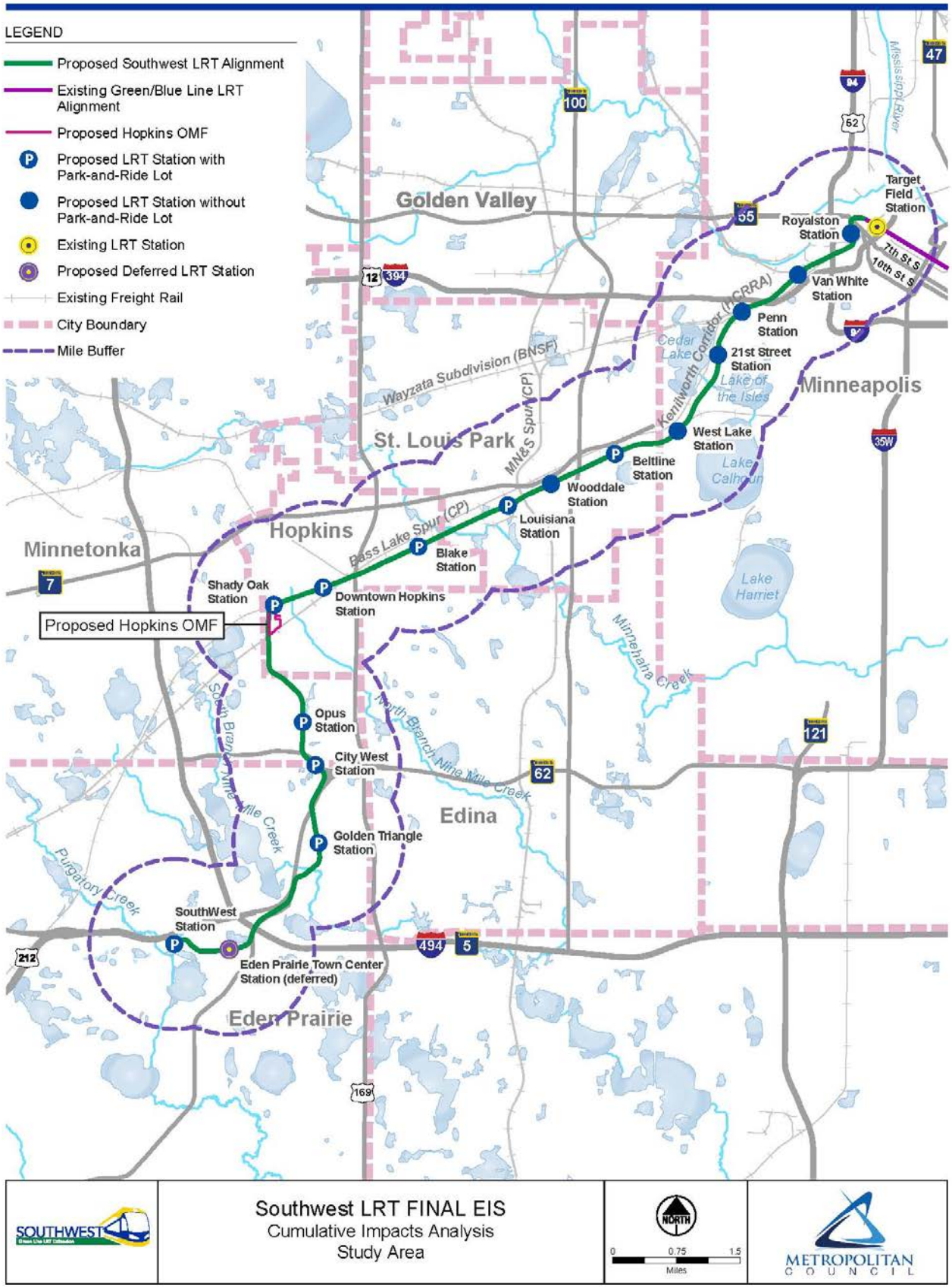
TABLE 3.17-1
Study Area Population Trends, 1960 to 2010

Year	State of Minnesota	Hennepin Co. Pop.
1960	4,413,864	842,854
1970	3,806,103	960,080
1980	4,075,970	941,411
1990	4,375,099	1,032,431
2000	4,919,479	1,116,200
2010	5,303,925	1,152,425
Percent Change 1960 – 2010	20%	38%
Average Annual Growth Rate	3.8%	6.5%

Source: U.S. Census Bureau

[82] The Project is fully contained within Hennepin County, Minnesota.

EXHIBIT 3.17-1
Cumulative Impacts Analysis Study Area



The future cumulative effects time frame, from 2020 to 2040, is bounded by the extent of regionally approved population and land use projections prepared as part of the Council's regional development framework, Thrive 2040. Over the 20 years from 2020 to 2040, continued growth is projected for the overall area. The 2010 (existing) population of the Project corridor is 547,510 (229,974 households). In 2040, the population of the corridor is expected to increase to 722,420, an increase of 32 percent from 2010 (see Chapter 1, Table 1.4-1).

Within the cumulative effects study area, population is projected to increase by approximately 41 percent between 2012 and 2040, and employment is projected to increase by 43 percent (Table 3.17-2).

TABLE 3.17-2
Overall Cumulative Effects Study Area 2020-2040 Population and Employment Projections

City	2010 Population	2040 Population Forecast	2010-2040 Population % Change	2010 Total Employment Estimate	2040 Total Employment Estimate	2010-2040 Employment % Change
Eden Prairie	47,941	53,000	10.6%	47,457	56,100	18.2%
Minnetonka	49,734	64,500	29.7%	44,228	63,200	42.9%
Hopkins	17,591	19,900	13.1%	11,009	16,200	47.2%
St. Louis Park	42,250	51,300	21.4%	40,485	46,700	15.4%
Minneapolis	382,578	459,200	20.0%	281,732	350,000	24.2%
Hennepin County	1,152,425	1,405,060	21.9%	805,089	1,032,580	28.3%
Study Area	135,267	190,540	40.9%	116,915	167,590	43.3%

Source: Metropolitan Council, Thrive 2040 (2015).

3.17.2 Past, Present, and Reasonably Foreseeable Future Actions

3.17.2.1 Past Actions

The passage of the Federal Aid Highway Act of 1956 and the start of Interstate construction the same year strongly influenced the pace and location of growth that transformed the Twin Cities region. The period of Interstate construction and in the Twin Cities region extended from 1956 to 1996. According to *Politics and Freeways: Building the Twin Cities Interstate System*, the years of Interstate construction can be grouped into three periods, mega-projects (from 1956 to the late 1960s), the era of expanding the debate (from 1970 to 1990), and the era of falling behind (1990s) (University of Minnesota, 2006). Accompanying the expansion of the Interstate system in the Twin Cities region was the expansion of U.S. highways and trunk highways that provided access to the Interstate system. The beginning of the past actions period is 1960 and the end of the period is 2016, which is just before this Project's proposed start of construction.

The Interstate construction period (beginning in approximately 1960) was selected as the core of the past actions period because the growth it helped spark in the Twin Cities region can be viewed as contributing to the need for this Project. Early evidence of the impact of the Interstate system can be seen in the 30 percent rise in total work trips between 1960 and 1970. The pattern of increase within the region kept pace with the changing population distribution. The greatest increases occurred in trips from the center cities to the suburban ring, and within the suburban ring. Many of the new trips used private automobiles. The proportion of trips by automobile increased 52 percent between 1960 and 1970 (United States Congress Office of Technology Assessment, 1976). At the end of the first period of Interstate construction (1970), during which the most miles of Interstate were constructed, the Twin Cities population was 1.9 million. By 2010 it had increased to 2.9 million (Council, 2014).

The following are the major transportation projects, land use policies, and events that contributed to the changes in land use patterns and resource context within the region between 1960 and 2016:

- 1956 – Passage of the Federal Aid Highway Act
- 1968 – I-94 completed
- 1966 – I-35W/Highway 62 (Crosstown Commons) completed
- 1973 – I-35E completed

- 1991 – I-394 completed
- 2004 – METRO Blue Line (Hiawatha LRT) Completed
- 2009 – Northstar Commuter Rail Line Completed
- 2014 – METRO Green Line (Central Corridor LRT) Completed

3.17.2.2 Present Actions and Reasonably Foreseeable Future Actions

Present projects, defined as those occurring during the Project's construction period (2017-2019), are described in Table 3.17-3. Present projects are a mix of public transportation projects and private development projects. Reasonably foreseeable future projects are those that would be constructed between 2020, this Project's opening year, and 2040, the planning horizon for the Southwest LRT Project. Table 3.17-4 lists the reasonably foreseeable actions. Present and reasonably foreseeable actions were obtained from the Council's 2040 Transportation Policy Plan (Council, 2015e), approved capital improvement plans, and development plans from local agency with jurisdiction in the cumulative impacts study area.

TABLE 3.17-3
Summary of Present Actions (year 2017-2019)

Agency	Project	Est. Timing	Description
Public Actions			
City of Eden Prairie	West 62nd St Improvements	2018	Roadway reconstruction and new multiuse trail.
City of Eden Prairie	Valley View Rd and Topview Rd Intersection Improvements	2018	Lane addition and intersection improvements.
City of Eden Prairie	Prairie Center Dr and Preserve Blvd Intersection Improvements	2017	Addition of double left turn lanes.
City of Eden Prairie	Prairie Center Dr and Franlo Rd Signal	2017	New traffic signal and geometric revisions.
City of Eden Prairie	Medcom Blvd Extension to Franlo Rd Improvements	2017	New roadway connection.
City of Eden Prairie	West 70th St Improvements	2015-2018	Roadway extension and new pedestrian and bicycle facilities.
City of Minnetonka	Opus Area Rd and Bridge Improvements	2016-2019	Road and bridge improvements, new trails, and road rehabilitation.
City of Minnetonka	Shady Oak LRT Station Area Infrastructure	2017-2018	Local share of improvements related to Southwest LRT Project.
City of Minnetonka	Opus LRT Station Area Infrastructure	2016-2020	Bridge replacement, one-way roadway reversal, trail, utility, and trail lighting improvements, street rehabilitation, and street light upgrades.
City of Hopkins	8th Ave South LRT Corridor Redevelopment/The Artery	2017-2020	Roadway reconstruction, new two-way cycle track, enlarging the pedestrian space, adding landscaping and stormwater treatment, access modifications, and utility and drainage improvements.
City of Hopkins and the Minnehaha Creek Watershed District	Blake Rd Corridor Cold Storage Site	2015-2018	16.9-acre industrial redevelopment, which will treat the stormwater that currently drains untreated directly into the creek by using pipes to redirect that runoff to a stormwater infiltration basin.
City of Hopkins, in partnership with the cities of Edina and St. Louis Park, Hennepin County, MnDOT, the Minnehaha Creek Watershed District,	Blake Rd Corridor Improvements	2017-2018	Roadway reconstruction to provide enhanced accommodations for pedestrians, bicycles, and buses, improve access to adjacent neighborhoods, provide the necessary infrastructure to support redevelopment and enhance economic growth along the corridor, improve and enhance traffic flow at major

Agency	Project	Est. Timing	Description
Three Rivers Park District, and the Southwest Project Office			intersections/interchanges, and provide for access to the proposed Blake Station.
City of Hopkins	County Road 3 Improvements	2018	New signalized intersection and roadway reconfiguration.
City of Hopkins	6th St S Improvements	2018	Roadway reconstruction and box culvert creek crossing replacement.
Hennepin County	METRO Blue Line Extension (Minneapolis to Brooklyn Park)	2018-2022	New 13-mile LRT line with 11 new stations.
Metro Transit	Penn Ave Arterial Bus Rapid Transit (Minneapolis to Brooklyn Park)	2018	New arterial bus rapid transit improvements.
Hennepin County	Reconstruct Blake Rd from Hwy 7 to Excelsior Blvd (Hopkins)	2018	Roadway reconstruction with pedestrian and bicycle improvements.
Hennepin County	Reconstruct Excelsior Blvd from Meadowbrook Rd to west of Dakota Ave S (Hopkins and St. Louis Park)	2018	Roadway reconstruction.
Private Actions			
UnitedHealth Group	UnitedHealth Group Campus (Eden Prairie)	2012-2016	1.48 million-square foot office campus on 71 acres with four buildings built in phases over four years. Buildings 1, 2, and 3 and the parking deck were completed in fall 2015.
Presbyterian Homes and Services	Presbyterian Homes and Prairie Center Dr Streetscape (Eden Prairie)	2016	Redevelopment of the southwest quadrant of Flying Cloud Dr and Prairie Center Dr by Presbyterian Homes as a Planned United Development, including pedestrian and bicycle improvements, lighting, street furniture, kiosks, landscaping, banners, and directional signage from Columbine Rd to Flying Cloud Dr.
HealthPartners	Methodist Hospital Expansion (St. Louis Park)	2016-2018	Park Nicollet Methodist Hospital expansion on Excelsior Blvd to add two floors on the east side of the building and one floor on the west side of the building.
Hillcrest Development	Westside Center (former Nestle Building) (St. Louis Park)	2016-2018	Hillcrest Development renovation of a 256,000-square foot facility into flexible, multi-tenant industrial spaces with parking improvements and landscaping.
Anderson Companies	Oak Hill II Office Building (St. Louis Park)	2016-2018	Anderson Companies is constructing a second 21,500 square-foot medical office building at the northeast corner of the Hwy 7 and Louisiana Ave interchange.
Gatehouse Properties, Ltd.	Wooddale Flats (St. Louis Park)	2016-2018	Six townhome-style buildings with five three-story buildings and one two-story building. The first building is nearing occupancy and three others are in various stages of construction.

Source: Council, 2015.

TABLE 3.17-4
Summary of Reasonably Foreseeable Future Actions (2020 to 2040)

Agency	Project	Est. Timing	Description	Source
Public Actions				
City of Eden Prairie	Valley View Rd/ Shady Oak Rd Traffic Signal	2022	New traffic signal and turn lanes	Eden Prairie 2015-2024 Capital Improvements Plan
City of Eden Prairie	Valley View Rd/Hwy 169 Interchange	2021	Interchange reconstruction	Eden Prairie 2015-2024 Capital Improvements Plan

Agency	Project	Est. Timing	Description	Source
City of Eden Prairie	West 78th St/Den Rd Intersection	2023	New traffic signal or roundabout and related improvements	Eden Prairie 2015-2024 Capital Improvements Plan
City of Eden Prairie	West 78th St Improvement Project (Prairie Center Drive to Washington Avenue)	2019	Roadway capacity expansion and new trail	Eden Prairie 2015-2024 Capital Improvements Plan
City of Eden Prairie	Flying Cloud Dr Improvements	2024	Roadway capacity expansion	Eden Prairie 2015-2024 Capital Improvements Plan
City of Eden Prairie	Town Center N-S Road Phase II	2020	Roadway extension	Eden Prairie 2015-2024 Capital Improvements Plan
Hennepin County	Reconstruct Hwy 3 from Hwy 20 to east of Meadowbrook Dr	2019	Roadway reconstruction	Hennepin County 2015 Capital Improvement Plan
Metro Transit	Chicago Emerson-Fremont Arterial Bus Rapid Transit (Minneapolis)	2020-2024	Bus rapid transit improvements	2040 Transportation Policy Plan, Appendix C: Hwy & Transit Capital Project List (Council, 2015e)
Private Actions				
Community Housing Corporation of America, Shelter Corporation	Music Barn Apartments (Minnetonka)	Future	The three-story building will provide more affordable housing to Minnetonka residents	City of Minnetonka Planning (http://eminnetonka.com/current-projects/planning-projects/1279-music-barn-apts)
At Home Apartments, LLC	At Home Apartments (Minnetonka)	Future	The proposed project will be a three- and four-story market-rate apartment building with one level of underground parking	City of Minnetonka Planning (http://eminnetonka.com/current-projects/planning-projects/1132-at-home-apartments)
Oppidan	4900 Excelsior Blvd (St. Louis Park)	Future	Site redevelopment – new six-story mixed-use development containing 28,000 square feet of commercial space (grocery store) and 189 apartments.	City of St. Louis Park Community Development (http://www.stlouispark.org/webfiles/file/community-dev/dev_projects_update_april_22_2015.pdf)
Erdogan Akgue	Minnota Addition (St. Louis Park)	Future	Residential development project – 14 to 16 townhome two- and three-story units with underground parking	City of St. Louis Park Community Development (http://www.stlouispark.org/webfiles/file/community-dev/dev_projects_update_april_22_2015.pdf)
Bader Development	Encore / The Shoreham (St. Louis Park)	Future	2.23-acre redevelopment project consisting of three residential and two commercial properties. 5-story mixed-use building on the site with 147 residential units and a total of 20,000 square feet of commercial and medical office space	City of St. Louis Park Community Development (http://www.stlouispark.org/webfiles/file/community-dev/dev_projects_update_april_22_2015.pdf)
Japs-Olson Company	Japs-Olson (St. Louis Park)	Future	Redevelopment of existing 513,000-square foot facility to add 192,000 square feet of production and warehouse that bisects property	City of St. Louis Park Community Development (http://www.stlouispark.org/webfiles/file/community-dev/dev_projects_update_april_22_2015.pdf)
PLACE Developers	Former McGarvey Coffee Property (St. Louis Park)	Future	Mixed-use, mixed-income, creative community that incorporates a mix of renewable energy sources, possibly including an anaerobic digester, which would provide heat and power to the development	City of St. Louis Park Community Development (http://www.stlouispark.org/webfiles/file/community-dev/dev_projects_update_april_22_2015.pdf)

Source: Council, 2015.

In addition to the consideration of public actions, land use projections were analyzed at the traffic analysis zone (TAZ) level to identify areas for potential future private growth within the general travel shed for the Project Corridor.[83] Refer to Exhibit 1.4-1 and Section 1.4 for additional information on the Project Corridor. TAZs with population and employment growth rates of 25 to 50 percent and more than 50 percent between 2010 and 2040 were identified as growth areas. This enabled the analysis to focus on those areas most likely to experience future growth and potential cumulative effects on resources of interest. In general, there are concentrations of potential growth areas located along the proposed LRT alignment. Of 69 TAZs within the cumulative impacts study area, 31 TAZs were identified as potential growth areas based on population and 22 TAZs were identified as growth areas based on employment. These TAZs are projected to accommodate approximately 91 percent of population growth and 98 percent of employment growth within the cumulative impacts study area between 2010 and 2040.

3.17.3 Cumulative Effects Assessment

Planned transportation and other governmental development and private development in the cumulative impacts study area would occur independently of the Project. These developments are located in communities along the proposed light rail alignment. Projections of anticipated land development are based on current local and regional land use and growth management objectives and regulations, which already consider the implementation of the Project. The Project would have an incremental effect on resources of interest in the context of other past, present, and reasonably foreseeable actions in the cumulative impacts study area. In general, direct and indirect adverse impacts generated by the Project will be localized, and the Project is not anticipated to generate substantial cumulative impacts for the environmental categories evaluated. The assessment of cumulative impacts of the Project and other past, present, and reasonably foreseeable actions is presented by environmental category in the following subsections.

3.17.3.1 Acquisitions and Displacements

Past projects such as the construction of the Interstate system and expansion of the trunk highway system that accompanied Interstate construction and the resulting growth in the suburban ring around the Twin Cities relocated a substantial number of residences and businesses. In the more recent past, projects like the METRO Green Line (Central Corridor LRT) resulted in property acquisition and associated displacements, and present actions such as the METRO Blue Line Extension (Bottineau LRT) will result in acquisitions and displacements.

Future projects such as the West 78th Street Improvement project and the Flying Cloud Drive project may acquire residential and commercial buildings. The 4900 Excelsior Boulevard and Encore/The Shoreham projects will require property acquisitions and have the potential to displace existing commercial and residential buildings.

As noted in Section 3.4.3.1, the Project will fully acquire 36 parcels (totaling approximately 64 acres) and partially acquire 159 parcels (totaling approximately 133.5 acres). Of these, 145 parcels (totaling approximately 126 acres) are private property and 50 parcels (totaling approximately 71.1 acres) are currently under public ownership.

Because the Project and other transportation projects that use federal funds are required by law to compensate property owners and renters for residences and businesses acquired by transportation improvements, the Project and similar federal actions would not contribute to cumulative acquisition impacts after mitigation.

[83] A TAZ is defined as geographic areas dividing the planning region into relatively similar areas of land use and land activity. TAZs represent the origins and destinations of travel activity within the region and include land use characteristics such as population and employment which are used for traffic analysis and forecasting. The Southwest LRT Project Corridor (see Exhibit 1.4-1) is the general travel shed that encompasses a geographic area where transit travel patterns are most likely to be affected by the alternatives under consideration throughout the Project's planning and environmental process. The travel shed is larger than the cumulative impacts study area.

The Project will implement appropriate measures to avoid, minimize, and mitigate acquisitions and displacement impacts (see Section 3.4); however, future actions other than the Project have the potential to adversely affect acquisitions and displacements in the cumulative effects study area.

3.17.3.2 Cultural Resources

Past transportation projects such as the early construction of the Interstate system and private development projects that predated the National Historic Preservation Act of 1966 and the National Environmental Policy Act of 1969 adversely affected architecture/history resources and archaeological resources. Because archaeological and architecture/history resources are widely distributed, present projects, such as the METRO Blue Line Extension also could affect cultural resources. Future projects may affect cultural resources, but because the historical significance of structures and the presence and significance of archaeological resources within the footprint of a project are generally not evaluated until a project is underway, it is difficult to reliably predict future projects' contribution to cultural resource cumulative impacts. Depending on the funding source for future projects, cultural resources are afforded some level of protection by federal, state, and local cultural resource regulations.

Based on results of the effects assessments and implementation of the measures included in the Section 106 MOA, FTA has determined, in consultation with the MnHPO and other consulting parties, that the Project will have No Adverse Effect on 25 historic resources and an Adverse Effect on five resources, including two archaeological sites, one individual property, one historic district, and one contributing resource to that historic district. Due to the Project's adverse effect on these five resources—the Chicago, Milwaukee, St. Paul & Pacific Railroad Depot; sites 21HE21HE0436 and 21HE0437; the Grand Rounds Historic District; and the Kenilworth Lagoon, as a contributing resource to the historic district—it has been determined that the undertaking will have an Adverse Effect on historic resources (see Section 3.5.4).[84]

The Project will implement appropriate measures identified in the Section 106 Memorandum of Agreement to minimize or mitigate the Project's adverse cultural resource effects (see Section 3.5.5); however, future actions other than the Project also have the potential to adversely affect cultural resources in the cumulative effects study area.

3.17.3.3 Parks and Recreation Areas and Open Spaces

Past federal and state transportation projects, particularly those constructed before the implementation of the Section 4(f) regulations (1966) and the National Environmental Policy Act (1969), and private development would have adversely affected parks and recreation areas. Even after the passage of Section 4(f) regulations, present publicly and privately funded projects still have the potential to adversely affect parks and recreation areas; however, at least for projects using federal funds, there is the potential for minimizing or mitigating adverse effects. There are also projects that expand parks and trails countering the impacts of other projects. For example, when complete, the Cottageville Park improvements in the City of Hopkins will increase the size of the park by three times helping to reverse the loss of parkland in other areas of the cumulative impacts analysis area.

Currently, the reasonably foreseeable projects in Table 3.17-3 are not expected to adversely affect parks or recreation areas. In fact, the projects may contribute to recreation areas. For example, the West 78th Street Improvement Project will include a new trail to extend the trail from the east end of the project toward Prairie Center Drive.

[84] Through the Section 106 process to resolve the adverse effect to the Chicago, Milwaukee, St. Paul & Pacific Railroad Depot, including coordination with the Project's Section 106 consulting parties, measures were incorporated into the Project's design and Section 106 MOA that avoid the adverse effect to the property. See Section 3.5 of this Final EIS for additional information about the Project's Section 106 process and analysis and Appendix H for the Section 106 MOA.

As described in Section 3.6.3 and summarized in Table 3.0-1, the following parks, recreation areas, and open space properties will be affected as a result of the Project, prior to mitigation. Refer to Table 3.6-2 for descriptions of these facilities and more detail regarding impacts.

- Purgatory Creek Park in Eden Prairie
- Nine Mile Creek Conservation Area in Minnetonka
- Unnamed Open Space A in Minnetonka
- Unnamed Open Space B in Minnetonka
- Overpass Skate Park in Hopkins
- Minnehaha Creek Open Space in St. Louis Park
- Edgebrook Park in St. Louis Park
- Jorvig Park in St. Louis Park
- Lilac Park in St. Louis Park
- Park Siding Park in Minneapolis
- Kenilworth Channel/Lagoon in Minneapolis
- Cedar Lake Park in Minneapolis
- Bryn Mawr Meadows Park in Minneapolis

Population growth in the cumulative effects analysis area caused by new residential development surrounding the proposed light rail stations may increase demand and capacity pressure on public parks and recreation facilities. Due to limited land availability and funding for acquisitions, the City of Minneapolis and other communities are limited in park expansion opportunities to meet recreational demands. These limitations have the potential to result in a long-term shortfall in the ratio of parks and recreation areas to population.

The Project will not contribute to substantial cumulative park and recreation area impacts directly related to acquisitions because the magnitude of the acquisition impacts is low (approximately 7 acres), as compared to the size of the parks in the cumulative effects study area (approximately 1,190 acres; see Table 3.1-1). The Project will implement appropriate measures to avoid, minimize, and mitigate other park, recreation areas, and open space impacts not related to acquisitions (see Section 3.6); however, future actions other than the Project have the potential to adversely affect parks, recreation and open space in the cumulative effects study area.

3.17.3.4 Visual Quality and Aesthetics

Past public and private actions in the Minneapolis Downtown Fringe landscape unit have transformed the visual environment by increasing the density and height of buildings in the downtown area. Southwest of downtown, particularly areas closer to the Project's west terminus, past actions created a transition in the visual environment from rural to suburban/urban. While the visual impacts of more recent past projects, present actions, and reasonably foreseeable projects along the proposed LRT alignment may be less visually transformative than past projects because they occur in a developed urban and suburban physical environment, they still have the ability to create visual impacts. However noting the severity of the visual impact is dependent on the scale and massing of the development.

The analysis conducted to evaluate the Project's effect on visual quality and aesthetics included long-term direct and indirect impacts. The analysis evaluated 19 representative viewpoints along the Project in Eden Prairie, North Eden Prairie/Minnetonka/South Hopkins, Hopkins, St. Louis Park, the Kenilworth Corridor, and the Minneapolis downtown fringe (see Section 3.7.2). Results of the analysis found that of the 19 viewpoint impacts assessed, seven will be "low," six will be "moderate," and six will be "substantial."

The Project will implement appropriate measures to avoid, minimize, and mitigate visual quality and aesthetics impacts (see Section 3.7.4); however, future actions other than the Project have the potential to adversely affect visual quality and aesthetics in the cumulative effects study area.

3.17.3.5 Geology and Groundwater Resources

As described in Section 3.8.3.1, long-term direct geology impacts are organized into four categories: (1) uneven ground settlement; (2) tunnels and underpasses, (3) engineered cut-and-fill locations, and (4) bedrock and karst. Past public and private projects have affected geology (soils) in a manner similar to the Project. Compressible soils and other soils unsuitable for construction have been excavated and replaced with suitable fill. In addition, past projects have disturbed soil geology while constructing cuts and fills required to build roadways and private development projects. While past projects would have affected geology, they would not have had adverse geology impacts, because they would have been subject to an environmental review process and would have included the appropriate avoidance measures and BMPs. It is not possible to know whether past actions encountered karst conditions, which could be an adverse geology impact.

It is more difficult to determine the impact of past actions on groundwater; however, it would be reasonable to expect that, like the Project, shallow groundwater was encountered during construction and temporary groundwater pumping was needed to create dry conditions needed for construction.

Recent past, present and reasonably foreseeable actions, whether state/federal transit (e.g. METRO Blue Line Extension) or roadway projects or residential/commercial developments would be expected to have similar soil and groundwater impacts to the Project's impacts described below.

The generally compatible geologic conditions along the proposed light rail alignment would accommodate construction and operations thus limiting long-term direct geology impacts.

Removing the compressible soils and replacing them with suitable fill in addition to activities that will disturb soil geology by constructing tunnels, underpasses, and regrading soil through cut-and-fill activities are not expected to create adverse geology impacts. No long-term direct groundwater impacts are expected. No long-term indirect impacts to geology or groundwater are expected. As a result, the Project will not contribute substantially to cumulative groundwater and geology effects (see Section 3.8).

3.17.3.6 Surface Water Resources

Well before the start of Interstate construction in the Project corridor, surface water resources (wetlands, floodplains, public waters/water quality) were being adversely affected by development activities, particularly in Hennepin County, the most populous county in the state. The conversion of the Corridor's original land cover, including maple and basswood forest, prairies, and wetlands, to agricultural land began the process of adverse impacts to surface water resources that intensified with the increase in urban development. The incomplete understanding of the inherent value of surface water resources and the lack of comprehensive environmental regulations at the local, state, and federal levels resulted in a generally degraded condition of surface water resources through the first period of Interstate construction in the Project corridor. As an example of past actions on water resources, it has been estimated that Minnesota has lost approximately half of its original pre-settlement wetlands due to draining and filling for agriculture and development.[85] A similar level of impact would be expected to have occurred in the Project corridor.

The passage of legislation, such as the 1972 Clean Water Act and the 1991 Minnesota Wetland Conservation Act, increased protection of water resources; however, water resource impacts, particularly on water quality, continue.

As a result of the Project's long-term direct impacts, fill will be placed in 13 locally regulated wetlands and 17 federally regulated wetlands totaling about 6.5 acres. From a long-term indirect impact standpoint, the Project may affect wetlands by facilitating future development. The Project will add approximately 40 acres of impervious surface that may adversely affect water quality. In addition, the operation of light rail transit may affect the hydrology and connectivity of public waters along the light rail alignment. If commercial, transportation, and industrial activities along the light rail alignment increase as a result of the Project,

[85] *Status and Trends of Wetlands in Minnesota: Wetland Quantity Trends from 2006 to 2011,* Minnesota DNR, May 2013.

there may be long-term indirect impacts on surface water resources as a result of new point and non-point sources of pollution. Finally, the Project will place 7,296 cubic yards of fill into 15 locally regulated 100-year floodplains adjacent to the LRT alignment. The Project may result in indirect impacts to floodplains by facilitating future development.

The apparent success of the state's no-net loss goal for wetlands is evidence that this Project and others have reduced the potential for wetland acreage cumulative impacts. The State of Minnesota has developed a wetland status and trends monitoring program (WSTMP) to provide scientifically-sound data regarding long-term changes in wetland quantity and quality. The Minnesota program mapped land cover change for 4,990 plots over repeating 3-year sampling cycles. In the first two complete sampling cycles, 2006–2008 and 2009–2011, a small, but statistically significant net gain in wetland acreage was identified. The total wetland gain within the sample plots was 200.4 acres and total wetland loss was 77.4 acres, resulting in a net gain of 123 acres. Extrapolating these results statewide indicates that Minnesota had a net gain of 2,080 acres of wetland during the study period, or about 0.02 percent of Minnesota's total wetland area of 10.62 million acres.[5]

There are local projects that would have a beneficial impact on water quality. As part of a larger effort to restore Minnehaha Creek through St. Louis Park and Hopkins, the Minnehaha Creek Watershed District (MCWD) is working to restore more than 1,000 feet of Minnehaha Creek adjacent to the Blake Road Corridor Cold Storage Site, an industrial property between Blake Road and the North Cedar Lake Regional Trail. The MCWD purchased the 16.9-acre property in 2011 and plans to use the property to treat a substantial amount of polluted stormwater from surrounding neighborhoods and to restore the channel. Projects like the Blake Road Corridor Cold Storage Site and the Cottageville Park Improvement project, which is also increasing green space along Blake Road to improvement Minnehaha Creek water quality, help mitigate water quality impacts from other projects.

3.17.3.7 Ecosystems

Past public and private actions, particularly during the first period of Interstate construction (1956-1969) with associated expansion of the U.S. highway and trunk highway and early residential and commercial suburban development, generally would have had a greater impact on ecosystems because the projects would have affected better quality habitat in more rural areas. Because the concept of protecting threatened and endangered (T&E) species was in its very early days between 1956 and 1969, the Endangered Species Preservation Act of 1966 was the predecessor to the Endangered Species Act of 1973, and it is difficult to speculate on public transportation and private development projects' impact on T&E species during that period. Public transportation and private development projects after 1969 continued to adversely affect ecosystems, but in general as habitat areas became smaller and more disturbed, the projects' impacts on the function and value of the ecosystems have been less pronounced.

The Project will be located mostly in areas that have been previously disturbed or developed with impervious surfaces and buildings. Portions of the Project will be within or near limited pockets of aquatic habitats and natural or open areas with vegetative cover that may provide foraging, migrating, or nesting habitat for wildlife. Long-term impacts to habitat include removal, conversion, degradation, or fragmentation of existing habitat. In addition, 42.9 acres of habitat associated with a Regionally Significant Ecological Areas will be converted to Project right-of-way. The Project is not expected to result in long-term direct or indirect impacts on state or federal protected T&E species or migratory birds because the Project will utilize appropriate best management practices to avoid impacts on listed species that have the potential to occur in the Project area. The Project will implement appropriate measures to avoid, minimize, and mitigate ecosystem impacts (see Section 3.10); however, future actions other than the Project have the potential to adversely affect ecosystems in the cumulative effects study area.

3.17.3.8 Noise

Although noise data for past transportation projects is not readily available, it is expected that past public transportation actions such as the early construction of the Interstate system and associated expansion of

the U.S. highway and trunk highway systems resulted in noise levels approaching or exceeding the FHWA Noise Abatement Criteria for sensitive receptors adjacent to the transportation improvements.

It is also expected that more recent past transportation projects, present actions, and reasonably foreseeable transportation projects have or will also result in noise impacts to sensitive receptors without evaluating and or constructing noise barriers.

The Project will implement appropriate measures to avoid, minimize, and mitigate noise impacts (see Section 3.12), as appropriate; however, future actions other than the Project have the potential to adversely affect noise in the cumulative effects study area.

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