Hennepin County West Broadway Avenue (CSAH 103) Reconstruction Project

# Environmental Assessment Worksheet

September 28, 2015



# **ENVIRONMENTAL ASSESSMENT WORKSHEET**

This Environmental Assessment Worksheet (EAW) form and EAW Guidelines are available at the Environmental Quality Board's website at:

https://www.eqb.state.mn.us/EnvRevGuidanceDocuments.htm. The EAW form provides information about a project that may have the potential for significant environmental effects. The EAW Guidelines provide additional detail and resources for completing the EAW form.

**Cumulative potential effects** can either be addressed under each applicable EAW Item, or can be addresses collectively under EAW Item 19.

**Note to reviewers:** Comments must be submitted to the RGU during the 30-day comment period following notice of the EAW in the *EQB Monitor*. Comments should address the accuracy and completeness of information, potential impacts that warrant further investigation and the need for an EIS.

# 1. Project title: West Broadway Avenue Reconstruction

#### 2. Proposer:

Hennepin County Transportation Department Contact person: Chad Ellos P.E. Title: Project Manager Address: 1600 Prairie Drive City, State, ZIP: Medina, MN 55340 Phone: 612-596-0395 Fax: Email: chad.ellos@hennepin.us

### 3. RGU

Hennepin County Contact person: Chad Ellos P.E. Title: Project Manager Address: 1600 Prairie Drive City, State, ZIP: Medina, MN 55340 Phone: 612-596-0395 Fax: Email: chad.ellos@hennepin.us

### 4. Reason for EAW Preparation: (check one)

Required:	Discretionary:
□ EIS Scoping	□ Citizen petition
Mandatory EAW	□ RGU discretion
	Proposer initiated

If EAW or EIS is mandatory give EQB rule category subpart number(s) and name(s):

The mandatory threshold triggered for this Environmental Assessment Worksheet (EAW) is under Highway Projects 4410.4300 subp.22.B.

#### 5. Project Location:

County: Hennepin City/Township: Brooklyn Park PLS Location (<sup>1</sup>/<sub>4</sub>, <sup>1</sup>/<sub>4</sub>, Section, Township, Range): T119N, R21W Sections 7, 8, 17, 18, 19 and 20 Watershed (81 major watershed scale): Upper Mississippi River Basin

#### At a minimum attach each of the following to the EAW:

- County map showing the general location of the project: See List of Figures
- U.S. Geological Survey 7.5 minute, 1:24,000 scale map indicating project boundaries (photocopy acceptable): See List of Figures
- Site plans showing all significant project and natural features. Pre-construction site plan and post construction site plan: See List of Figures

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# 6. Project Description:

# a. Provide the brief project summary to be published in the EQB Monitor, (approximately 50 words).

The County is proposing to reconstruct approximately two miles of West Broadway Avenue in the City of Brooklyn Park from south of Candlewood Drive to north of 93rd Avenue North. The roadway needs to be reconstructed primarily to address its poor pavement condition, enhance safety, improve capacity and accommodate transit service.

b. Give a complete description of the proposed project and related new construction, including infrastructure needs. If the project is an expansion include a description of the existing facility. Emphasize: 1) construction, operation methods and features that will cause physical manipulation of the environment or will produce wastes, 2) modifications to existing equipment or industrial processes, 3) significant demolition, removal or remodeling of existing structures, and 4) timing and duration of construction activities.

#### Project Location and Existing Conditions

The proposed project is located along Hennepin County State Aid Highway (CSAH) 103 (West Broadway Avenue) in the City of Brooklyn Park from south of Candlewood Drive to north of CSAH 30 (93rd Avenue North), for a distance of approximately two miles (**Figure 1: Project Location – County Level and Figure 2: Project Location – Topographic**). The existing roadway is a mixture of four-lanes (two in each direction), and two-lanes (one in each direction). Certain portions of the two-lane section near intersections have been widened with the addition of turn lanes and/or bypass lanes.

West Broadway Avenue is functionally classified as an A-minor Arterial Expander in Hennepin County's regional roadway system. Functional classification identifies the role of a roadway in the transportation system and whether the primary purpose of the roadway is to move traffic efficiently, provide access to the adjacent land use or a combination of both purposes. Roadways meant to move a large volume of traffic over long distances with very few access points are classified as a Principal Arterials and are typically spaced far apart (two to three miles). A-minor Expanders are intended to supplement Principal Arterial roadways in less dense or developing areas and have closer spacing (one to two miles). A-minor Expanders have more access points than a Principal Arterial yet they still carry high volumes of traffic compared to lower classified roadways (i.e. Collector Roads, Local City Street) and link this traffic to Principal Arterials. West Broadway Avenue serves this purpose by serving medium to short length north-south trips; it provides an alternative to using Principal Arterials such as Trunk Highway (TH) 169 to the west and links these trips to I-94/I-694 to the south and TH 610 to the north.

#### Proposed Improvements

The project is currently in the preliminary design phase and includes reconstructing West Broadway Avenue to a continuous four-lane with center median urban roadway. The project's design will also accommodate future transit improvements consistent with the Metropolitan Council's 2040 Transportation Policy Plan (TPP). The West Broadway Avenue Reconstruction project roadway design includes the following elements which accommodate BLRT (see **Figure 3: Cross Sections):** 

- 11 foot lanes (two southbound and two northbound)
- 11 foot dedicated left turn lanes at signalized intersection <sup>(1)</sup>
- 10 foot multi-purpose trail along both sides of West Broadway Avenue
- 35 mph design speed (allows for narrower 11 foot lanes, tighter horizontal curves, reduced buffers widths to objects outside the roadway making the roadway feel narrower, and the addition of curb and gutter versus roadside ditches)
- An approximately 31 to 55 feet center median for BLRT
- Approximately 120 feet overall roadway right-of-way width in areas that are between intersections
- 151 feet overall right-of-way width in areas that are at intersections but do not have proposed stations <sup>(1)</sup>
- 154 feet overall right-of-way width in areas that are at intersections and have proposed stations (such as 93rd Avenue North and 85th Avenue North)<sup>(1)</sup>
  - <sup>(1)</sup> Intersections along West Broadway will be configured to meet forecast travel demand. This will include construction of turn lanes to manage traffic flow and accommodate interactions of drivers and pedestrians.

West Broadway Avenue is designated as a bicycle route in the Hennepin County Bicycle Transportation Plan, and is considered a future route in the Brooklyn Park Trail and Sidewalk Master Plan. The proposed project includes constructing a paved multi-use trail along both sides of the roadway. Further discussion on the existing and future bicycle and pedestrian accommodations are discussed in **Question 9**.

An existing 115kW electrical transmission line located from 89th Avenue to TH 610 will need to be shifted approximately 50 feet to the west to accommodate the new roadway construction (**Figure 5: Roadway Layout**). The shifting of the existing transmission line does not trigger Minn. Rule 7850.1500 (High Voltage Transmission Line Rules). Minn. Rule 7850.1500 subp B. 3 states that no permit is required because the transmission line is being shifted by a local agency to allow for roadway construction.

#### Drainage

An urban storm drainage system will be included in the project to collect and treat stormwater runoff within the project area. The water will be collected using curb and gutter and underground pipes to convey the water. The drainage system will connect into existing and new stormwater treatment ponds. Further details on stormwater can be found in **Question 11.b.ii**.

#### Access Alternatives

Two alternative access configurations on West Broadway Avenue are being considered and include:

- Without Maplebrook Signal this alternative includes limiting this intersection to right-in/ right-out at Maplebrook Parkway/Maplebrook Terrace and West Broadway Avenue and no traffic signal.
- With Maplebrook Signal this alternative includes allowing all movements to occur (i.e. left turns, throughs and right turns) between Maplebrook Parkway/Maplebrook Terrace and West Broadway Avenue and also includes a traffic signal to accommodate these movements.

These alternatives are being evaluated to provide a full consideration of the benefits and potential impacts of the two options. Providing a full access intersection at this location would result in a total property taking of a six unit townhome, including all of the attendant impacts of relocating residents and removing housing stock from the Maplebrook Estates Homeowner Association.

However, a restricted right-in/right-out access intersection would change patterns of traffic and community accessibility, which also has potential negative impacts on the community. Impacts associated with intersection options at Maplebrook Parkway/Maplebrook Terrace are discussed and explored in this EAW. Potential property impacts are described in **Question 6.c**. Potential traffic and access impacts are addressed in **Question 18**.

#### Construction

Construction and operation methods that will cause or involve physical manipulation of the environment for the proposed project are expected to include:

- Excavation and removal of poor soils not suitable for the roadway construction
- Demolition and removal of related sewer and water facilities
- Trench excavation for storm sewer and watermain installation
- Stormwater treatment pond excavation
- Floodplain and wetland mitigation
- Grading of roadway base to prepare for concrete curb construction and bituminous paving
- Grading of trail to prepare for bituminous paving
- Grading of sidewalk to prepare for concrete paving
- Curb and gutter installation
- Bituminous paving of the roadway and multi-use trail
- Concrete paving of the sidewalk
- Temporary and permanent erosion control and turf establishment
- Traffic signal construction and upgrades
- Trench excavation for relocation and burial of private utilities

Construction of the project is expected to begin 2018. Road closures are anticipated and will be communicated to the public in advance of construction and appropriate signage will direct drivers, pedestrians, and bicyclists to available detours.

#### c. Project magnitude:

Total Project Acreage	72.2
Linear project length (miles - approximately)	1.8
Number and type of residential units	N/A
Commercial building area (in square feet)	N/A
Industrial building area (in square feet)	N/A
Institutional building area (in square feet)	N/A
Other uses – stormwater pond (in square feet)	949,698
Structure height(s)	N/A

#### **Right-of-way Acquisition**

Right-of-way acquisition is required for the project. Permanent and temporary easements will also be necessary (**Figure 5: Roadway Layout**). The extent of the right-of-way acquisition is dependent upon the decision of whether or not a signalized full access is built at the intersection of West Broadway Avenue and Maplebrook Parkway/Maplebrook Terrace. Table 1 and Table 2 show the estimated right-of-way and easement acquisition required for the two alternatives. Under the signalized option, a six unit townhome will need to be acquired and the residents relocated. Other than this, no total property acquisitions are necessary under either alternative.

The project will require approximately the following acreage and parcels of permanent rights-ofway and temporary easements. See **Question 18** for additional information on traffic related impacts for these alternatives.

Acquisition and relocation will be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended.

#### TABLE 1: ACREAGE AND PARCELS IMPACTED WITHOUT A SIGNAL AT MAPLEBROOK PARKWAY

Acquisition type	Acreage	Parcels	
Permanent Right-of-way <sup>2</sup>	6.4	81	
Permanent Easement <sup>3</sup>	0.9	36	
Temporary Easement <sup>4</sup>	32.3	106	

<b>TABLE 2: ACREAGE AND PARCELS IMPACTED</b>	WITH A SIGNAL AT MAPLEBROOK PARKWAY
----------------------------------------------	-------------------------------------

Acquisition type	Acreage <sup>1</sup>	Parcels
Permanent Right-of-way <sup>2</sup>	6.8	87
Permanent Easement <sup>3</sup>	1.1	42
Temporary Easement <sup>4</sup>	32.0	97

<sup>1</sup> The total footprint is slightly larger because additional area is needed to construct the Maplebrook Parkway signal.

<sup>2</sup> Permanent Right-of-way is when the public entity acquires full rights to a part of a property (partial taking) or the entire property (total or full taking)

Permanent Easement is when the public entity purchases certain rights such as drainage, utility, wall, trail or stormwater ponding and the owner retains remaining property rights.

<sup>4</sup> Temporary Easement is when the public entity purchases the right to use the property for construction purposes during a defined period of time and full ownership reverts back to the owner upon expiration.

# *d.* Explain the project purpose; if the project will be carried out by a governmental unit, explain the need for the project and identify its beneficiaries.

Reconstructing West Broadway Avenue is primarily needed to address poor pavement conditions, enhance safety, improve traffic delays and capacity, and accommodate potential future transit improvements as noted in the region's long-range Transportation Policy Plan. Secondly, it is also needed to address the lack of bicycle and pedestrian accommodations and the lack of access control along the corridor, which also degrades safety and traffic operations. A full discussion of the project's purpose and need can be found in **Appendix 2: Purpose and Need Technical Memorandum**.

The center median within this segment of West Broadway Avenue will be wide enough to accommodate a transit corridor. Currently, the future Metro Blue Line Extension Light Rail Transit (BLRT) is under development. The BLRT is currently under analysis in a separate environmental review being developed by the Metropolitan Council. The Draft Environmental Impact Statement (EIS) for the LRT was released in March 2014 and the Final EIS is anticipated to be released for review in 2016. While the BLRT project, if built, would occupy the median along this segment of West Broadway Avenue, it is not a future stage of the reconstruction of the roadway.

e. Are future stages of this development including development on any other property planned or likely to happen?  $\Box$  Yes  $\boxtimes No$ 

If yes, briefly describe future stages, relationship to present project, timeline and plans for environmental review.

f. Is this project a subsequent stage of an earlier project?  $\Box$  Yes  $\boxtimes$  No

If yes, briefly describe the past development, timeline and any past environmental review.

7. Cover types: Estimate the acreage of the site with each of the following cover types before and after development:

COVED TYPE	Without Maj	plebrook Signal	With Maplebrook Signal <sup>1</sup>	
COVER I IPE	Before	After	Before	After
Wetlands	4.8	0.9	4.8	0.9
Deep water/streams	0.4	0.2	0.4	0.2
Wooded/forest	2.0	0.6	2.0	0.6
Brush/Grassland	7.6	0.4	7.6	0.4
Cropland	0.9	0.5	0.9	0.5
Lawn/landscaping	17.3	6.2	17.4	6.4
Impervious surface	34.7	41.6	34.9	41.7
Underground Stormwater Pond	0.0	1.5 (2)	0.0	1.5 (2)
Surface Stormwater Pond	0.0	1.0	0.0	1.0
Floodplain Mitigation Area <sup>(3)</sup>	0.0	10.0	0.0	10.0
Stormwater Pond and Floodplain Mitigation Area <sup>(4)</sup>	4.5	9.3	4.5	9.3
TOTAL	72.2	71.8	72.5	72.5

**TABLE 3: COVER TYPES** 

<sup>1</sup> The total footprint is slightly larger because additional area is needed to construct the Maplebrook Parkway signal.

<sup>2</sup> The total footprint includes the underground storage at College Park and North Hennepin Community College. It is likely only one of these will be constructed. The underground storage does not result in a land cover change.

<sup>3</sup> Floodplain mitigation area construction will involve re-grading to lower an area and does not result in land cover change.

<sup>4</sup> A portion of the stormwater pond and floodplain mitigation area is already stormwater pond.

### 8. Permits and approvals required:

List all known local, state and federal permits, approvals, certifications and financial assistance for the project. Include modifications of any existing permits, governmental review of plans and all direct and indirect forms of public financial assistance including bond guarantees, Tax Increment Financing and infrastructure. All of these final decisions are prohibited until all appropriate environmental review has been completed. See Minnesota Rules, Chapter 4410.3100.

Permits are identified in Table 4.

Unit of Government	Type of Application	Status
Federal		
U.S. Army Corps of Engineers	Section 404 Permit	To be submitted
State	•	
Minnesota Pollution Control Agency (MPCA)	NPDES General Stormwater Permit for Construction Activity	To be submitted
Minnesota Department of Natural Resources	Work in Public Waters	To be submitted
Minnesota Department of Natural Resources	Floodplain permit	To be submitted
Local		
City of Brooklyn Park	Preliminary Layout Approval	To be submitted
City of Brooklyn Park	Final Plan Approval	To be submitted
Shingle Creek/West Mississippi Watershed Management Commission (WMC)	Project Review Application	To be submitted
Shingle Creek/West Mississippi Watershed Management Commission (WMC)	Wetland Conservation Act Joint Application for Activities Affecting Water Resources in Minnesota	To be submitted

#### TABLE 4: PERMITS AND APPROVALS

Cumulative potential effects may be considered and addressed in response to individual EAW Item Nos. 9-18, or the RGU can address all cumulative potential effects in response to EAW Item No. 19. If addressing cumulative effect under individual items, make sure to include information requested in EAW Item No. 19

### 9. Land use:

#### a. Describe:

i. Existing land use of the site as well as areas adjacent to and near the site, including parks, trails, prime or unique farmlands.

#### Existing Land Use (Including Sensitive Community Facilities)

Land use along the corridor is a mix of commercial businesses (retail and office), residential developments, parks, and institutional facilities. Residences and business parks comprise the majority of the land adjacent to the corridor. Future development and redevelopment opportunities are present at multiple locations along the corridor with vacant parcels and businesses available for sale. Within the corridor, 93rd Avenue North and 85th Avenue North serve as important cross community connectors that link neighborhoods. Proposed improvements at 93rd Avenue North and 85th Avenue North are anticipated to support connectivity between neighborhoods.

The existing road is a mix of rural and urban street sections (some portions have curb and gutter while others have ditches). Shingle Creek crosses the road north of Candlewood Drive.

A summary of land uses and their approximate location follows (See Figure 4: Natural Features Overview or Figure 5: Roadway Layout):

#### Commercial:

- Broadway Square: southwest corner of West Broadway Avenue and 85th Avenue North intersection. This is a linear-type mall with parking lots on the front and sides of the stores and restaurants. The shopping center includes retail as well as other service providers including a Montessori school, dentist and animal hospital. At least two of the business sites are for lease at this time.
- Crosstown North Business Center: industrial and office buildings west of West Broadway Avenue from 89th Avenue North to north of 93rd Avenue.

#### Institutions:

- Brooklyn Park Evangelical Free Church: 7901 Broadway Avenue (west of West Broadway Avenue south of Candlewood Drive, at south limits of project)
- North Hennepin Community College (NHCC): 7411 85th Avenue North (southeast corner of West Broadway Avenue and 85th Avenue North intersection)
- Berean Baptist Church: 8825 Broadway Avenue (west of West Broadway Avenue and south of 89th Avenue)

#### Recreational/Open Space:

- Unnamed Park land: City park land located south of NHCC extending east, includes a paved trail extending from West Broadway Avenue east to Candlewood Drive
- NHCC Ball Fields: on south end of NHCC property east of West Broadway Avenue
- College Park: City park located west of West Broadway Avenue across from NHCC

#### Residential:

- Single Family Homes: east side, from south of Candlewood Drive to Shingle Creek
- Single Family Homes: west side from south of Broadway Square to Shingle Creek
- Maplebrook Townhomes: west side from north of Maplebrook Parkway to 85th Avenue North
- Single Family Homes: east side from 92nd Avenue North to College Parkway (north edge of the NHCC undeveloped parcel)

#### Available for or Proposed Development:

- Undeveloped land across from Candlewood Drive on the west side of West Broadway Avenue
- Undeveloped land northeast corner of West Broadway Avenue and 85th Avenue North is the site of a Hennepin County Library, construction started in early 2015
- A church is currently being constructed in the southeast corner of West Broadway Avenue and 93rd Avenue North.
- Northeast corner of West Broadway Avenue and 93rd Avenue North with business construction underway.
- Calvin Gray farm at 8924 West Broadway is available for single-family development

These undeveloped and developing areas are further discussed in Question 19 of the EAW.

#### Sensitive Community Facilities

Community facilities near West Broadway Avenue include a community college, Montessori school, County library (under construction), parks, medical facilities, and places of worship. There are homes and townhomes adjacent to the roadway. For evaluation of potential conflicts, refer to **Question 17** regarding noise, **Question 16** regarding air quality, and **Question 18** regarding traffic.

#### Prime Or Unique Farm Lands, Parks, Recreational Areas And Trails

#### Prime or Unique Farm Lands

There are no prime or unique farm lands in the corridor.

#### Parks and Recreation Areas

North Hennepin Community College (NHCC) baseball and softball fields are located on the south end of the campus, adjacent to West Broadway Avenue. The fields are approximately 6 acres in size. One main baseball diamond with three sets of bleachers and one smaller baseball diamond with two team benches exist. There is a forested area to the east of the baseball diamonds. Shingle Creek is located to the south of the baseball diamonds. A parking lot is located north of the baseball diamonds and is accessible by vehicle from West Broadway Avenue. There is a paved path between the two baseball diamonds and Shingle Creek, making them accessible to pedestrians and cyclists. Potential impacts from the West Broadway Reconstruction project to the baseball fields are anticipated to be approximately 1.1 acres (0.6 acres temporary easement and 0.5 acres permanent right of way). The project has been discussed with the city of Brooklyn Park and NHCC. The city and NHCC have provided letters to the county describing the current park uses and potential park impacts as a result of the West Broadway Reconstruction project (See Appendix 3: Letters from Brooklyn Park and North Hennepin Community **College**). Options are being explored by the county, city and NHCC to mitigate park and recreational impacts.

College Park is located on the west side of West Broadway Avenue across from NHCC and is managed by Brooklyn Park. The park is approximately 5.7 acres in size and includes open fields with several mature trees, a playground, a paved trail for biking and walking, a picnic shelter, and a park building. The park is located in a neighborhood and is accessible by pedestrians, bicycles, and vehicles. Potential impacts from the road reconstruction project include the addition of a multi-use trail, grassy back slopes, and a new underground stormwater facility on park property.

The unnamed park land is located south of and adjacent to the NHCC ball fields and is managed by Brooklyn Park. This park land also contains a pedestrian/bicycle trail that connects West Broadway Avenue and Candlewood Drive. Excavation for the floodplain mitigation is proposed in the unnamed park land (see the response to **Question 9.a.iii**.) and will likely include the creation of a small backwater area that could provide aesthetic value and habitat views.

The impacts of the trail and grassy slopes are anticipated to not exceed 0.10 acres (approximately 0.03 acres temporary easement, 0.05 permanent right of way and 0.02 square feet utility easement) in College Park. The underground storm water facility impacts are anticipated to not exceed 0.7 acre of both temporary and permanent easements in College Park.

The impacts of road reconstruction impacts are anticipated to be 0.84 acres (0.72 acres temporary easement and 0.12 acres permanent easement) in the unnamed park land. The excavation for floodplain mitigation storage is not anticipated to exceed 3.0 acres of both temporary and permanent easements in the park land adjacent to Shingle Creek.

The City has designated two Conservancy Districts along Shingle Creek on the east and west sides of West Broadway Avenue north of Candlewood Drive on the east and south of the residences along 82nd Avenue North. Conservancy Districts are intended to conserve areas with valuable environmental qualities. They are also intended for areas that are considered unsuitable for residential and other development. Impacts to Shingle Creek are discussed in further detail in **Question 9.a.iii**.

#### **Trails**

Trails are located on both sides of West Broadway Avenue, north of 93rd Avenue North and continue over Hwy 610. As mentioned above there is an existing trail in the City's unnamed park land adjacent to Shingle Creek on the east side of West Broadway Avenue. These trail segments are planned to connect to the existing Rush Creek Regional Trail and the Mississippi River Trail, which are part of the Three Rivers Park District regional trail system and identified in the Hennepin County Bicycle Transportation Plan, Planned Bikeway System (April 2015).

No adverse effects are anticipated for the existing Land Use

#### Conclusions

While there will be some temporary and permanent easements obtained from park properties, these easements and associated transportation improvements (including the addition of a multi-use trail, grassy back slopes, and new storm water treatment facilities) will enhance access to these recreational facilities, and improve overall water quality in the project area. The recreational utility of these parks will remain essentially unaffected. Therefore, no adverse effects are anticipated for the recreation and open space resources.

This project is not expected to cause significant change in land use. The construction will be occurring within the existing roadway corridor, and is consistent with local and regional plans.

ii. Plans. Describe planned land use as identified in comprehensive plan (if available) and any other applicable plan for land use, water, or resources management by a local, regional, state, or federal agency.

#### Regional/Local Planning

The Brooklyn Park 2030 Comprehensive Plan (2030 Plan) was adopted on December 31, 2008. The 2030 Plan establishes the direction for guiding development and redevelopment in the city through the year 2030. The document is reviewed and revised when necessary to incorporate changing conditions and community goals. The 2030 Plan denotes the following land use categories for the corridor:

- Low and Medium Density Residential
- Neighborhood Commercial
- Business Park
- Parks & Open Space
- Institutional

The existing and proposed development is consistent with the 2030 Plan. The Brooklyn Park Recreation and Parks Master Plan was adopted on October 1, 2012. The Recreation and Parks Plan has a goal of creating an east-west trail connection to the Mississippi River Trail. Shingle Creek is the focus of an urban greenway/linear park. Plans are to complete trails along West Broadway Avenue and a trail loop encircling the city consisting of the Rush Creek Regional Trail, the Mississippi River Trail, and the Shingle Creek Greenway.

Hennepin County worked together with the Three Rivers Park District (TRPD) to develop the Hennepin County 2040 Bikeway Transportation Plan (2040 Bikeway Plan) that was adopted in April 2015. This plan guides how, where, and when the County and the TRPD will build bikeways through the year 2040. The Shingle Creek Regional Trail and Rush Creek Regional Trail are listed as existing off-street bikeways in the 2040 Bikeway Plan and in the TRPD regional trail system. West Broadway Avenue is listed as a planned off-street bikeway in the 2040 Bikeway Plan. The Recreation and Parks Plan also identifies the West Broadway Avenue corridor as a planned north-south connection to the Rush Creek Regional Trail.

# iii. Zoning, including special districts or overlays such as shoreland, floodplain, wild and scenic rivers, critical area, agricultural preserves, etc.

#### **Zoning**

The proposed project would be considered an allowed use as an existing transportation corridor. A Highway Overlay District is located on the northwest side of the intersection of 93rd Avenue North and West Broadway Avenue. The West Broadway Avenue corridor is slightly within the District and coordination with the City to provide compatible access to existing and upcoming development will be necessary.

Shingle Creek crosses West Broadway Avenue in the southern portion of the corridor and is within a "Conservation District" zoning category.

#### Floodplain

Impacts to floodplains are protected through several Executive Orders 11988 and 13690, state law, local ordinances and watershed district rules. In order to identify floodplain areas, regulatory maps were reviewed. Several areas depicted on FEMA/ FIRM floodplain maps (Flood Insurance Study Numbers 27053CV001A and 27053CV002A) lie within and adjacent to the West Broadway Avenue reconstruction project. However, mapped floodplain boundaries can change over time based on revised hydraulic calculations that account for changes in land use that affect drainage patterns. Land use changes that have affected floodplain boundaries are noted below.

Occurrences of mapped 100-Year Floodplain within the West Broadway Avenue Reconstruction project area are described as follows (**Figure 4-Natural Features**):

- Northeast Quadrant of 93rd Avenue North and West Broadway Avenue. A small area is mapped as 100-Year Floodplain in this area; however, the site is now occupied by a large warehouse, known as the "610 Commerce Area", parking lot, landscaped lawn, roadside ditches, and storm water basins.
- South side of 92nd Avenue North (east and west sides of West Broadway Avenue). This hydrologically isolated basin, bisected by West Broadway Avenue, is mapped as 100-Year Floodplain and as MNDNR Public Water Wetland #559W.

- Northwest Quadrant of 89th Avenue North and West Broadway. This regional storm pond, known as Setzler Pond, is used for stormwater management and is mapped as 100-Year Floodplain.
- Shingle Creek at West Broadway Avenue. Large areas adjacent to Shingle Creek on the east and west sides of West Broadway Avenue are mapped as 100-Year Floodplain. The channel of Shingle Creek is mapped as Floodway. Mapped 100-Year floodplain on the north and south sides of Shingle Creek west of West Broadway Avenue are currently being removed from designation as floodplain through a letter of Map Revision (LOMR). Portions of mapped floodplain on the east side of West Broadway Avenue and north of Shingle Creek are also being removed from designation as floodplain though the LOMR process.

Proposed earthwork in mapped 100-Year Floodplains requires a Minnesota DNR floodplain permit.

Several areas mapped as 100-Year Floodplain will be impacted within the proposed roadway reconstruction project area. Impacts may be the result of fill required for the project footprint or they may be excavation impacts used for mitigation of floodplain fill impacts or accommodation of stormwater management. The total proposed floodplain fill impacts are 13,500 cubic yards (c.y.). Locations of these areas and proposed impacts and mitigation are described as follows:

- Setzler Pond Northwest quadrant of 89th Avenue North and West Broadway Avenue. The total proposed floodplain fill in Setzler Pond is 500 c.y. Mitigation for the proposed floodplain fill would be at a 1:1 volume ratio within Setzler Pond.
- South side of 92nd Avenue North (east and west sides of West Broadway Avenue). The total proposed floodplain fill for this mapped 100-Year Floodplain area is 5,500 c.y. Mitigation for the proposed floodplain fill would be at a 1:1 volume ratio within this basin.
- Shingle Creek Floodplain (east and west sides of West Broadway Avenue). The total proposed floodplain fill for the Shingle Creek floodplain (east and west of West Broadway Avenue) is 7,500 c.y. Several areas near Shingle Creek are being studied for the potential to provide viable 1:1 volume mitigation for this floodplain fill.

#### Shoreland Zones

Shoreland zones are defined in Minnesota Rules 6120.2500 – 3900; shoreland zones typically include areas within 1000 feet of the Ordinary High Water Mark of a lake or within 300 feet of a stream. The only potentially applicable shoreland zone within the West Broadway Avenue Reconstruction project area is within 300-feet north and south of Shingle Creek. However, given that the City of Brooklyn Park has not adopted the State Shoreland Standards, the 300-foot shoreland zone does not apply in this case.

#### Other Zoning Related Resources

There are no Wild and Scenic Rivers, critical areas, or agricultural preserves within the roadway reconstruction area.

# b. Discuss the project's compatibility with nearby land uses, zoning, and plans listed in Item 9a above, concentrating on implications for environmental effects.

The West Broadway Avenue Reconstruction project is consistent with local and regional comprehensive plans. The reconstruction of West Broadway Avenue is included in the Hennepin County Capital Improvement Program and Hennepin County has identified West

Broadway Avenue as an off-street primary bicycle route in its 2040 Hennepin County Bicycle Plan. Hennepin County has worked closely with the City of Brooklyn Park on the development of this project and has taken into account the current and future land uses of adjacent properties.

The reconstruction and expansion of this existing roadway is consistent with local and regional plans. New development is already scheduled and the roadway improvements are expected to benefit the community with improved mobility and safety. In addition, the reconstruction of West Broadway Avenue would provide capacity for implementation of future transitway improvements.

# c. Identify measures incorporated into the proposed project to mitigate any potential incompatibility as discussed in Item 9b above.

The West Broadway Avenue Reconstruction project is compatible with existing and planned land uses. Changes to property access will be minor in scale and are not deemed significant. Therefore, no mitigation measures are required.

### 10. Geology, soils and topography/land forms:

a. Geology - Describe the geology underlying the project area and identify and map any susceptible geologic features such as sinkholes, shallow limestone formations, unconfined/shallow aquifers, or karst conditions. Discuss any limitations of these features for the project and any effects the project could have on these features. Identify any project designs or mitigation measures to address effects to geologic features.

The geology of the West Broadway Avenue Reconstruction project area consists of Upper Terrace surficial deposits overlying Early Paleozoic Era bedrock. The terrace deposits of sand, gravelly sand, and loamy sand, are covered by silt, loam, or organic sediments (Meyers and Hobbs 1989). The underlying bedrock transitions from the younger Prairie du Chein-Jordan formations in the southern end of the project area to the St. Lawrence-Franconia formations in the northern portion. The Prairie du Chien Group consists of dolostone with increasing sand content near its transition to the Jordan Sandstone. The Jordan formation is a quartzose sandstone that is carbonate cemented in the upper 10 to 15 feet, coarse grained in the middle, and fine-grained with shale in the basal portion of the formation. The stratigraphically lower St. Lawrence-Franconia formations consist of dolomitic siltstones and fine-grained, glauconitic sandstone with shale Olsen and Bloomgren 1989). Depth to bedrock is generally greater than 100 feet, with the exception for the very southern end of the project area, where it can be as shallow as 50 feet below ground surface (bgs). A bedrock valley extends from east to west through the project area between 85th and 89th Avenues. Bedrock depths in this area are upwards of 300 to 400 feet bgs (Bloomgren et. al.1989).

The ground surface elevation in the project area is between 870 feet to 880 feet above mean sea level. The water table elevation is at approximately 860 feet (10-20 bgs) and groundwater flow is generally to the northeast. The West Broadway Avenue Reconstruction project area lies in an area designated as "High Sensitivity" to pollution of the water table, due to the presence of sandy materials in the unsaturated zone. The Prairie du Chien-Jordan Aquifer is the most heavily used aquifer in Hennepin County. The project area lies along the edge of the Prairie du Chien formation. In the southern-most one mile of the project area (in the vicinity of Shingle Creek), the Prairie du Chien-Jordan formations are still present. This area is designated as "High-Moderate to High" pollution sensitivity for the Prairie du Chien-Jordan Aquifer.

The Prairie du Chien formation consists of carbonate bedrock that is susceptible to dissolution. Thicknesses of overlying unconsolidated material are generally greater than 50 feet and surficial karst features such as sinkholes are unlikely in the project area. Other dissolution features (enlarged fractures, caves, etc.) associated with the Prairie du Chien would likely occur at depths well below the proposed construction.

b. Soils and topography - Describe the soils on the site, giving NRCS (SCS) classifications and descriptions, including limitations of soils. Describe topography, any special site conditions relating to erosion potential, soil stability or other soils limitations, such as steep slopes, highly permeable soils. Provide estimated volume and acreage of soil excavation and/or grading. Discuss impacts from project activities (distinguish between construction and operational activities) related to soils and topography. Identify measures during and after project construction to address soil limitations including stabilization, soil corrections or other measures. Erosion/sedimentation control related to stormwater runoff should be addressed in response to Item 11.b.ii.

NOTE: For silica sand projects, the EAW must include a hydrogeologic investigation assessing the potential groundwater and surface water effects and geologic conditions that could create an increased risk of potentially significant effects on groundwater and surface water. Descriptions of water resources and potential effects from the West Broadway Avenue Reconstruction project in EAW Item 11 must be consistent with the geology, soils and topography/land forms and potential effects described in EAW Item 10.

The predominant soils in the project area are the Soderville loamy fine sand, the Forada sandy loam, and the Anoka and Zimmerman soils. The USDA Web Soil Survey classifies the Soderville loamy fine sand as moderately well drained, the Forada sandy loam as poorly drained, and the Anoka and Zimmerman soils as well to excessively drained (Table 5). The most limiting layer in these soils is classified as having a moderate to very high capacity for transmitting water. The poorly drained soils are associated with wetlands in the Project area, whereas the well drained soils are generally associated with upland and stream terrace landscapes. These soil drainage characteristics and high soil permeability indicate that there is potential for groundwater and soil contamination.

There are several wetlands in or adjacent to the West Broadway Avenue Reconstruction project area that are listed on the National Wetlands Inventory. These sensitive areas have a potential for contamination and impacts during project construction. In addition, the project corridor exists within a Wellhead Protection Area as noted on Minnesota's Department of Health website and is noted as having high hydrogeologic sensitivity of the water table aquifer.

Potential causes of contamination are gasoline or other chemical spills during construction. Vehicles containing gasoline or diesel will be present in the project area during construction; however risk of potential fuel spills from these vehicles is low. If any other hazardous or non-hazardous chemical substances are spilled on site during construction, corrective measures in accordance with the U.S. Environmental Protection Agency must be taken immediately.

The West Broadway Avenue Reconstruction project area lies within 8 different soil types. The Anoka and Zimmerman soils and the Forada sandy loam are found on hills and drainage ways on stream terraces. With an influx of flowing water, there is potential for erosion in these areas. An erosion management plan should be outlined for construction activities. Erosion due to construction and storm water run off can lead to increased levels of suspended solids in the surrounding waters, such as Shingle Creek. High amounts of suspended solids will affect water quality and need to be treated and removed. A full discussion of stormwater can be found in **Question 11.b.ii**.

Symbol	Name	% Slopes	Erodibility Status <sup>1</sup>	Location Information	% Of AOI	Acreage
D1B	Anoka and Zimmerman soils, terrace	2 - 6 %	NHELPrimary soil type in parcels along the middle section of the Project area between State Highway 610 and 85th Avenue North.		19.8%	14.2
D6A	Verndale sandy loam, acid substratum	0 - 2%	NHELMostly located in the northern part of the Project area north of 85th Avenue North.		13.6%	9.8
D10A	Forada sandy loam	0-2%	NHEL	Mostly located in the southern half of the Project area along 85th Avenue North.	26.2%	18.8
D17A	Duelm loamy sand	0-2%	NHEL	Small occurrence south of Shingle Creek.	0.0%	0.0
D20A	Isan sandy loam	0-2%	NHEL	Soil type in sections throughout Project area.	0.7%	0.5
D25A	Soderville loamy fine sand, terrace	0 – 3%	NHEL	Predominant soil type from Shingle Creek to Highway 610 north, alternating with D10A and D1B through the Project area.	20.9%	15.0
D30A	Seelyeville and Markey soils, depressional	0-1%	NHEL	Small occurrence mostly near wetlands at 92nd Avenue North and Shingle Creek.	7.1%	5.1
U2A	Udorthents, wet substratum	0-2%	NHEL	Small occurrence near Shingle Creek north to 85th Avenue North.	11.7%	8.4

TABLE 5: SOILS	CLASSIFICATION
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The above soils information is taken from the USDA Web Soil Survey for Hennepin County Minnesota

<sup>1</sup> All soils within the West Broadway Avenue Reconstruction project area are classified as "Non-Highly Erodible Land" (NHEL)

#### 11. Water resources:

# a. Describe surface water and groundwater features on or near the site in a.i. and a.ii. below.

i. Surface water - lakes, streams, wetlands, intermittent channels, and county/judicial ditches. Include any special designations such as public waters, trout stream/lake, wildlife lakes, migratory waterfowl feeding/resting lake, and outstanding resource value water. Include water quality impairments or special designations listed on the current MPCA 303d Impaired Waters List that are within one mile of the project. Include DNR Public Waters Inventory number(s), if any.

Eight wetlands and aquatic resources were delineated within the West Broadway Avenue Reconstruction project area. Characteristics of these wetlands are summarized in Table 6 and located on **Figure 4: Natural Features Overview**:

Shingle Creek lies in the Mississippi River – Twin Cities Watershed of the Upper Mississippi River Basin. Eagle Lake and Magda Lake, both impaired lakes on the 303 (d) List, are located approximately one mile to the west of the West Broadway Avenue Reconstruction project area. No other waterbodies on the 303 (d) List are located within one mile of the West Broadway Avenue Reconstruction project area. Shingle Creek, in the vicinity of the West Broadway Avenue, is known as County Ditch 13 and is under the administration of Hennepin County. Shingle Creek is also an unnumbered Public Watercourse per the MNDNR Public Water Inventory. It is likely that a MNDNR Public Waters Work Permit would be required for work below the Ordinary High Water (OHW) elevation, if known, or the bankfull elevation of Shingle Creek

Wetland ID	NWI Mapping	Wetland Type <sup>1</sup>	Location	303(d) Listing and Floodplain Mapping	Notes
W18	PEM1C	PEMA	SW quadrant of 92nd Avenue North and West Broadway Avenue	Not listed	Public Water Wetland 559W
W19	PEM1C	PEMA	SE quadrant of 92nd Avenue North and West Broadway Avenue	Not listed.	Public Water Wetland 559W
W20	Not mapped	PEMA	SE quadrant of 92nd Avenue North and West Broadway Avenue	Not listed.	Isolated hydrologically
W21	PEM1Ax	PEM1Ax	NW quadrant of 89th Avenue North and West Broadway Avenue	Not listed. Mapped as within the 100-Year floodplain	Known as Setzler Pond, a regional storm pond constructed in 1997. Unnumbered Public Water Course (Mattson Brook). Currently culverted under West Broadway Avenue
W22	PEM1F/ PUBGx	PEMC	NW quadrant of Shingle Creek and West Broadway Avenue	Not listed. Mapped as within the 100-Year floodplain	Some history as a mitigation site (never used)
W23	Not mapped	PEMA	NE quadrant of Shingle Creek and West Broadway Avenue	Not listed. Mapped as within the 100-Year floodplain	Isolated hydrologically

 TABLE 6: WETLAND ID, NWI MAPPING, WETLAND TYPE

Wetland ID	NWI Mapping	Wetland Type <sup>1</sup>	Location	303(d) Listing and Floodplain Mapping	Notes
W24	R2UBFx	R2UBFx	Shingle Creek and West Broadway Avenue – east side	2004 303(d) List; impairment for aquatic life due to low dissolved oxygen levels. 2006 303 (d) List; impairment for aquatic life due to stressors impacting aquatic macroinvertebrate community. A Chloride Total Maximum Daily Load (TMDL) report was approved by EPA in 2007. Mapped as within the Floodway.	Shingle Creek. Unnumbered Public Watercourse. Established as Hennepin County Ditch 13 in 1908 and remains under the administration of Hennepin County. DNR Public Waters Work Permit likely required for impacts below the bankfull elevation of the Creek.
W25	R2UBFx	R2UBFx	Shingle Creek and West Broadway Avenue – west side	2004 303(d) List; impairment for aquatic life due to low dissolved oxygen levels. 2006 303 (d) List; impairment for aquatic life due to stressors impacting aquatic macroinvertebrate community. A Chloride Total Maximum Daily Load (TMDL) report was approved by EPA in 2007. Mapped as within the Eloodway	Shingle Creek. Unnumbered Public Watercourse. Established as Hennepin County Ditch 13 in 1908 and remains under the administration of Hennepin County. DNR Public Waters Work Permit likely required for impacts below the bankfull elevation of the Creek.

Wetland codes are as described in Cowardin, L.M. 1979. "Classification of Wetlands and Deepwater Habitats in the United States". **P**= Palustrine (non-flowing), **R**=Riverine (flowing), **EM**=Emergent Marsh, **UB**=Unconsolidated Bottom, **A**=Temporarily Flooded, **C**=Seasonally Flooded, **F**=Semi-Permanently Flooded, **x**=Excavated

1

ii. *Groundwater:* aquifers, springs, seeps. Include: 1) depth to groundwater; 2) if project is within a MDH wellhead protection area; 3) identification of any onsite and/or nearby wells, including unique numbers and well logs if available. If there are no wells known on site or nearby, explain the methodology used to determine this.

Locations of wellhead protection areas within the West Broadway Avenue Reconstruction were determined based on review of the City of Brooklyn Park Master Plan. The entire West Broadway Avenue Reconstruction project area lies within a Minnesota Department of Health (MDH) wellhead protection area. The subject wellhead protection area extends north of the project area to the north side of Highway 610 and south of the project area to Interstate 94/ 694.

One City of Brooklyn Park well is located in the northwest quadrant of 85th Avenue North and West Broadway Avenue. This well is relatively shallow and, according to the 2006 City of Brooklyn Park "Water System Supply and Treatment Master Plan" pumps low-quality water from quaternary deposits of glacial drift. Water from this glacial drift well and those in the vicinity are high in Manganese, Iron, Magnesium, Calcium, and other dissolved solids. This ground water is treated by the City to bring it to applicable state and federal drinking water standards. Several other glacial drift wells and others that pump from the deeper Franconia – Ironton – Galesville are present in the west central portion of the City of Brooklyn Park, though they are outside of the subject project area.

Based on review of the County Well Index for Hennepin County, four private wells are located close to or within the West Broadway Avenue Reconstruction project area. A summary of private well characteristics is provided below:

- Well #214493. Located on the east side of West Broadway Avenue between Setzler Parkway North and Maplebrook Terrace North. Drilled to a depth of 360 feet.
- Well #405810. Located on the east side of West Broadway Avenue between Setzler Parkway North and Maplebrook Terrace North. Drilled to a depth of 82 feet.
- Well #749065. Located on the east side of West Broadway Avenue between Setzler Parkway North and Maplebrook Terrace North. Drilled to a depth of 100 feet.
- Well #155091. Located on the southwest quadrant of West Broadway Avenue and 89th Avenue North. Drilled to a depth of 102 feet.

Based on review of the Hennepin County Geological Atlas, "Sensitivity of Ground Water Systems to Pollution" (Plate 7 of 9), most of the West Broadway Avenue Reconstruction project area is "Highly" sensitive to groundwater pollution. A portion of the project area along the west side of West Broadway Avenue Reconstruction project area is "Very Highly" sensitive to groundwater pollution. The groundwater sensitivity is largely caused by the presence of highly permeable sandy soils at the edge of the Anoka Sandplain, a large area of sandy outwash including the northern portion of Hennepin County.

- b. Describe effects from project activities on water resources and measures to minimize or mitigate the effects in Item b.i. through Item b.iv. below.
  - i. *Wastewater:* For each of the following, describe the sources, quantities and composition of all sanitary, municipal/domestic and industrial wastewater produced or treated at the site.
    - 1) If the wastewater discharge is to a publicly owned treatment facility, identify any pretreatment measures and the ability of the facility to handle the added water and waste loadings, including any effects on, or required expansion of, municipal wastewater infrastructure.

Not Applicable.

2) If the wastewater discharge is to a subsurface sewage treatment systems (SSTS), describe the system used, the design flow, and suitability of site conditions for such a system.

Not Applicable.

3) If the wastewater discharge is to surface water, identify the wastewater treatment methods and identify discharge points and proposed effluent limitations to mitigate impacts. Discuss any effects to surface or groundwater from wastewater discharges.

No wastewater will be discharged to surface waters.

ii. Stormwater: Describe the quantity and quality of stormwater runoff at the site prior to and post construction. Include the routes and receiving water bodies for runoff from the site (major downstream water bodies as well as the immediate receiving waters). Discuss any environmental effects from stormwater discharges. Describe stormwater pollution prevention plans including temporary and permanent runoff controls and potential BMP site locations to manage or treat stormwater runoff. Identify specific erosion control, sedimentation control or stabilization measures to address soil limitations during and after project construction.

The proposed West Broadway Avenue Reconstruction will require stormwater management. Regulatory and permitting authority for stormwater management for the West Broadway Avenue Reconstruction project is under the jurisdiction of the City of Brooklyn Park, the Minnesota Pollution Control Agency (MPCA), and also the Shingle Creek and West Mississippi Watershed Management Commission.

Stormwater in the greater project area, which is directed toward West Broadway, is predominantly runoff from areas to the west of West Broadway. Approximately 60 percent of the roadway drains to Shingle Creek, 33 percent drains into Setzler Pond and MNDNR Public Water #559 W, and seven percent drains into the floodplain within TH 610. These areas are described in more detail in the following sections and in **Appendix 4: Stormwater and Floodplain Technical Memorandum**.

Stormwater ponds that are the only water quality treatment facility for project runoff will be designed to National Urban Runoff Program (NURP) standards, with the dead pool sized to store runoff from a 2.5-inch rain event over the contributing drainage areas per Shingle Creek Watershed Management (SCWM) and West Mississippi Commission (WMC) rules. Wet sedimentation forebays will be used in some instances to pretreat runoff going to an existing basin to mitigate for the added impervious surface. These forebays will be designed to meet the standards of the NPDES permit that will be obtained prior to project construction. The forebay along with the treatment occurring in the existing basin will meet the requirements of the SCWM WMC.

Infiltration or filtration Best Management Practice (BMPs) provide quantity (rate and volume) control and water quality treatment and can be constructed as surface BMPs or underground practices. Much of Brooklyn Park has soil categorized into hydrologic soil groups A or B and may be suitable for infiltration BMPs. Hydrologic Soil Groups A and B have textures that allow water to flow vertically through them relatively easily. However, most of the West Broadway corridor is also in a highly vulnerable portion of the Brooklyn Park Central Drinking Water Supply Management Area (DWSMA). Further coordination with city representatives will occur to determine where infiltration is acceptable and if protective measures must be taken to ensure well safety.

Filtration BMPs can be utilized in locations where inclusion in the DWSMA, proximity to groundwater, or proximity to soil or groundwater contamination precludes the use of infiltration BMPs. They can also be used at treatment pond locations, by using a 10-foot bench of engineered soil above the normal water level as a filtration bench. This would allow a certain volume of water in the pond to filtrate through engineered soil and be collected in drain tile that would flow to the pond outfall. Soil borings should be taken during preliminary and final design to determine where infiltration or filtration BMPs may be appropriate.

Much of the existing drainage patterns will be maintained, but West Broadway corridor drainage and a relatively small amount of offsite area draining onto the roadway will be redirected to several BMPs. The proposed stormwater management plan currently includes wet ponds in certain locations, which represent the expected worst-case footprint for the BMPs. Soil borings and piezometers will be drilled and further discussion with the City will occur to determine the feasibility of infiltration or filtration BMPs in these locations.

See **Appendix 4: Stormwater and Floodplain Technical Memorandum** which depicts proposed corridor drainage boundaries and a representation of where BMPs are proposed.

iii. Water appropriation: Describe if the project proposes to appropriate surface or groundwater (including dewatering). Describe the source, quantity, duration, use and purpose of the water use and if a DNR water appropriation permit is required. Describe any well abandonment. If connecting to an existing municipal water supply, identify the wells to be used as a water source and any effects on, or required expansion of, municipal water infrastructure. Discuss environmental effects from water appropriation, including an assessment of the water resources available for appropriation. Identify any measures to avoid, minimize, or mitigate environmental effects from the water appropriation.

The project will not require surface or groundwater appropriation.

#### iv. Surface Waters

1) <u>Wetlands:</u> Describe any anticipated physical effects or alterations to wetland features such as draining, filling, permanent inundation, dredging and vegetative removal. Discuss direct and indirect environmental effects from physical modification of wetlands, including the anticipated effects that any proposed wetland alterations may have to the host watershed. Identify measures to avoid (e.g., available alternatives that were considered), minimize, or mitigate environmental effects to wetlands. Discuss whether any required compensatory wetland mitigation for unavoidable wetland impacts will occur in the same minor or major watershed, and identify those probable locations.

The proposed improvements to West Broadway Avenue Reconstruction will include filling of wetland areas in certain locations, and excavation within wetland areas in other locations. Fill impacts to wetlands will permanently convert wetland to upland; it is estimated that the project will permanently impact approximately 3.9 acres of wetlands as a result of required fill within the project footprint. Excavation impacts may convert one wetland type to another wetland type. Wetland type conversion can potentially change how the wetland functions. Some temporary wetland impacts may be required in order to accommodate construction of the project. Temporary wetland impacts would be restored per permit conditions during post-construction. The total acreage of wetland impact (permanent and temporary) resulting from the subject project is relatively minor in comparison to the wetland acreage within the Mississippi River – Twin Cities Watershed and within more local watersheds.

The majority of wetland impacts will occur in areas where wetland is present on both sides of West Broadway; for example, where Shingle Creek crosses West Broadway and in Wetland 18 and 19 just south of 92nd Avenue North. This constraint means that wetland impacts cannot be avoided by moving the centerline of the roadway to the east or west.

All delineated basins within the project area meet the definition of wetlands; however, some basins are currently used for stormwater management. An example is Wetland 21 (Setzler Pond). Setzler Pond was constructed in 1997 as a regional storm pond. Therefore, impacts to the Setzler Pond are not calculated as wetland impacts for purposes of the EAW and impacts to it will not be considered as wetland impacts later during the permitting process. Wetland 22 was previously a golf course and was excavated in uplands to create wetland conditions. Further, Wetland 22 receives untreated storm water runoff from West Broadway Avenue. Thus, Wetland 22 is serving the purpose of a storm pond. For purposes of the EAW, impacts to Wetland 22 are currently calculated as wetland impacts. During the permitting process, there appears to be some evidence that impacts to Wetland 22 could be treated as non wetland impacts.

Several construction techniques and BMPs will be used to minimize impacts to project area wetlands. The proposed sideslopes of the proposed roadway reconstruction will be 3 (horizontal):1 (vertical) in the vicinity of wetlands and 4:1 in areas not adjacent to wetlands. Sideslopes steeper than 3:1 would typically require guard rail which introduces additional safety concerns and issues with snow removal.

Silt fences will be properly installed in the vicinity of wetlands to minimize potential siltation into wetlands and receiving water bodies. Bare soils will be stabilized with erosion control measures and re-vegetated immediately after construction.

Impacted wetlands in the project area that are within the jurisdiction of state and federal law and local rules will be mitigated per relevant permit conditions. Mitigation is typically accomplished with an acre ratio of 2 (mitigated):1 (impacted). Sometimes, circumstances dictate that the mitigation ratio is 2.5:1. Typically, roadway reconstruction-related wetland impacts that demonstrate safety improvements will be mitigated through the Board of Water and Soil Resources (BWSR) Road Replacement Program. Road reconstruction impacts that are associated with trail construction or are not safety-related do not qualify for the BWSR Road Replacement Program; therefore such impacts would be mitigated through the purchase of suitable banked private wetland mitigation credits or with construction of on-site wetland mitigation areas.

2) <u>Other surface waters:</u> Describe any anticipated physical effects or alterations to surface water features (lakes, streams, ponds, intermittent channels, county/judicial ditches) such as draining, filling, permanent inundation, dredging, diking, stream diversion, impoundment, aquatic plant removal and riparian alteration. Discuss direct and indirect environmental effects from physical modification of water features. Identify measures to avoid, minimize, or mitigate environmental effects to surface water features, including in-water Best Management Practices that are proposed to avoid or minimize turbidity/sedimentation while physically altering the water features. Discuss how the project will change the number or type of watercraft usage.

Construction may cause impacts to Shingle Creek. This segment of the project may require a combination of temporary sedimentation basins, creek diversion, silt fences and silt curtains, and erosion control to minimize potential sedimentation to the Creek and receiving water bodies downstream. Shingle Creek is listed as an impaired water body per the USEPA 303 (d) list. Water quality in the creek is not anticipated to be significantly impacted. The area disturbed during construction will be revegetated immediately after construction.

The proposed roadway reconstruction will impact a culvert just north of 89th Avenue North. The culvert conveys what was once called Mattson Brook. The culvert now flows beneath a fully built-out residential neighborhood and daylights approximately 800 feet to the east of the project area. Temporary sedimentation basins and other BMPs will be necessary to minimize the potential for sedimentation to enter this conveyance and receiving water bodies downstream. Portions of this culvert will be replaced. The area disturbed during construction will be revegetated immediately after construction.

### 12. Contamination/Hazardous Materials/Wastes:

a. Pre-project site conditions: Describe existing contamination or potential environmental hazards on or in close proximity to the project site such as soil or ground water contamination, abandoned dumps, closed landfills, existing or abandoned storage tanks, and hazardous liquid or gas pipelines. Discuss any potential environmental effects from pre-project site conditions that would be caused or exacerbated by project construction and operation. Identify measures to avoid, minimize or mitigate adverse effects from existing contamination or potential environmental hazards. Include development of a Contingency Plan or Response Action Plan. A desktop evaluation was conducted to identify existing and potentially contaminated properties that could impact the project area. The Minnesota Pollution Control Agency's (MPCA) What's In My Neighborhood database (which includes listings of potentially contaminated properties, environmental permits and registrations) was queried for listings within 750 feet of the project area. The search identified 77 listings for 54 unique sites. Forty unique sites\* were further categorized using MnDOT's risk potential for contamination based on the type of listing:

#### Low Environmental Risk:

Hazardous and/or petroleum substances are known or inferred to have been, or are being used, stored or generate on these sites; however, there appear to be "good housekeeping" practices conducted on the site. Good housekeeping practices are defined as proper handling and/or storage of hazardous or petroleum substances. There is also no record or evidence of spills, releases, surface contamination and/or subsurface contamination at the site.

#### Medium Environmental Risk:

Hazardous substances are known or inferred to have been, or are being used, stored, or generated on these sites, and there appears to be "poor housekeeping" practices conducted at the site. Poor housekeeping practices are defined as improper handling and/or storage of hazardous or petroleum substances. All properties that have underground storage tanks (USTs) or above ground storage tanks (ASTs) and leaking underground storage tank (LUST) sites that have received closure from the Minnesota Pollution Control Agency (MPCA) and vehicle repair and maintenance facilities are also considered medium environmental risks.

#### High Environmental Risk:

These are sites where hazardous and/or petroleum substances are known or inferred to have been, or are being used, stored, or generated, and there is a record or evidence that a spill, release, surface contamination and/or subsurface contamination has occurred. These sites include all active Voluntary Investigative and Cleanup (VIC), Minnesota Environmental Response & Liability Act (MERLA), active LUST sites and all active and inactive dump sites.

High and medium environmental risk sites were identified within and adjacent to the project area. Almost all of these properties have or had documented contamination to the soil and/or groundwater that could impact construction activities. A limited Phase I Environmental Site Assessment (Phase I ESA) was conducted for the project area in 2008 by Foth Infrastructure & Environment (Foth). The Phase I ESA was prepared under the previous standard, ASTM Practice E1527-05. An updated Phase I ESA is recommended to fully evaluate the project area for areas of potential contamination and to aid in the scoping of a targeted subsurface investigation (Phase II ESA) to determine the need for avoidance areas or development of a Response Action Plan prior to construction. A Construction Contingency Plan will be developed to outline proper response to undocumented contamination that may be encountered through the course of construction.

A Phase I ESA is being conducted in support of the Final EIS for the Metro Transit BLRT project. The West Broadway Avenue project area footprint is included in the Phase I ESA for this project. A review of the LRT Blue Line Extension Phase I ESA and subsequent Phase II ESA may be used in lieu of a separate investigation for this project, if reliance on these reports is granted to Hennepin County by Metro Transit.

\*Six sites with mapped addresses (along Winnetka Ave) outside the 750 ft buffer were added to the table below, because the property boundaries were determined to be within the project area.

Table 7 is a summary of the identified listings and their relative risk ranking (**Figure 6: Hazardous Materials**).

Name	Address Ranking		Site ID	Database(s)
Modern Mfg. Parcel - 610	9430 Winnetka Ave N	Medium	173199	Inactive VIC
Amoco Oil Co	9400 Winnetka Ave N	Medium	215893	Leak Site/Petroleum Brownfield/ Inactive Tank Site
Amoco Pipeline - Winnetka	9400 Winnetka Ave N	Medium	172964	Inactive VIC
Northcross Partners LLC	9400 Winnetka Ave N	Medium	59820513	Closed Leak Site
681 Properties/Steven Scott Management	7845 Yates Ave	Medium	232343	Tank Site
Andys Manufacturing	7900 N Highway 169	Medium	215518	Tank Site
Commons Shenehon Prop I	8479 W Broadway Ave	Medium	38704	Inactive Tank Site, Closed Leak Site, Hazardous Waste, Small to Minimal QG
Midwest Management Inc	8082 8088 Brooklyn Park Blvd	Medium	225797	Tank Site
Newport Terminal Corp	9399 W Broadway N	Medium	55099503	Tank Site
North Hennepin Community College	7411 85th Ave N	Medium	41484	Active Tank Site, Closed Leak Site, Hazardous Waste, Small to Minimal QG
<b>Tessman Property</b>	9400 Winnetka Ave N	Medium	8228	Closed Leak Site
Biotest Laboratories Inc	9303 W Broadway Ave	Low	62256025	Hazardous Waste, Small to Minimal QG
Brooklyn Park Suzuki	7900 Highway 169	Low	38309	Hazardous Waste, Small to Minimal QG
Common Cleaners	8463 W Broadway Ave	Low	38703	Hazardous Waste, Small to Minimal QG
CVRX Inc	9201 W Broadway Ave Ste 650	Low	55019486	Hazardous Waste, Small to Minimal QG
Duane Whitney	8800 Wyoming Ave N	Low	156	Hazardous Waste, Small to Minimal QG, Air Permit
EIS Inc	9210 Wyoming Ave N Ste 215	Low	66017876	Hazardous Waste, Small to Minimal QG
Family Chiropractic Health Service	8445 W Broadway Ave	Low	39348	Hazardous Waste, Small to Minimal QG
FedEx SmartPost Inc	7500 Setzler Pkwy N	Low	254432	Hazardous Waste, Small to Minimal QG
Gyrus ACMI Inc dba Olympus Surgical Tech	9600 Louisiana Ave N	Low	68902099	Hazardous Waste, Small to Minimal QG
Hennepin County	8100 Jefferson Hwy N - Transfer Sta	Low	60106712	Hazardous Waste, Small to Minimal QG
Industrial Netting	7681 Setzler Pkwy N	Low	62362653	Hazardous Waste, Small to Minimal QG
Institute for Environmental Assessment	9201 W Broadway Ave Ste 600	Low	53707649	Hazardous Waste, Small to Minimal QG
J T L Construction	7965 Louisiana Ave N	Low	40210	Hazardous Waste, Small to Minimal QG

# TABLE 7: SITE LISTINGS AND RISK RANKINGS

Name	Address	Ranking	Site ID	Database(s)			
JA Service	7709 89th Ave W	Low	40211	Hazardous Waste, Small to Minimal QG			
Jobs Foundation	9220 Xylon Ave N	Low	67085168	Hazardous Waste, Small to Minimal QG			
Maple Brook Dental Center	8421 W Broadway Ave	Low	40775	Hazardous Waste, Small to Minimal QG			
Midwest Finishing Inc	9000 Wyoming Ave N	Low	76665	Hazardous Waste, LQG			
Minuteman Press	8461 W Broadway Ave	Low	41233	Hazardous Waste, Small to Minimal QG			
Paragon Machinery Corp	9200 Wyoming Ave N Ste 340	Low	77149	Hazardous Waste, Small to Minimal QG			
Residential	5045 109th Ave N	Low	128593	Hazardous Waste, Small to Minimal QG			
Sherwin Williams Co 3089	8471 W Broadway Ave	Low	42547	Hazardous Waste, Small to Minimal QG			
Southern Graphic Systems Inc	9300 Winnetka Ave N	Low	198254	Hazardous Waste, Small to Minimal QG, Air Permit			
Star Exhibits Inc	6920 93rd Ave N	Low	128613	Hazardous Waste, Small to Minimal QG, Air Permit			
Stellar Technologies Inc	9200 Xylon Ave	Low	160392	Hazardous Waste, Small to Minimal QG			
Technical Resin Packaging Inc	7700 Setzler Pkwy N	Low	66146788	Hazardous Waste, Small to Minimal QG			
Walman Optical	9200 Wyoming Ave N, Ste 350 & 360	Low	76875	Hazardous Waste, Small to Minimal QG			
Liberty Diversified Industries	6900 93rd Ave N	Low	127761	Hazardous Waste, Small to Minimal QG, Air Permit			
Genmab MN Inc	9450 Winnetka Ave N	Low	136235	Hazardous Waste, Small to Minimal QG			
BP Pipelines North America Inc	9400 Winnetka Ave N	Low	6793	Hazardous Waste, Small to Minimal QG			

### b. Project related generation/storage of solid wastes - Describe solid wastes generated/stored during construction and/or operation of the project. Indicate method of disposal. Discuss potential environmental effects from solid waste handling, storage and disposal. Identify measures to avoid, minimize or mitigate adverse effects from the generation/storage of solid waste including source reduction and recycling.

The disposal of solid waste generated by clearing the construction area is a common occurrence associated with road construction projects. The project design will consider selection of grade lines and locations to minimize excess materials. Excess materials and debris from this project, such as asphalt, will be disposed of in accordance with MnDOT Standard Specification, 2104.3C and Minnesota Rules Part 7035.2825. In particular, the project will not include the placing of excess materials and debris in wetlands or floodplains. Stable waste materials that conform to specific construction standards and definitions as specified in the project's contract documents may be disposed of by burying in the roadway embankment. Combustible materials will be disposed of off the project site. Offsite disposal will be at publicly controlled dumpsites or at sites arranged for and secured by the contractor which will not create a public nuisance or result in unsightly conditions. The project's contract documents will identify any borrow material that may be required. The contractor will provide disposal of excess materials for this project.

c. Project related use/storage of hazardous materials - Describe chemicals/hazardous materials used/stored during construction and/or operation of the project including method of storage. Indicate the number, location and size of any above or below ground tanks to store petroleum or other materials. Discuss potential environmental effects from accidental spill or release of hazardous materials. Identify measures to avoid, minimize or mitigate adverse effects from the use/storage of chemicals/hazardous materials including source reduction and recycling. Include development of a spill prevention plan.

No use or storage of hazardous materials during construction or operation of the project is anticipated. Temporary storage tanks for petroleum products may be located in the project area for the purposes of refueling construction equipment during construction activities. The total volume, number of tanks, and location of potential storage tank is not known at this time.

The project area lies within an area with high sensitivity to pollution to the water table aquifer. The southern-most mile of the project area is also considered "High-Moderate to High Sensitivity" to pollution for the underlying bedrock aquifer (Prairie du Chien-Jordan). Faster travel times of releases at the surface to the underlying aquifers are predicted due to the presence of sandy soils and shallow groundwater.

If necessary a Spill Prevention, Countermeasure, and Control Plan (SPCC) will be prepared for the project that will detail the proper storage of petroleum products and measures to reduce the likelihood of accidental spills or releases, and how to respond to spills should they occur.

d. Project related generation/storage of hazardous wastes - Describe hazardous wastes generated/stored during construction and/or operation of the project. Indicate method of disposal. Discuss potential environmental effects from hazardous waste handling, storage, and disposal. Identify measures to avoid, minimize or mitigate adverse effects from the generation/storage of hazardous waste including source reduction and recycling

There will be no hazardous wastes generated from the project.

# 13. Fish, wildlife, plant communities, and sensitive ecological resources (rare features):

# a. Describe fish and wildlife resources as well as habitats and vegetation on or in near the site.

The project is largely located in the Mississippi Sand Plain Land Type Association (LTA) of the Anoka Sandplain Ecological Subsection, but a segment at the southern end of the project is within the Hopkins Moraine LTA in the Big Woods Ecological Subsection. The Minnesota Department of Natural Resources' (MNDNR) state wildlife action plan (*Tomorrow's Habitat for the Wild and Rare*) identify habitat loss in MN and habitat degradation in MN as the most serious threats to species in greatest conservation need occurring in these ecological subsections. Nonforested wetlands, prairie and oak savannah habitat are listed as sensitive or important habitats in the Anoka Sandplain while non-forested wetlands and upland forests are listed as sensitive or important habitats in the Big Woods Ecological Subsection (MNDNR, 2006). The project is located along an urban corridor which includes residential, civic and commercial development. A majority of the project area has been previously developed and these areas provide limited habitat opportunities for native flora and fauna. Further discussion of land use is located in **Question 9**.

Green space in the project area is associated with unnamed park land just north of Shingle Creek and east of West Broadway Avenue, Shingle Creek, College Park (City of Brooklyn Park) and two wetland areas. College Park is maintained as turf grass with scattered deciduous trees, and provides limited habitat opportunities for native flora and fauna.

The greenspace associated with Shingle Creek and the unnamed City Park land is located on the east and west side of West Broadway Avenue north of Candlewood Drive and south of 82nd Avenue. This greenspace was established by the City of Brooklyn Park to preserve sensitive habitats and areas unsuitable for development and is zoned "Conservancy District". This greenspace contains a mix of altered or non-native deciduous broadleaf forests and altered or non-native emergent wetland vegetation, as noted by the Minnesota Land Cover Classification System (MLCCS). The portion of this greenspace located east of West Broadway Avenue is identified as a Twin Cities Metro Regionally Significant Ecological area. This greenspace is located adjacent to the portion of the project in the Hopkins Moraine LTA.

None of the green spaces adjacent to the project are owned by the state or federal government for conservation purposes, nor have they been identified in the Minnesota County Biological Survey as native plant communities or as containing significant natural resources. There are no State Wildlife Management Areas, Scientific and Natural Areas, Parks or conservation easements (Conservation Reserve Enhancement Program, Reinvest in Minnesota Program) within one mile of the project, no regional parks are within one mile, nor are there any federal wildlife refuges or Waterfowl Production Areas within one mile. The project does not bisect metro conservation corridors as identified by the MNDNR.

b. Describe rare features such as state-listed (endangered, threatened or special concern) species, native plant communities, Minnesota County Biological Survey Sites of Biodiversity Significance, and other sensitive ecological resources on or within close proximity to the site. Provide the license agreement number (LA-717) and/or correspondence number (ERDB-see Appendix 5: Agency Letters and Responses) from which the data were obtained and attach the Natural Heritage letter from the DNR. Indicate if any additional habitat or species survey work has been conducted within the site and describe the results.

Blanding's turtles were documented along Shingle Creek approximately 3.5 miles downstream from the project in 1988 (LA-717) (MNDNR, 2014). It is possible this species could occur in the project area by traveling upstream along Shingle Creek. However, due to the lack of recent observations of this species along Shingle Creek and extensive urban development which subsequently occurred within the watershed, this species is not likely to be found in the area.

No records of northern-long eared bat, a federally threatened species, are included in the NHIS data of Hennepin County, but this species is listed as occurring in Hennepin County by the USFWS. This species is known to occur in forested habitat and utilize woody cavities for roosting and as maternity colonies between mid-April and early October.

No records of state or federal species listed as threatened or endangered or MBS sites are located within one mile of the project (MNDNR, 2013).

c. Discuss how the identified fish, wildlife, plant communities, rare features and ecosystems may be affected by the project. Include a discussion on introduction and spread of invasive species from the project construction and operation. Separately discuss effects to known threatened and endangered species.

Impacts to the Shingle Creek conservation corridor will involve the removal of woody vegetation, primarily on the east side of West Broadway Avenue. Shingle Creek is further discussed in **Question 11** of the EAW. The project is not likely to introduce invasive species because the construction will be occurring in an existing roadway. There are no known threatened or endangered species occurring in the West Broadway Avenue Reconstruction Project area.

# *d.* Identify measures that will be taken to avoid, minimize, or mitigate adverse effects to fish, wildlife, plant communities, and sensitive ecological resources.

Impacts to greenspace will be limited to a small amount of riparian forested woodlands associated with Shingle Creek. Forest dwelling species, such as the federally threatened northern long-eared bat, common songbirds, small mammals and amphibians will experience a small amount of habitat loss as a result of the project.

To avoid impacts to Blanding's turtles and habitat adjacent to the project, perimeter controls will be established to control stormwater runoff, prevent erosion and sedimentation and also to prevent construction equipment from straying from the project area.

Upon completion of the project, uplands adjacent to wetlands will be reseeded using native grasses and shrubs to provide habitat opportunities for native flora and fauna.

#### Northern Long-Eared Bat Best Management Practices

Northern long-eared bats may occur in the project area, particularly in wooded habitat associated with Shingle Creek. To avoid direct impact to this species, all tree clearing will occur between October 1 and April 1, which coincides with the hibernation period for this species when bats will not be in the project area.

#### Blanding's Turtle Best Management Practices

Blanding's turtles may occur in the project area, so these best management practices will be implemented to avoid impacts to this species (MNDNR, 2008b). Contractors will be provided with a flyer notifying them this species may be present. To prevent the Blanding's turtles from entering or establishing a nest in the project area during construction perimeter control such as silt fencing may be used. Trenches will be checked for turtles prior to being backfilled. Perimeter controls will be removed when the project is complete and the area has become re-vegetated .

# 14. Historic properties:

Describe any historic structures, archeological sites, and/or traditional cultural properties on or in close proximity to the site. Include: 1) historic designations, 2) known artifact areas, and 3) architectural features. Attach letter received from the State Historic Preservation Office (SHPO). Discuss any anticipated effects to historic properties during project construction and operation. Identify measures that will be taken to avoid, minimize, or mitigate adverse effects to historic properties.

A letter dated June 11, 2015 from SHPO stated that there no known records of properties listed in the National or State Registers of Historic Places, and no known or suspected archeological properties in the project area. (See **Appendix 5: Agency Letters and Responses**)

# 15. Visual:

Describe any scenic views or vistas on or near the project site. Describe any project-related visual effects such as vapor plumes or glare from intense lights. Discuss the potential visual effects from the project. Identify any measures to avoid, minimize, or mitigate visual effects.

The project is not located near any scenic views or vistas. The project is a reconstruction of an existing transportation corridor in an already developed area. The visual elements in the project area are not expected to change. There are no anticipated visual impacts anticipated on the surrounding community and the visual quality will not be altered.

### 16. Air:

a. Stationary source emissions: Describe the type, sources, quantities and compositions of any emissions from stationary sources such as boilers or exhaust stacks. Include any hazardous air pollutants, criteria pollutants, and any greenhouse gases. Discuss effects to air quality including any sensitive receptors, human health or applicable regulatory criteria. Include a discussion of any methods used assess the project's effect on air quality and the results of that assessment. Identify pollution control equipment and other measures that will be taken to avoid, minimize, or mitigate adverse effects from stationary source emissions.

There would be no stationary source emission impacts as a result of the project.

b. Vehicle emissions: Describe the effect of the project's traffic generation on air emissions. Discuss the project's vehicle-related emissions effect on air quality. Identify measures (e.g. traffic operational improvements, diesel idling minimization plan) that will be taken to minimize or mitigate vehicle-related emissions.

The project is not anticipated to have significant impacts or cause any significant decrease in air quality. As discussed in **Questions 6 and 18**, traffic congestion is not expected to increase to levels that will cause air quality concerns. The forecast traffic volumes will increase for the new roadway; however, the volumes are lower than the benchmark volume of 79,400 vehicles per day (per MnDOT hot-spot screening guidance), below which carbon monoxide (CO) concentrations

are not expected to approach state air quality standards. Additionally, the project does not impact any of the top ten intersections in the Twin Cities CO maintenance area.

c. Dust and odors: Describe sources, characteristics, duration, quantities, and intensity of dust and odors generated during project construction and operation. (Fugitive dust may be discussed under Item 16a). Discuss the effect of dust and odors in the vicinity of the project including nearby sensitive receptors and quality of life. Identify measures that will be taken to minimize or mitigate the effects of dust and odors.

Dust will be generated during construction. Construction activities will disturb existing vegetative ground cover and allow soil material to become airborne. The impacts will be temporary and associated with grading activities. To minimize dust generation construction operations will be scheduled so that the smallest area is disturbed at one time, the subgrade will be watered as needed to control dust, and temporary or permanent surface-stabilization measure will be installed immediately after grading is completed.

### 17. Noise

Describe sources, characteristics, duration, quantities, and intensity of noise generated during project construction and operation. Discuss the effect of noise in the vicinity of the project including 1) existing noise levels/sources in the area, 2) nearby sensitive receptors, 3) conformance to state noise standards, and 4) quality of life. Identify measures that will be taken to minimize or mitigate the effects of noise.

Noise is defined as any unwanted sound. Sound travels in a wave motion and produces a sound pressure level. This sound pressure level is commonly measured in decibels. Decibels (dB) represent the logarithmic increase in sound energy relative to a reference energy level. For highway traffic noise, an adjustment, or weighting, of the high- and low-pitched sounds is made to approximate the way that an average person hears sounds. The adjusted sound levels are stated in units of "A-weighted decibels" (dBA). For environmental noise, a sound level increase of 3 dBA may be barely perceptible to the human ear, while a 5 dBA increase is clearly noticeable, and most people perceive an increase in sound level of 6 dBA to 10 dBA as being twice as loud. If the sound energy is doubled (e.g. the amount of traffic doubles), there will be a 3 dBA increase in noise, which is just barely noticeable to most people. On the other hand, if traffic volumes increase by a factor of ten, the resulting increase of 10 dBA may be heard as about twice as loud. Table 8 provides a rough comparison of the noise levels of some common noise sources.

#### **TABLE 8: A-WEIGHTED NOISE LEVELS OF COMMON NOISE SOURCES**

dBA



#### Construction Noise

The project area is not expected to be significantly affected by construction noise, assuming that construction equipment is properly muffled. In addition, construction noise will be regulated by the Minnesota Pollution Control Agency and standards set forth by the U.S. Environmental Protection Agency.

#### Traffic Noise Prediction

A computer analysis of the existing and post-construction noise levels was conducted. The analysis used MnDOT's MINNOISE computer model (a version of the Federal Highway Administration's Stamina/Optima model modified by the Minnesota Department of Transportation) and traffic predictions to predict noise levels.

The noise modeling for this project area was validated by comparison to sound level measurements conducted at five sites throughout the project area. Computed sound levels at the five measurement sites ranged from 0 dBA to 3 dBA higher than the measured sound levels, with an average overprediction of 1.7 dBA. This slight overprediction indicates that the noise modeling is appropriately conservative and is within the standards required by MnDOT for traffic noise studies.

#### Model Data & Assumptions:

- For the project corridor, the following scenarios were studied:
  - 2014 Existing existing conditions for 2014
  - o 2040 No Build projected 2040 conditions without any project improvements
  - o 2040 Build projected 2040 conditions with project improvements

- 2014 Existing conditions and projected 2040 No Build conditions roadway traffic noise level predictions were based on constant operating speeds of 45 miles per hour on West Broadway from south of Candlewood Drive to 85th Avenue North and 50 miles per hour from 85th Avenue North to north of 93rd Avenue North, reflecting the current posted speeds. Traffic on major cross streets (85th Avenue North and 93rd Avenue North) was modeled at 45 mph and traffic on all other cross streets was modeled at 30 mph.
- 2040 Build conditions roadway traffic noise level predictions were based on constant operating speeds of 35 miles per hour on West Broadway Avenue for the entire corridor (reflecting the intended posted speeds). Speeds on cross streets were modeled as in the Existing and 2040 No Build cases.
- Existing earth berms were modeled in both the existing and post-construction conditions. Generally, the proposed roadway will meet into existing slopes without impacting the height of existing earth berms. In cases where retaining walls will be constructed to accommodate the increased width and/or relocation of the project road, the retaining walls were modeled.
- The analysis assumed acoustically soft ground cover between the roadway at all receiver locations (alpha = 0.5).
- Noise levels were predicted at 106 receiver sites along the corridor (see **Figure 7: Noise Receivers** for the location of the receivers). The sites generally were located approximately 25 feet from buildings, towards West Broadway Avenue, and were intended to represent areas where frequent human use is likely to occur. Receivers at some multi-family residences were located on first-floor decks approximately four feet above ground level where those were judged to be the primary outdoor-use area for the residence. In addition to residences, receptors were located at other noise-sensitive facilities including the Berean Baptist Church, the Brooklyn Park Evangelical Church, North Hennepin Community College, a future branch of the Hennepin County Library, and the future location of the Ebenezer Community Church.
- Traffic studies performed by Hennepin County and the City of Brooklyn Park were analyzed to determine the AM and PM peak traffic hours. The same traffic studies and projected traffic counts were used to provide the traffic input needed for the model. For each scenario, loudest-hour noise levels for both the AM and PM traffic peaks were computed.

#### Results

The results from the MINNOISE noise analysis are shown in Table 9 for each of the receivers and for the scenarios noted above. The graphic in **Appendix 6: Traffic Technical Memorandum** shows the location of each receiver as well as the five noise measurement sites. The graphic also indicates the "clusters" of residences with similar noise exposure represented by each receiver. Generally, the proposed roadway will meet into existing slopes without reducing the height existing earth berms and the vertical alignment of the roadway will remain very similar to the existing alignment. Therefore, most changes in noise levels can be attributed to increased traffic (present with or without the proposed construction), changes in posted speed limits, and the roadway moving closer to receiver locations in the build conditions.

When compared to the corresponding 2014 Existing condition, 2040 Build conditions would result in loudest-hour L10 sound levels that increase by up to approximately 1 dBA at a total of six receivers, representing 10 dwelling units and also North Hennepin Community College. An increase in sound of 1dBA is not detectable by the human ear; therefore, no audible change in corridor noise levels would be attributed to the proposed project. The increases at these six receivers would be due primarily to increased traffic volumes and/or the improved roadway being located closer to receivers. Sound levels would decrease or remain the same at all other receivers due primarily to lower speeds on West Broadway Avenue, despite projected increased traffic volumes.

When compared to the corresponding 2040 No Build condition, 2040 Build conditions would result in loudest-hour L10 sound levels that are the same or lower at all receivers. The computed decreases in sound level would range from 0 dBA to 4 dBA throughout the study area and would be attributable primarily to lower speeds on West Broadway Avenue.

The design elements of the project were selected to minimize overall impacts, especially to existing development along the corridor, while improving the safety and traffic-carrying capacity of the roadway. In almost all locations, the noise levels for the Build scenario will be lower than for the No Build scenario. At a few locations, there will be noise level increases of 1 dB or less, which are undetectable in the environment. Therefore, the West Broadway Avenue reconstruction project does not require any mitigation.

### TABLE 9: NOISE ANALYSIS RESULTS

Computed AM and PM Loudest-Hour Sound Levels (L10, dBA)								
Receiver	Addresses Represented	2014 Existing		2040 No-Build		2040 Build		
		AM	PM	AM	PM	AM	PM	
R-1	92nd Ave & W Broadway Ave	65	66	67	67	64	65	
R-2	9189/9183/9177/9171/9143/9137/ 9131/9125 Nevada Ave N	57	58	58	59	55	56	
R-3	9119/9117/9133 Nevada Ave N	56	57	57	58	54	55	
R-4	9129/9125 Nevada Ct N	59	60	60	61	57	58	
R-5	9121 Nevada Ct N	67	69	69	70	64	66	
R-6	9117 Nevada Ct N	60	62	62	63	58	60	
R-7	9113/9109 Nevada Ct N	61	62	62	63	60	61	
R-8	9037/9043 Nevada Cir N	58	60	60	61	57	58	
R-9	9031/9025/9019 Nevada Circle N	61	62	62	63	59	61	
R-10	9018/9024/9010 Nevada Circle N	58	59	59	60	56	57	
<b>R-11</b>	9030 Nevada Circle N	54	56	56	57	53	54	
R-12	8924 W. Broadway Ave	67	69	68	70	65	67	
R-13	8839/8836 Oregon Ave	64	66	66	67	62	63	
R-14	8831/8825 Oregon Ave	63	64	64	65	60	61	
R-15	8807/8813/8819 Oregon Ave	64	65	65	67	61	63	
R-16	8801 Oregon Ave	66	68	68	69	64	65	
R-17	8800 Oregon Ave	58	60	60	61	58	60	
R-18	8806/8812/8818 Oregon Ave	53	54	54	55	51	52	
R-19	8830/8824 Oregon Ave	52	54	54	55	50	51	
R-20	8836 Oregon Ave	57	58	58	59	54	55	
R-21	8749/8743 Oregon Ave	69	70	70	71	66	68	
R-22	8737/8731/8725 Oregon Ave	62	64	64	65	60	62	
R-23	8719/8713/8707 Oregon Ave	63	64	64	65	61	63	

See Appendix 6: Traffic Technical Memorandum for graphics showing the receiver locations.

Computed AM and PM Loudest-Hour Sound Levels (L10, dBA)								
Receiver	Addresses Represented	2014 Existing		2040 No-Build		2040 Build		
		AM	PM	AM	PM	AM	PM	
R-24	8701/8619/8613/8607 Oregon Ave	63	64	64	65	61	63	
R-25	8601 Oregon Ave	59	60	60	61	57	58	
R-26	8604 Oregon Ave	55	56	56	57	53	55	
R-27	8610/8616 Oregon Ave	53	54	53	55	51	53	
R-28	8622/8700/8706 Oregon Ave	53	54	54	55	51	53	
R-29	8712/8718/8724/8730 Oregon Ave	53	54	54	55	51	53	
R-30	8736/8742 Oregon Ave	58	59	59	61	57	59	
R-31	7516/7520/7512 Maplebrook Pkwy N	68	69	70	70	68	69	
R-32	7504/7500/7508 Maplebrook Pkwy N	68	69	70	70	68	69	
R-33	7544/7540/7536 Maplebrook Pkwy N	61	62	62	63	60	60	
R-34	7532/7528/7524 Maplebrook Pkwy N	59	60	61	61	58	59	
R-35	8790/8794 N Maplebrook Cir	62	63	64	64	63	64	
R-36	8788/8792 N Maplebrook Cir	57	58	59	59	57	58	
R-37	8782/8786 N Maplebrook Cir	61	62	63	63	62	63	
R-38	8780/8784 N Maplebrook Cir	56	57	57	58	56	57	
R-39	8774/8778 N Maplebrook Cir	63	64	65	65	64	65	
R-40	8772/8776 N Maplebrook Cir	57	58	58	59	57	58	
R-41	8770/8766 N Maplebrook Cir	68	69	70	70	68	68	
R-42	8764/8768 N Maplebrook Cir	59	60	60	61	58	59	
R-43	8758/8762 N Maplebrook Cir	68	69	70	70	68	68	
R-44	8756/8760 N Maplebrook Cir	59	60	60	61	58	59	
R-45	8750/8754 N Maplebrook Cir	66	67	68	68	65	66	
R-46	8748/8752 N Maplebrook Cir	58	59	59	60	57	58	
R-47	8742/8746 N Maplebrook Cir	60	61	61	62	59	59	
R-48	8740/8744 N Maplebrook Cir	56	57	57	58	55	56	
R-49	8734/8738 N Maplebrook Cir	56	57	57	58	55	56	
R-50	8732/8736 N Maplebrook Cir	54	55	56	56	53	54	
R-51	8739/8735/8743/ 8747 N Maplebrook Cir	55	56	57	57	54	55	
R-52	8751/8755/8759/8763/8767/ 8771 N Maplebrook Cir	55	56	56	57	54	55	
R-53	8626/8630 S Maplebrook Cir	56	57	58	58	55	56	
R-54	8624/8628 S Maplebrook Cir	54	55	55	56	52	53	
R-55	8618/8622 S Maplebrook Cir	59	60	61	61	58	58	
R-56	8616/8620 S Maplebrook Cir	55	56	56	57	53	54	
Computed AM and PM Loudest-Hour Sound Levels (L10, dBA)								
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<b>F</b>	2014 Exis		xisting	isting 2040 No-Build		2040 Build		
Receiver	Addresses Represented	AM	PM	AM	PM	AM	PM	
R-57	8614/8610 S Maplebrook Cir	61	62	63	64	60	61	
R-58	8608/8612 S Maplebrook Cir	57	58	58	59	55	56	
R-59	8602/8606 S Maplebrook Cir	67	68	69	69	66	66	
<b>R-60</b>	8600/8604 S Maplebrook Cir	60	61	61	62	58	59	
<b>R-61</b>	8574/8578 S Maplebrook Cir	70	70	71	71	68	69	
R-62	8572/8576 S Maplebrook Cir	61	62	62	63	59	60	
R-63	8566/8570 S Maplebrook Cir	70	70	71	71	69	69	
R-64	8566/8568 S Maplebrook Cir	61	62	62	63	59	60	
R-65	8558/8562 S Maplebrook Cir	70	70	71	71	69	69	
R-66	8556/8560 S Maplebrook Cir	61	61	62	62	60	60	
R-67	8550/8554 S Maplebrook Cir	65	66	66	67	66	66	
R-68	8548/8552 S Maplebrook Cir	60	61	61	62	60	61	
R-69	8542/8546 S Maplebrook Cir	65	67	66	67	65	67	
R-70	8540/8544/8532/ 8536 S Maplebrook Cir	61	62	61	63	61	62	
<b>R-7</b> 1	8534/8538 S Maplebrook Cir	69	70	70	71	69	71	
R-72	8539/8535/8547/ 8543 S Maplebrook Cir	58	58	59	59	56	57	
R-73	8501/8505/8509/ 8515 S Maplebrook Cir	55	56	56	57	53	54	
R-74	85th Ave & W Broadway Ave, North Hennepin Community College	67	70	68	71	67	71	
R-75	College Pkwy & W Broadway Ave	62	63	63	64	60	62	
R-76	8825 W Broadway Ave	67	68	69	69	67	67	
<b>R-77</b>	8459/8457 Rhode Island Dr	71	71	72	72	70	70	
R-78	8449 Rhode Island Dr	63	64	64	65	62	62	
R-79	8449 Rhode Island Dr/ 7501 84th Ave	70	70	71	71	68	68	
R-80	8432 Rhode Island Dr/ 7508 84th Ave	62	63	63	64	61	61	
<b>R-8</b> 1	7501 84th Ave N/7500 83th Ave N	68	69	69	70	68	68	
R-82	7509 84th Ave N/ 7508 83th Ave N	62	64	64	65	61	62	
R-83	7501 83th Ave N/ 7500 N College Park Dr	70	71	71	72	70	70	
R-84	7506 83th Ave N/ 7509 N College Park Dr	63	64	64	65	62	63	
R-85	N 7501 College Park Dr	70	71	71	72	70	71	
R-86	7507 N College Park Dr	63	64	64	65	62	63	
R-87	8224/8228/8232/8236 Quebec Ct N	69	70	70	71	69	70	

Computed AM and PM Loudest-Hour Sound Levels (L10, dBA)							
D !		2014 Existing		2040 No-Build		2040 Build	
Receiver	Addresses Represented	AM	PM	AM	PM	AM	PM
R-88	8208/8212/8216/8220 Quebec Ct N	69	70	70	71	68	69
R-89	7500 82nd Ave N	66	67	67	68	66	67
R-90	7504 82nd Ave N	61	63	63	64	61	62
R-91	8209/8201 Quebec Ct N	57	58	58	59	56	57
R-92	7501 82nd Ave N	70	71	71	72	69	70
R-93	7509 82nd Ave N	61	62	62	63	60	61
R-94	Ball Field – North Hennepin Community College	65	67	66	68	64	67
R-95	7424/7432 Candlewood Dr	67	69	67	69	65	68
R-96	7416 Candlewood Dr	59	61	60	62	58	60
R-97	7949/7947 Oregon Ave N	68	70	69	71	67	71
R-98	7925/7933/7917/ 7909 Oregon Ave N	64	67	65	68	63	66
R-99	7433/7901 Oregon Ave N	63	66	64	67	62	65
R-100	7421 Oregon Ave N	58	60	59	61	56	59
R-101	7418 78th Ave N	59	61	59	61	57	59
R-102	7424 78th Ave N	67	69	68	70	65	68
R-103	7916/7910/7934 Oregon Ave N	54	56	55	57	53	55
R-104	7412 Oregon Ave N	54	56	55	56	52	54
R-105	7940/7937 Oregon Ave N	62	64	63	65	61	64
R-106	7849 W Broadway Ave - Brooklyn Park Evangelical Church	62	64	63	65	61	63
LT-D	Measurement Site	68	69	69	70	67	68
ST-3	Measurement Site	65	68	67	69	64	67
LT-E	Measurement Site	70	70	72	72	70	70
LT-2	Measurement Site	68	70	70	71	66	68
LT-F	Measurement Site	62	63	63	64	59	61

Note: Numbers in red identify where the proposed improvements (2040 Build) are higher than existing conditions.

#### 18. Transportation

a. Describe traffic-related aspects of project construction and operation. Include:
1) existing and proposed additional parking spaces 2) estimated total average daily traffic generated, 3) estimated maximum peak hour traffic generated and time of occurrence, 4) indicate source of trip generation rates used in the estimates, and 5) availability of transit and/or other alternative transportation modes.

Items 1-4 above do not apply to this project. The construction of the project will not be generating additional parking spaces or generate additional traffic. However, it is anticipated that the project's increased capacity will divert traffic from parallel congested corridors and is accounted for in the forecasted traffic volumes described in **Appendix 6: Traffic Technical Memorandum**.

Metro Transit serves this area primarily through Routes 760, 723, and 724. Route 760 provides express service to Minneapolis, and has stops along the project corridor between Candlewood Drive and Setzler Parkway. Route 724 provides limited stops between the Target campus north of TH 610 and Minneapolis. It has stops along the project corridor between 78th Avenue and 85th Avenue. Route 723 provides service between Hennepin County Community College and the Brooklyn Center Transit Center. It has stops along the project corridor between 78th Avenue and 85th Avenue.

Other various forms of transit are available along the corridor, including dial-a-ride and special needs paratransit.

b. Discuss the effect on traffic congestion on affected roads and describe any traffic improvements necessary. The analysis must discuss the project's impact on the regional transportation system. If the peak hour traffic generated exceeds 250 vehicles or the total daily trips exceeds 2,500, a traffic impact study must be prepared as part of the EAW. Use the format and procedures described in the Minnesota Department of Transportation's Access Management Manual, Chapter 5 (available at: http://www.dot.state.mn.us/accessmanagement/resources.html) or a similar local guidance.

Traffic is not generated by the proposed project. Traffic is projected to increase in the area as a result of adjacent development, regional growth, and the diversion of some trips from parallel congested corridors due to additional capacity on West Broadway Avenue. The project is intended to make travel more efficient and safer for all modes of travel, including single occupant vehicle users, transit users, pedestrians and bicyclists.

Traffic operations were assessed for Existing Conditions, the projected 2040 conditions with no improvements (2040 No Build) and two projected 2040 Build alternatives (Without Maplebrook Signal and With Maplebrook Signal). Both projected 2040 Build alternatives include the conversion of West Broadway Avenue to a four-lane divided section with a center median throughout the project corridor. The Without Maplebrook Signal alternative includes right-in-right-out (RIRO) access at intersection of West Broadway Avenue with Maplebrook Parkway/Maplebrook Terrace. The With Maplebrook Signal alternative includes a traffic signal at the intersection of West Broadway Avenue and Maplebrook Parkway/Maplebrook Terrace, maintaining its full movement functionality.

Table 10 summarizes the access changes and existing and proposed intersection traffic control proposed for the various scenarios that were analyzed.

	Intersection Traffic Control			
Intersection	Existing <sup>1</sup>	Without Maplebrook Signal	With Maplebrook Signal	
West Broadway Avenue/93rd Avenue North	Signal	Signal	Signal	
West Broadway Avenue/92nd Avenue North	Through-stop	Through-stop (RIRO)	Through-stop (RIRO)	
West Broadway Avenue/Setzler Parkway	Through-stop	Signal	Signal	
West Broadway Avenue/8924 West Broadway (Janet Gray Trustee – north driveway entrance)	Through-stop	Through-stop (RIRO)	Through-stop (RIRO)	
West Broadway Avenue/8924 West Broadway (Janet Gray Trustee – south driveway entrance)	Through-stop	Closed	Closed	
West Broadway Avenue/89th Avenue North	Through-stop	Through-stop (RIRO)	Through-stop (RIRO)	
West Broadway Avenue/8825 West Broadway (Berean Baptist Church)	Through-stop	Closed	Closed	
West Broadway Avenue/Maplebrook Parkway/Maplebrook Terrace	Through-stop	Through-stop (RIRO)	Signal	
West Broadway Avenue/College Parkway	Through-stop	Through-stop (RIRO)	Through-stop (RIRO)	
West Broadway Avenue/85th Avenue North	Signal	Signal	Signal	
West Broadway Avenue/8455-8459 West Broadway Ave (Broadway Square)	Through-stop	Through-stop (RIRO)	Through-stop (RIRO)	
West Broadway Avenue/Rhode Island Drive	Through-stop (RIRO)	Through-stop (RIRO)	Through-stop (RIRO)	
West Broadway Avenue/84th Avenue North/ North Hennepin Community College access	Signal	Through-stop (RIRO)	Through-stop (RIRO)	
West Broadway Avenue/83rd Avenue North	Through-stop	Through-stop (RIRO)	Through-stop (RIRO)	
West Broadway Avenue/College Park Drive/ North Hennepin Community College Access	Through-stop	Signal	Signal	
West Broadway Avenue/82nd Avenue North	Through-stop	Through-stop (RIRO)	Through-stop (RIRO)	
West Broadway Avenue/Candlewood Drive	Through-stop	Signal	Signal	
93rd Avenue North/9200 West Broadway Avenue (Future Ebeneezer Community Church)	Through-stop	Through-stop (RIRO)	Through-stop (RIRO)	
93rd Avenue North/7300 93rd Avenue North (Future Commercial Development)	Through-stop	Through-stop (RIRO)	Through-stop (RIRO)	
85th Avenue North/Maplebrook Parkway	Through-stop	Signal	Through-stop (Full Access)	

#### TABLE 10: EXISTING AND PROPOSED PUBLIC AND PRIVATE ACCESS AND TRAFFIC CONTROL

<sup>1</sup> Through-stops include full access movements

Level of service (LOS) is an objective method for assessing how much delay occurs or is projected to occur along a corridor or at an intersection. The grading scale is from A to F, with LOS A representing free flow conditions and LOS F representing complete gridlock. The border of LOS D and LOS E is often used in urban/suburban areas as the threshold for acceptable and unacceptable operations.

#### Existing Conditions (2014) Analysis

The operational analysis developed along the corridor (**see Appendix 6: Traffic Technical Memorandum**) indicates that all intersections currently operate at LOS of D or better in both the AM and PM peak hours under existing conditions. All approaches to intersections also operate at LOS D or better, with the exception of the approaches identified in Table 11.

West Broadway Avenue Intersection	Analysis Period	Intersection LOS	Intersection Approach Leg	Approach LOS
93rd Avenue North	PM Peak	D	Eastbound	F
92nd Avenue North	PM Peak	А	Eastbound	Е
Candlewood Drive	PM Peak	А	Westbound	Е

#### TABLE 11: EXISTING CONDITIONS (2014): INTERSECTIONS AND/OR MOVEMENTS AT LOS E/F

The eastbound approach at 93rd Avenue North is experiencing LOS F primarily because of the relatively high volume of left turns (298 turns) in the PM peak hour combined with the relatively short eastbound left turn lane available storage of 215 feet. The eastbound and westbound approaches at 92nd Avenue North and Candlewood Drive, respectively, are experiencing LOS E because these intersections are both currently through-stop intersections where it can be particularly difficult for left turns and/or through movements from the minor street to find acceptable gaps on a heavily traveled corridor.

#### 2040 No Build Analysis

Under the 2040 No Build scenario, numerous intersections are expected to experience severe delays as displayed in Table 12:

West Broadway Avenue Intersection	Analysis Period	Intersection LOS	Intersection Approach Leg	Approach LOS
93rd Avenue North	AM Peak	F	Eastbound Southbound Westbound	F E F
	PM Peak	F	Northbound Eastbound Southbound Westbound	F F F F
92nd Avenue North	PM Peak	F	Northbound	
Setzler Parkway	PM Peak	F	Northbound Eastbound Westbound	F F F
89th Avenue North	PM Peak	D	Eastbound	F
84th Avenue North	AM Peak	Е	Eastbound	F
	PM Peak	Е	Eastbound	F
Candlewood Drive	PM Peak	А	Westbound	Е

TABLE 12: 2040 NO BUILD: INTERSECTIONS AND/OR MOVEMENTS AT LOS E/F

#### 2040 Build Analysis

Under the two 2040 Build alternatives, all intersections are projected to operate at LOS D or better in the AM and PM peak periods. All approaches are also projected to operate at LOS D or better, with the exceptions of the two movements identified in Table 13. Under both scenarios, the overall intersection LOS is acceptable, with LOS D. In developing coordinated signal timing along a corridor, it is not unusual to have some isolated movements that experience LOS E or F so that overall delay can be minimized along the corridor as a whole.

TABLE 13: 2040 BUILD ALTERNATIVES: INTERSECTIONS AND/OR
PM PEAK PERIOD MOVEMENTS AT LOS E / F

West Broadway Avenue Intersection	Alternative / Analysis Period	Intersection LOS	Intersection Approach Leg	Approach LOS
85th Avenue North	Without Maplebrook Signal / PM Peak	D	Eastbound	E
85th Avenue North		D	Southbound	E

The difference in traffic delays and resulting LOS E between the two 2040 Build alternatives are small, resulting in very similar results. See **Appendix 6: Traffic Technical Memorandum** for more detailed information on traffic impacts.

### c. Identify measures that will be taken to minimize or mitigate project related transportation effects.

Road construction can be extremely disruptive to users. For this reason, construction staging and traffic control plans will be developed with the objective of minimizing impacts to the traveling public, residents, and area businesses. As part of this effort, temporary pedestrian access routes will be developed which will assure that adequate access will be available to non-motorized users during construction.

## 19. Cumulative potential effects: (Preparers can leave this item blank if cumulative potential effects are addressed under the applicable EAW Items)

a. Describe the geographic scales and timeframes of the project related environmental effects that could combine with other environmental effects resulting in cumulative potential effects.

See discussion below.

b. Describe any reasonably foreseeable future projects (for which a basis of expectation has been laid) that may interact with environmental effects of the proposed project within the geographic scales and timeframes identified above.

See discussion below.

## c. Discuss the nature of the cumulative potential effects and summarize any other available information relevant to determining whether there is potential for significant environmental effects due to these cumulative effects.

See discussion below.

In addition to reviewing the individual potential impacts of this project, the EAW process requires consideration of the cumulative impacts of multiple projects within an area.

#### Regulatory Requirement

The state of Minnesota Administrative Rules address the required analysis of cumulative impacts:

- MN Rule 4410.1700, subpart 7, item B which states "cumulative potential effects of related or anticipated future projects" must be considered.
- MN Rule 4410.1200, subpart E which states "major issues sections identifying potential environmental impacts... including cumulative potential effects."

#### Temporal and Spatial Boundaries

The temporal boundary is the design life of the project. This analysis was conducted considering transportation and planned development projects within a reasonable distance from the proposed project. The approach was taken because these projects would impact the same or similar resources to those impacted by the proposed project.

#### Past, Present, and Reasonably Foreseeable Activities

Reasonably foreseeable activities include activities that are not speculative and that constitute an independent utility or function. In addition, reasonably foreseeable projects should be planned and funded. The MnDOT, City of Brooklyn Park, and Hennepin County websites were accessed to identify reasonably foreseeable projects within approximately a one mile area (**Figure 8: Cumulative Impacts**). The present and reasonably foreseeable future activities that may impact resources affected by the project are presented in Table 14 below:

Action	Estimated Construction Timing	Description	Potential Impact
BLRT Construction	2018-2020	Construction of light rail in the center median of the West Broadway Reconstruction Project	Noise, transportation, water resources, land use, visual, stormwater, construction
93rd Avenue North Construction	2018-2020	Construction includes reconstructing 93rd Avenue North from 2 lanes to 4 lanes from West Broadway to TH 169.	Transportation, water resources, land use, visual, stormwater, construction
Phased improvements along County State Aid Highway 81 (Bottineau Boulevard)	2017 - 2019	Roadway Reconstruction from 63rd Avenue to TH 169	Transportation, noise, water resources, land use, visual, stormwater, construction
NE corner of West Broadway Avenue and 93rd Avenue North	Under construction	Commercial development	Transportation, water resources, land use, visual, stormwater, construction
SE corner of West Broadway Avenue and 93rd Avenue North	Under Construction	Church	Transportation, water resources, land use, visual, stormwater, construction
NE of West Broadway Avenue and 85th Avenue North	Under construction	Library	Transportation, water resources, land use, visual, stormwater, construction
Undeveloped land across from Candlewood Drive on west side of West Broadway Avenue	Future development	Unknown	Transportation, water resources, land use, visual, stormwater, construction
Target Campus	Ongoing	Commercial Development north of TH 610	Transportation, water resources, land use, visual, stormwater, construction
Astra Village	Planned development	Commercial and housing development at the intersection of County Roads 30 and 14.	Transportation, water resources, land use, visual, stormwater, construction

#### TABLE 14: PRESENT AND FUTURE PROJECTS

Action	Estimated Construction Timing	Description	Potential Impact
Calvin Gray Farm	Available for development	Single family homes at 8924 West Broadway	Transportation, water resources, land use, visual, stormwater, construction
Brooklyn Park Business Center	Planned	Commercial development just	Transportation, water
	development	west of West Broadway and	resources, land use, visual,
	unknown	south of TH 610.	stormwater, construction
Gateway	Planned	Commercial and housing	Transportation, water
	development	development in the SW	resources, land use, visual,
	unknown	quadrant of TH 610/TH 169.	stormwater, construction

The discussion below provides a description of the potential impacts on resources.

#### Land use

Much of the project area has been developed with businesses and housing projects over the years. The open space remaining is either being currently developed or is slated for future development. Land use is typically driven by local jurisdiction zoning and comprehensive planning. The future developments in the area of the project would be subject to the requirements in the city of Brooklyn Park's 2030 Comprehensive plan.

#### Geology, soils, and topography/land forms

Impacts to geology, soils or topography will occur during construction from excavation and filling activities. Soils may be redistributed at each project site, or new soils may be imported to meet engineering requirements. Soils would be managed on a project by project basis. No cumulative impacts to these resources are anticipated

#### Water Resources/Wetlands

The 93rd Avenue North roadway construction project is being designed concurrently with the West Broadway Avenue Reconstruction project. Stormwater management requirements for 93rd Avenue North are being considered during the design for the West Broadway Avenue project. It is anticipated that the West Broadway Avenue stormwater improvements will treat runoff from 93rd Avenue North as well.

The West Broadway Avenue Reconstruction is being designed to accept and treat stormwater from the area in the median that would be set aside for transit use. In the event that the BLRT project moves forward to construction, provisions for stormwater management will already be planned.

Development projects in the area would need to provide treatment commensurate with the area of impervious surface created at each development property, in accordance with applicable local, state, and federal regulations. Such treatment facilities would be separate from the West Broadway Avenue stormwater treatment system.

Wetland impacts are typically mitigated at a 2 (mitigated):1 (impacted) ratio. Additionally, the mitigation credits must be approved to be suitably functional by regulatory agencies before they can be used. Water quality BMPs associated with the West Broadway Avenue Reconstruction will provide improvements in pre-treatment to wetlands and help to improve their function.

There will be a net increase in wetland acreage and functionality in the vicinity of the project area after the West Broadway Avenue Reconstruction project is built. Since the proposed West Broadway Avenue Reconstruction cross section includes a median area dedicated for future transit use, no additional wetland impacts would be anticipated in the West Broadway Avenue corridor if the BLRT project were to move forward to construction.

Development projects in the area would be subject to similar wetland mitigation requirements as the West Broadway Avenue project.

#### Contamination/Hazardous Materials/ Waste

Continued development of transit, transportation and commercial development in the area over time could contribute to the remediation of sites. Project proposers would potentially be required to clean up sites as redevelopment occurs.

#### Fish, wildlife, plant communities, and sensitive ecological resources

Impacts to fish, wildlife and sensitive ecological resources are expected to be minimal because the area is currently developed. Limited amounts of natural habitat are remaining in the area.

#### Historic Properties

Historic properties have not been identified in the West Broadway Avenue project corridor. Proposed development projects and other transportation projects are not anticipated to impact historic properties.

#### Visual

Continued development of transit, transportation and commercial development in the area over time would contribute to the viewshed in the area. However the impacts would be minor given the already developed nature of the area.

#### Air

Continued transportation and land development could result in increased air pollutant emissions primarily from increased automobile and truck traffic. The proposed BLRT project would potentially have a minor mitigating effect, as it would reduce the overall vehicle miles traveled in the area.

#### Noise

The results of this traffic noise study completed for the EAW will be combined with the proposed BLRT project in the cumulative impacts section of the Final Environmental Impact Statement (Final EIS) to determine the overall effects of both projects. The BLRT project noise assessment will look at the operational noise from light rail vehicles, any horn or bell sounding at stations and grade crossings, and other ancillary sources of noise related to transit operations. The inputs to the BLRT noise assessment will include the speed, hours of operation, number of trains per hour, and the length of the trains. If noise mitigation is required for the BLRT project, or the combined projects, the feasibility of providing mitigation for both BLRT and traffic noise will be assessed.

In addition to the noise assessment, a vibration assessment for BLRT operations will be conducted for the Final EIS. Vibration assessments are not conducted for roadway projects, since rubber-tired vehicles do not generate sufficient vibration levels to cause impacts.

Cumulative noise impacts from the addition of commercial development and housing projects would be minimal. Additional noise would be due to traffic entering and exiting properties and traffic routing to the properties. The traffic from these receptors was predicted for the overall noise analysis (discussed in **Question 17**) and is discussed in the overall noise analysis for West Broadway Avenue Reconstruction project.

#### Transportation:

Cumulative transportation effects due to the West Broadway Avenue Reconstruction project and constructing BLRT is expected to result in increased demand for transportation along the corridor. The two-lane to four-lane divided expansion on West Broadway will result in increased capacity and thus could attract additional traffic from adjacent congested corridors. The BLRT project will increase the capacity to move people along the corridor by introducing mass transit on a dedicated LRT guideway. The combination of the roadway improvements and BLRT is expected to draw additional vehicular traffic associated with passenger drop-off locations and additional pedestrian and bicycle traffic near and around the West Broadway Avenue stations (93rd Avenue North and 85th Avenue North). The roadway environment as a result of the two combined projects is expected to have lower travel speeds than what exists today due to passenger drop-off, pedestrian, and bicycle activity around stations and narrower 11 foot lanes. The BLRT Final EIS will include analysis of intersection operation effects of the BLRT project as well as movement of all modes of traffic around stations.

The 93rd Avenue North (CSAH 30) project will be reconstructed to carry four-lanes from West Broadway Avenue to TH 169. This reconstruction would address the bottleneck that would otherwise exist (four-lanes to two-lanes back to four-lanes) in this short segment. A consistent number of lanes meets driver's expectations by removing the need to change lanes unexpectedly due to a lane drop. The intersection at 93rd Avenue North and Winnetka Avenue North will be upgraded to include a new signal that supports the new lane geometry. The signal is expected to adequately serve the existing and projected (2040) traffic volumes.

Commercial developments along West Broadway Avenue will need to be designed to accommodate the project's proposed signal locations and access locations and/or restrictions (i.e. right-in/right-out).

This cumulative impacts analysis included existing and planned future projects within approximately one (1) mile of the project area. Table 15 below identifies key resource areas and the potential cumulative effects that may occur as a result of constructing the projects listed in the previous table. The mitigation measures for each of the resource areas listed in the table are not project specific. Project specific mitigation measures, if required, would be determined on an individual basis before each project begins construction. This analysis is based on existing conditions of critical resources within the area, and is limited to major issue resources or those potentially requiring mitigation.

Resources	Cumulative Impacts	Mitigation
Land use	Future changes in land use due to continued development of transportation corridors could impact land use in the area. Additional transportation options may increase the demand for housing, commercial, and or industrial facilities.	The city of Brooklyn Park has planned for future growth in the corridor with their comprehensive plan. Potential impacts on land use will need to be compatible with the plan.
Geology, soils, and topography/land forms	Impacts to geology, soils, or topography could occur during the construction phase of the project. Long-term cumulative impacts are not anticipated.	Mitigation could include the use of approved and proven mitigation measures and Best Management Practices (BMPs) to minimize the potential for soil erosion during construction.
Water resources	Cumulative impacts to water quality are not anticipated. Future activities could impact wetlands; however, impacts to wetlands are regulated and often permitted under separate process.	Mitigation could include the use of approved and proven mitigation measures, BMPs, and/or adhere to applicable regulations to minimize the potential water quality and wetland impacts.
Contamination/Hazardous Materials/Wastes	Future activities could impact contaminated or hazardous material sites in the area. Clean-up and/or other remediation activities are regulated and may require separate approval from local or state agencies. Any impacts to these areas by the project would require appropriate remediation measures.	Mitigation could include the use of approved and proven mitigation measures, BMPs, and/or the need to adhere to applicable regulations if impacts to hazardous or contaminated sites occur.
Fish, wildlife, plant communities, and sensitive ecological resources	Future activities would likely have little impact on the flora and fauna of the area. The project area is located in a highly developed and urbanized area, typically lacking habitat for sensitive ecological resources.	Mitigation could include the use of approved and proven mitigation measures and BMPs to minimize any potential impacts to fish, wildlife and plant communities.
Historic properties	Future activities could impact historic properties if buildings or properties in the area are converted or demolished for development. Some properties could be protected by Section 106 of the National Historic Preservation Act of 1966.	Mitigation would include adhering to Section 106 of the NHPA and/or applicable state and local requirements in the event a qualifying historic property is impacted.
Visual	Future activities would impact the view shed of the immediate community.	Mitigation could include meeting requirements in local municipal ordinances and land use plans.

#### TABLE 15: SUMMARY OF CUMULATIVE IMPACTS

Resources	Cumulative Impacts	Mitigation
Air	Future activities, specifically transportation projects, could impact air quality in the area. Planned transportation projects, such as BLRT, are expected to reduce vehicle traffic which may reduce overall air emissions.	Mitigation could include the use of approved and proven mitigation measures and BMPs to minimize any potential impacts to air resources.
Noise	Future activities, specifically transportation projects, could increase noise levels in the area.	Noise impacts will be assessed for mitigation on a project by project basis and be subject to local noise ordinances.
Transportation	Future transportation activities would impact current transportation corridors. The BLRT project is expected to increase transportation demand and development density while potentially reducing vehicle traffic in the area.	The City of Brooklyn Park's 2030 Comprehensive Plan includes transportation objectives that this project will help to meet.

# 20. Other potential environmental effects: *If the project may cause any additional environmental effects not addressed by items 1 to 19, describe the effects here, discuss the how the environment will be affected, and identify measures that will be taken to minimize and mitigate these effects.*

There are no other environmental effects anticipated from the project.

**RGU CERTIFICATION.** (The Environmental Quality Board will only accept **SIGNED** Environmental Assessment Worksheets for public notice in the EQB Monitor.)

#### I hereby certify that:

- The information contained in this document is accurate and complete to the best of my knowledge.
- The EAW describes the complete project; there are no other projects, stages or components other than those described in this document, which are related to the project as connected actions or phased actions, as defined at Minnesota Rules, parts 4410.0200, subparts 9c and 60, respectively.
- Copies of this EAW are being sent to the entire EQB distribution list.

San Signature (

Date 9/15/2016

Title Project Manager – Hennepin County Transportation Department

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#### **APPENDIX 1: FIGURES**

Figure 1: Project Location – County Level

Figure 2: Project Location – Topographic

Figure 3: Cross Sections

Figure 5: Cross Sections Figure 4: Natural Features Overview Figure 5: Roadway Layout Figure 6: Hazardous Materials Figure 7: Noise Receivers

Figure 8: Cumulative Impacts

FIGURE 1: PROJECT LOCATION – COUNTY LEVEL

#### West Broadway Avenue (CSAH 103) Reconstruction





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FIGURE 2: PROJECT LOCATION – TOPOGRAPHIC

#### West Broadway Avenue (CSAH 103) Reconstruction



#### Figure 2 Project Location - Topographic



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#### FIGURE 3: CROSS SECTIONS



#### West Broadway Avenue (CSAH 103) Reconstruction









FIGURE 4: NATURAL FEATURES OVERVIEW

#### 12 MAPLEBROOK PKWY N Z **Brooklyn Park** AVF Broadway Square Evangelical Free Church 85T 85th Ave WEST BROADWAY WEST BROADWAY 103 Station North Hennepin North Hennepin Community College Ball Fields Community) Hennepin Cou Public Librar College (under constru Project Footprint Delineated Wetland The entire stormwater, floodplain mitigation, or stormwater / floodplain mitigation areas may not **Existing Transmission Line** NWI Updated (2015) be used for mitigation purposes Existing right-of-way / parcel lines Floodplain Potential Floodplain Mitigation

**PWI Stream** 

PWI Lake or Wetland

Potential Stormwater & Floodplain Mitigation

Potential Surface Stormwater Treatment

Potential Underground Stormwater Treatment



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#### West Broadway Avenue (CSAH 103) Reconstruction

#### Figure 4 - 1 Project and Natural Features <u>Overview</u>

#### West Broadway Avenue (CSAH 103) Reconstruction

#### Figure 4 - 2 **Project and Natural Features Overview**





Potential Underground Stormwater Treatment

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#### Figure 4 - 3 **Project and Natural Features Overview**



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# FIGURE 5: ROADWAY LAYOUT

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#### Figure 5 - 1 Roadway Layout



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#### Figure 5 - 2 Roadway Layout



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#### Figure 5 - 3 Roadway Layout



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West Broadway Avenue (CSAH 103) Reconstruction

#### Figure 5 - 4 Roadway Layout



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#### Figure 5 - 5 Roadway Layout



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#### Figure 5 - 6 Roadway Layout



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#### Figure 5 - 7 A Roadway Layout (without Maplebrook Parkway signal)

Potential Floodplain Mitigation

Potential Stormwater & Floodplain Mitigation

Potential Surface Stormwater Treatment

Potential Underground Stormwater Treatment

1.1.1

# West Broadway Avenue (CSAH 103) Reconstruction



Proposed Permanent Easement

Proposed Temporary Easement

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----- Centerline

100

Feet

----- Blue Line Alignment

• • •

**Delinated Wetland** 

Existing right-of-way / parcel lines

Existing 115kV Transmission Line

#### Figure 5 - 7 B Roadway Layout (with Maplebrook Parkway signal)





Proposed ROW

Proposed Permanent Easement

Proposed Temporary Easement



- Potential Floodplain Mitigation
- Potential Stormwater & Floodplain Mitigation
- Potential Surface Stormwater Treatment
- Potential Underground Stormwater Treatment

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Delinated Wetland

Existing right-of-way / parcel lines

Existing 115kV Transmission Line

Site Geometry

----- Blue Line Alignment

---- Centerline

100

Feet

#### Figure 5 - 8 A Roadway Layout (without Maplebrook Parkway signal)



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#### Figure 5 - 8 B Roadway Layout (with Maplebrook Parkway signal)



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#### Figure 5 - 9 Roadway Layout

Potential Underground Stormwater Treatment



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Feet

#### Figure 5 - 10 **Roadway Layout**

# West Broadway Avenue (CSAH 103) Reconstruction

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#### Figure 5 - 11 Roadway Layout



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#### Figure 5 - 12 Roadway Layout



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#### Figure 5 - 13 Roadway Layout



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# FIGURE 6: HAZARDOUS MATERIALS

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# **FIGURE 7: NOISE RECEIVERS**

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Hennepin

# West Broadway Avenue (CSAH 103) Reconstruction

#### Figure 7 - 1 Noise Recievers



Hennepin

# West Broadway Avenue (CSAH 103) Reconstruction

## Figure 7 - 2 Noise Recievers



#### Figure 7 - 3 Noise Recievers



Hennepin

# West Broadway Avenue (CSAH 103) Reconstruction

#### Figure 7 - 4 Noise Recievers



#### Figure 7 - 5 Noise Recievers



Hennepin

# West Broadway Avenue (CSAH 103) Reconstruction

#### Figure 7 - 6 Noise Recievers



# Hennepin

# West Broadway Avenue (CSAH 103) Reconstruction

#### Figure 7 - 7 Noise Recievers



#### Figure 7 - 8 Noise Recievers





#### Figure 7 - 9 Noise Recievers



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## FIGURE 8: CUMULATIVE IMPACTS

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## APPENDIX 2: PURPOSE AND NEED TECHNICAL MEMORANDUM

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# **Technical Memo**

Date:	Tuesday, August 04, 2015
Project:	West Broadway Avenue Reconstruction Environmental Assessment Worksheet County Project No. 2923900 HDR No. 254137
To:	Chad Ellos, PE, Transportation Design – Hennepin County Jennifer Lowry, PE, Transportation Design – Hennepin County
From:	Brandi Popenhagen, PE, HDR Kelly Garvey, HDR Marc Briese, PE, Stonebrooke Engineering
Subject:	Purpose and Need

The purpose of the technical memorandum is to document the purpose and need for improving County State Aid Highway 103 (West Broadway Avenue) from south of Candlewood Drive to north of 93rd Avenue.

## **Purpose and Need Statement**

The purpose of improving West Broadway Avenue is to enhance safety and mobility for all users under both the existing and future conditions.

The project is primarily needed to address poor pavement conditions, enhance safety, improve traffic delays and capacity, and accommodate transit service. Secondly, it is also needed to address the lack of bicycle and pedestrian accommodations and the lack of access control along the corridor which also degrades safety and traffic operations.

The needs are further described in the Needs Assessment section on the following pages.

## **Project Location and Regional Significance**

The project is located along CSAH 103 (West Broadway Avenue) in the City of Brooklyn Park from south of Candlewood Drive to north of CSAH 30 (93rd Avenue) and is approximately two miles in length. The existing roadway is a mixture of two-lanes (one in each direction) with areas near intersections where it was widened with turn lanes and/or additional through lanes. The project location map is found on **Figure 1**.

West Broadway Avenue is functionally classified as an A-minor Arterial Expander in Hennepin County's regional roadway system. A-minor Expanders are intended to supplement the principal arterials in less dense or developing areas. West Broadway Avenue serves this purpose by supplementing north-south trips on parallel principal arterials such as Trunk Highway (TH) 169 immediately to the west and linking these trips to I-94/I-694 to the south and TH 610 to the north.

## Figure 1: Project Location Map



## **Project Background**

Hennepin County (the County) has been studying the transportation needs for the West Broadway Avenue corridor for several years. Funding for the right of way was provided in 2002, and roadway reconstruction has been in the County's Capital Improvement Program since 2004. The roadway was constructed in phases beginning back in 1940, and has been periodically resurfaced. Portions of the two-lane section north of 85th Avenue have been widened to accommodate turn lanes, shoulders, and bypass lanes. Studies conducted over the past several years concluded that the roadway needs to be reconstructed to address roadway deficiencies (e.g. pavement condition, traffic conditions, urban drainage features, number of through and turn lanes, and other necessary improvements). Public meetings were held in 2007 and 2008 in preparation for road reconstruction. However, the West Broadway Avenue project was put on hold as the Bottineau Transitway Alternatives Analysis Study was just getting underway. The transit study was needed to inform the roadway study so as to not preclude future transit development opportunities. Once the needs for the transitway were identified, the County began to move the West Broadway Avenue project forward with the understanding that the West Broadway Avenue project would occur in advance of transit improvements in the corridor.

Following the Bottineau Transitway Alternatives Analysis Study, the Bottineau Transitway Draft Environmental Impact Statement (Draft EIS) was prepared and published in March 2014. The Draft EIS documented the need for transit improvements, the process through which transit alternatives were analyzed, the selection of the Locally Preferred Alternative (LPA) and the social, economic, and environmental impacts associated with the alternatives. The LPA included a light rail transit corridor now known as the Blue Line Light Rail Transit (BLRT) extension segment that runs down the center of West Broadway Avenue. The analysis in the Bottineau Transitway Draft EIS assumed that the West Broadway Avenue project would have been built prior to the BLRT construction, and therefore, only the impacts of adding light rail to the corridor were evaluated in the Draft EIS.

Public meetings for the West Broadway Avenue project were held by the County in March and May 2014 to present design concepts. A roadway design was presented that included a sufficiently wide center median to accommodate the future BLRT, which was supported by the Brooklyn Park City Council in their resolution passed on June 18, 2012 for the Bottineau LPA. In response to public input, the County has been evaluating alternative roadway designs to minimize community and environmental impacts while still meeting transportation needs. The County has also been investigating the most effective manner in which to advance the West Broadway Avenue project through the environmental review and design processes. Metro Transit, who in accordance with regional policy, has taken on the preliminary engineering and preparation of the Final EIS for the BLRT, is coordinating with Hennepin County on developing this approach.

## **Needs Assessments**

## **Pavement Condition**

The pavement condition on West Broadway Avenue is in poor condition especially from Candlewood Drive to 85th Avenue. Hennepin County rates pavement condition on a 0-100 scale. Pavements ranked between 0-20 require a total reconstruction to address the condition. Pavements that range from 21-65 can be improved with an overlay. The segment between Candlewood Drive and 85th Avenue falls within 0-20 and would require full reconstruction. The segment to the north between 85th Avenue North and 93rd Avenue North falls between 21 and 65 and would require, at a minimum, a pavement overlay. This segment was recently overlaid to address very poor rider conditions. As overlays continue over time, the life of the each reoccurring overlay becomes shorter and shorter. Therefore, the pavement condition index (PCI) values along these segments of roadway are shown in **Table 1**. Please note the significant findings shaded in red in the table.

### **Table 1: Pavement Condition Index**

From	То	PCI
Candlewood Dr	82nd Ave N	20
82nd Ave N	College Park Dr	20
College Park Dr	84th Ave N	14
84th Ave N	Rhode Island Dr	14
Rhode Island Dr	85th Ave N	14
85th Ave N	Maplebrook Pkwy	55
Maplebrook Pkwy	89th Ave N	54
89th Ave N	93rd Ave N	55
93rd Ave N	TH 610 Bridge	38
	PCI CATEGORIES	
	PCI Range	
86-100	Preventative Maintenance	
66-85	Routine Maintenance	
21-65	Overlay	
0-20	Reconstruct	

### Safety

Crash data from 2004-2013 was evaluated along West Broadway Avenue. The data showed problematic intersections and roadway segments further described below. The data was analyzed based on whether the crashes yielded a higher than normal crash rate and/or severity rate. A higher than normal rate exceeds what is called the critical rate. The critical rate is a statistically valid rate used to identify hazardous locations. The critical rate was calculated using a 99.5% confidence interval. Critical rates account for the type of roadway or intersection (number of lanes, traffic control, approach speed, environment), amount of vehicle exposure (measured as million vehicle miles - mvm) traveling through the roadway segment or intersection, and the random nature of crashes.

#### INTERSECTION CRASHES

**Table 2** provides the calculated crash rates and comparable average and critical rates.Please note the significant findings shaded in red in the table.

Table 2: West	Broadway	Intersection	<b>Crash Analysis</b>
---------------	----------	--------------	-----------------------

Interrection			Troffic Control	Crash	Severity	Average Rates		Critical Rates	
Intersection Legs		AADT		Rate <sup>2</sup>	Rate	CR⁵	SR <sup>4</sup>	CR <sup>6</sup>	SR <sup>3</sup>
Broadway/93rd Ave	4	18400	Signal (high spd/vol)	0.40	0.70	0.43	0.64	0.59	0.65
Broadway/Setzler Pkwy	4	15050	Rural Thru-Stop	0.11	0.25	0.29	0.47	0.45	0.48
Broadway/89th Ave	3	13425	Rural Thru-Stop	0.20	0.45	0.21	0.47	0.35	0.48
Broadway/85th Ave	4	32600	Signal (high spd/vol)	0.44	0.74	0.41	0.64	0.53	0.64
Broadway/Candlewood Dr	3	15950	Urban Thru-Stop	0.33	0.70	0.21	0.30	0.34	0.31

1 2011 and 2013 Traffic volumes, taken from the MnDOT traffic data mapping application

2 From Minnesota Crash Mapping Analysis Tool, 2004-2013 Data

3 Using 99.5% confidence level

4 From MnDOT's 2013 Crash Tool Kit, 2004-2013 data for Rural thru-stop similar intersections on the Trunk Highway system.

<sup>5</sup> Hennepin County Suburban Average Rate – 3 year (2008-2010)

<sup>6</sup> Critical Rate – 10 year, 2.0=K Factor for confidence Level (based on Hennepin County Average Rate)

- West Broadway Avenue at 93rd Avenue this intersection suffers from severe crashes that exceed the critical rate for this type of intersection. The severity rate at this signalized intersection is 0.70 crashes/mvm, which exceeds the 0.65 critical rate. Many of the severe crashes at this intersection are right angles (also known as t-bone). This intersection is located at the northern terminus of the project limits. The southern intersection leg provides one lane in each direction with a dedicated left turn lane and lacks a center median. The intersection also suffers from long delays (nearly 60 seconds for the overall intersection, exceeding what is desirable (delays and resulting Level of Service are shown Table 6).
- West Broadway Avenue at 85th Avenue this intersection suffers from severe crashes that exceed the critical rate for this type of intersection. The severity rate at this signalized intersection is 0.74 crashes/mvm which exceeds the 0.64 critical rate. The intersection accommodates two through lanes on each leg and dedicated left and right turn lanes. Most of the crashes (roughly two thirds) are rear end crashes are at this intersection. These crashes can be quite severe because of the extreme differential in travel speed between stopped and moving vehicles along a high speed corridor. As a comparison, rear end crashes at average high speed, high volume signalized intersections average just under 50%.
- West Broadway Avenue at Candlewood Drive this intersection suffers from high number of crashes and severe crashes that exceed the critical rate for this type of intersection. This intersection is a through/stop condition. The severity rate at this intersection is 0.70 crashes/mvm which exceeds the 0.51 critical rate substantially. Many of these crashes are attributed to vehicles trying to find gaps when turning left out of Candlewood Drive onto southbound West Broadway Avenue.

#### ROADWAY SEGMENT CRASHES

**Table 3** provides the calculated crash rates and comparable average and critical rates. Please note the significant findings shaded in red in the table.

Section	Section Length		Crash	Severity	Averag	e Rates	Critica	<b>Critical Rates</b>	
Section	(miles)	AADT	Environment	Rate <sup>2</sup>	Rate	CR <sup>5</sup>	SR <sup>4</sup>	CR <sup>6</sup>	SR <sup>3</sup>
Broadway-College Pkwy to N	0.93	13000	Rural 2-lane, 50 mph	0.89	1.73	0.83	1.23	2.06	1.24
of 93rd Ave									
Broadway-College Park Dr to	0.49	13500	Urban 4-lane div,	1.77	3.04	0.68	4.23	2.04	5.69
College Pkwy			45-50 mph						1
Broadway-S of Candlewood Dr	0.39	14700	Urban 4-lane undiv,	1.00	2.01	1.14	5.67	1.70	4.26
to College Park Dr			45 mph						1

## Table 3: West Broadway Segment Crash Analysis

<sup>1</sup>2011 and 2013 Traffic volumes, taken from the MnDOT traffic data mapping application

<sup>2</sup> From Minnesota Crash Mapping Analysis Tool, 2004-2013 Data

<sup>3</sup> Using 99.5% confidence level

<sup>4</sup> From MnDOT's 2013 Crash Tool Kit, 2004-2013 data for similar segments on the Trunk Highway system.

<sup>5</sup> Hennepin County Suburban Average Rate – 3 year (2008-2010)

<sup>6</sup> Critical Rate – 10 year, 2.0=K Factor for confidence Level (based on Hennepin County Average Rate)

West Broadway Avenue from College Parkway to north of 93rd Avenue – this segment of roadway suffers from high number of crashes and severe crashes that exceed the critical rates for this type of intersection. The severity rate along this segment is 1.73 crashes/mvm, which exceeds the critical rate of 1.24. Roughly half of the crashes were rear end and right angle crashes, and over 80% of the crashes occurred at intersections. Both statistics are reflective of the urbanizing nature of this existing high speed rural corridor. This segment carries two through lanes (one in each direction) with intermittent dedicated left turn lanes and lacks center medians, therefore access control. The segment of roadway has high traffic volumes compared to its vehicle carrying capacity. Two intersections on this segment of roadway suffer from long delays exceeding what is considered acceptable.

### **Existing and Future Traffic Demand**

Existing and future traffic demands were analyzed along West Broadway Avenue. **Table 4** displays planning level capacity analysis using existing and 2040 forecast average annual daily traffic (AADT) volumes. Existing volumes were based on a combination of 2012 and 2014 counts. Planning level capacity thresholds for 2-lane and 4-lane alternatives were taken from the Hennepin County Planning Division and are 14,700 and 29,200, respectively. The table shows that the existing volumes of segment between 85th Avenue North and 93rd Avenue North is only 1,400 vehicles per day (vpd) below the capacity threshold for a two-lane section, while the projected volumes for the same segment would exceed the capacity of a two-lane section by 2,300 vpd. The segments north of 93rd Avenue North and south of 85th Avenue North are within 3,200 vpd today, and exceeds available capacity by 2040 by 1,000 vpd. Please note the significant findings shaded in red in the table.

			AA	\DT	Over/Under Capacity <sup>2</sup>		
Location on CSAH 103 (W Broadway Blvd)	Existing Design	Section Capacity <sup>1</sup>	Existing (2012 & 2014)	Forecast (2040)	Existing (2012 & 2014)	Forecast No Build	
Between TH 610 and 93rd Ave	4-lane divided	29,200	13,900	20,000	15,300	9,200	
Between 93rd Ave and 85th Ave	2-lane	14,700	13,300	17,000	1,400	(2,300)	
Between 85th Ave and Brooklyn Blvd	4-lane undivided	20,000	16,800	21,000	3,200	(1,000)	

## Table 4: Existing and Forecast AADT and Capacity Analysis

Source: Kimley-Horn

<sup>1</sup> Planning level capacities are highly dependent on assumptions used such as access spacing, peak hour percent, directional distribution, saturation flow rates, etc. Values should not be used for operational analysis or final design.
 <sup>2</sup> Positive numbers indicate that additional capacity is available. Negative numbers indicate over capacity.

## **Traffic Operations Analysis**

An analysis of how well West Broadway Avenue moves traffic along the facility revealed that long delays and excessive queues exist at its intersection with 93rd Avenue north specifically in the PM peak hour. Long delays are also experienced at 92nd Avenue for vehicles trying to cross or turn onto West Broadway Avenue in the PM peak hour. As traffic continues to grow at these intersections, as well as at other intersections along the corridor, it is expected that delays and queues would become worse.

The analysis of how well traffic flows along West Broadway Avenue was developed using traffic simulation software. The existing AM and PM peak hour traffic volumes were analyzed along the network using existing traffic control (signals and stop signs), existing signal timing, and existing roadway geometry. The analysis measures the roadways ability to move traffic along the corridor by accounting for delay that is experienced at intersections. This delay is then given a letter grade A-F, known as Level of Service (LOS). Figure 2 depicts a graphical interpretation of delay times that define level of service. The delay thresholds are lower for unsignalized intersections than signalized intersections



Figure 2: Intersection Level of Service Ranges

due to the public's level of acceptable delays for the two different traffic controls.

### AM PEAK HOUR (EXISTING AND FUTURE 2040)

There were no excessive queue lengths or long delays resulting unacceptable LOS or congestion reported in the AM peak hour in 2014 (existing conditions).

An operations analysis of future 2040 traffic volumes using the existing lane configurations was conducted and problematic intersections are shown in **Table 5**. Both 93rd Avenue and 84th Avenue are showing high delays resulting in unacceptable LOS.

- **93rd Avenue North:** Three out of four intersection approaches have high delays resulting in LOS E or F. This results in an overall intersection delay of 113 seconds resulting in LOS F. Several movements have queue lengths that exceed available storage including the southbound and westbound through lanes which back into adjacent intersections.
- 84th Avenue North: This intersection's eastbound approach has high delays resulting in LOS F. This approach impacts the overall intersection with 57 seconds of delay resulting in LOS E.

Scenario	2040 No-Build AM											
Intersection	Appr	LOS		Delay (sec)	Effective Storage (ft)			Max Queue (ft)				
		by Appr	by Inters	by Inters	LT	Th	RT	LT	Th	RT		
	NB	D			225	600	600	220	448			
W Broadway Ave / 93rd Ave N	EB	F	E	E.	F	113	_2 <u>15</u>	1220	<u>1220</u>	296	665	
W bloadway Ave / Sola Ave N	SB	<u> </u>		115	<u>375</u>	785	_ <u>78</u> 5	484	860	828		
	WB	F			290	1220	1220	340	1321			
	NB	C			400	250	250		221			
W Broadway Ave / 84th Ave N	EB	F	E C	57	640	640	640	254				
W Broadway AVE / 64th AVE N	SB	В	E	57	265	265	265	219	233			
	WB	В			115	115	115	39	39	31		

## Table 5: 2040 AM Peak Hour Operational Analysis

Source: Hennepin County

Note: Only intersections with LOS E or worse or queuing concerns are reported.

#### PM PEAK HOUR (EXISTING AND FUTURE 2040)

**Table 6** shows queuing problems during the PM peak hour at 93rd Avenue North in 2014 (existing conditions). The 93rd Avenue North intersection also has an eastbound approach with long delays resulting in LOS F. In addition, there are approaches with LOS E, 92nd Avenue North and 84th Avenue North in 2014. Note the significant findings shaded in red and yellow in the table.

## Table 6: 2014 PM Peak Hour Operational Analysis

	2014												
Scenario		Existing Condition											
Intersection	Approach	LOS		Delay (sec)	Effective Storage (ft)			Max Queue (ft)					
		Approach	Inters	ection	LT	Th	RT	LT	Th	RT			
W Broadway Ave / 93rd Ave N	NB FB	D			<u>225</u> 215	6 <u>00</u> 1220	60 <u>0</u> 1220	60 720	6 <u>20</u> 290	6 <u>2</u> 0 290			
	SB	С	D	D	D	C D	C D	53	375	785	785	120	310
	WB	D			290	1220	1220	100	250	245			
	NB	<u> </u>			<u>950</u>	<u>950</u>	220	<u>1</u> 75	<u>210</u>	<u>205</u>			
W Broadway Ave / 92nd Ave N	EB	E	۸	٥	<u>1250</u>	1250	<u>1250</u>	135	135	135			
W Dioduway Ave / Szilu Ave N	SB	<u> </u>	~	5	600	600	140	45	60	25			
	WB	В			430	430	430	50	50	50			
W Broadway Ave / Candlewood Dr	NB	A				715	715		45	_65_			
	EB		۸	2									
	SB	A		2 <sup>2</sup>	815	815		45	15				
	WB	E			150		150	120		125			

Source: Kimley Horn

Note: Only intersections with LOS E or worse or queuing concerns are reported.

### Table 7: 2040 PM Peak Hour Operational Analysis

Scenario		2040									
Scenario					No-B	uild					
Intersection	Approach	LOS		Delay (sec)	Effect	Effective Storage (ft)			Max Queue (ft)		
		Approach	Inters	ection	LT	Th	RT	LT	Th	RT	
	NB	F			225	600	600	187	632		
W Broadway Ave / 93rd Ave N	EB	F	E	> 200	215	1220	1220	300	1289	_	
W bloadway Ave / 5510 Ave W	SB	F		200	375	785	785	485	852	900	
	WB	F			290	1220	1220	340	1328		
	NB	F			950	950	220	120	962		
W Broadway Ave / 92nd Ave N	EB	F	F	> 200	1250	1250	1250	550			
	SB	Α		200	600	600	140	49			
	WB	F			430	430	430	192			
W Broadway Avo / Sotalar Pkym	NB	F	F		195	870	350	56	873	201	
	EB	F		04	275	275	275	368	326		
W bloadway Ave / Setzler PRWy	SB	A		54	250	950	250	69			
	WB	F			275	275	275	179	414		
	NB	В			650	650		25	448		
W Broadway Ave / 89th Ave N	EB	F	р	26	1900		1900	434			
w bloadway Ave / ostil Ave iv	SB	A	D	20		870	870				
	WB										
	NB	С			400	250	250		451		
W Broadway Ave / 84th Ave N	EB	F	F	57	640	640	640	298			
W Broadway Ave / 84th Ave N	SB	В		57	265	265	265	143	138		
	WB	В			115	115	115	60	82	124	
	NB	A				715	715		17		
W Broadway Ave / Candlewood Dr	EB		۸	4							
V Dicadway Ave / Caliblewood Di	SB	Α	~	4	815	815			74		
	WB	E			150		150	175	T		

Source: Hennepin County Note: Only intersections with LOS E or worse or queuing concerns are reported.

An operational analysis of 2040 volumes on existing lane geometry shows that conditions worsen substantially in the PM peak hour (**see Table 7**). Six intersections show problematic operational performance.

- **93rd Avenue North:** Similar to the AM peak hour this intersection has an overall very high delay, greater than 200 seconds resulting in LOS F and all approaches at LOS F. The queue lengths exceed nearly all available storage lengths spilling into adjacent intersections.
- **92nd Avenue North:** This intersection performs poorly as well partly due to the vehicle queues resulting from the 93rd Avenue and also due to the lack of available capacity to adequately route the traffic through at this intersection. Three out of four approaches have long delays resulting in LOS F with an overall intersection delay of greater than 200 seconds resulting in LOS F. The northbound through queue extends into the next intersection to the south.
- Setzler Parkway: This intersection performs poorly as well partly due to the vehicle queues resulting from the 92nd Avenue and also due to the lack of available capacity to adequately route the traffic through at this intersection. Three out of four approaches have long delays resulting in LOS F with an overall intersection delay of 94 seconds resulting in LOS F. Again, the northbound queue exceeds the available storage spilling into the next intersection to the south.
- **89th Avenue North:** The eastbound approach at this "T" intersection through/stop intersection experiences long delays resulting in LOS F due to the lack of gaps available to make a movement onto West Broadway Avenue. Even though the approach is experiences long delays the overall intersection performance is acceptable at LOS F.
- 84th Avenue North: The eastbound approach has long delays resulting in LOS F. This
  degrades the overall intersection delay resulting in LOS E. Queues lengths along the
  eastbound approach exceed available storage spilling into the next intersection to the
  west.
- **Candlewood Drive:** The overall intersection operates with acceptable delay resulting in LOS A with the exception of the westbound approach. This is also due to the lack of available gaps for the stop controlled movements, left turns, trying to turn onto West Broadway Avenue.

## **Transit Accommodations**

Hennepin County began transit planning in the project area in 2002, and demonstrated a need for transit service in the West Broadway corridor. In 2010, the Metropolitan Council adopted a fixed guideway corridor in the vicinity of West Broadway Avenue called the Bottineau LRT corridor (now called the Blue Line Extension. In March 2014, a Draft Environmental Impact Statement was published identifying a locally preferred alternative that would occupy the median down the center of West Broadway Avenue. ). And in January of 2015 the Blue Line Extension was identified in Metropolitan Council's 2040 Transportation Policy Plan. Project development timeline for the Blue Line extension is now in parallel with the West Broadway Avenue reconstruction project development schedule.



## Access Management

West Broadway Avenue is a regional A-minor arterial Expander in the county roadway system. Guidelines for access spacing call for 1,320-foot spacing for full access intersections and 660-foot spacing for partial access intersections. An inventory of all access points along the project corridor was conducted. Public and private accesses were inventoried, as well as whether full or partial accesses are available. Full access means that full left and right turns are allowed, while partial access means that some movements are not available. A right-in-right-out access is an example of partial access. **Table 8** below shows a tabulation of the access points and access points per mile and **Figure 3** shows the type and location of access points within the project area.

### **Table 8: Existing Access Spacing**

Location	Length	Num	ber of Ac	cesses (P	Full Access	Total Access		
Location	(miles)	Full		Partial		Total	Mile	Mile
CSAH 103 - 78th Ave to 900' North of CSAH 30	2.0	13 6 1 2		2	22	9.5	11.0	
Iennepin County Access Spacing Guidelines (maximum)48								

While the average total access points per mile across the entire study corridor is approximately 11 access points per mile, there is substantial variability from the south end to the north end of the study limits. Access density is relatively high between 78th Avenue North and 85th Avenue North, at roughly 15 access points per mile or average spacing of 350 feet. The average access spacing between 85th Avenue North and the northern study limits is approximately 550 feet per access, or an average of 10 access points per mile.

## Figure 3: Existing Access Points√



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701 Xenia Avenue South, Suite 600, Minneapolis, MN  $\,55416{-}3636$  (763) 591-5400  $\,$ 



### **Bicycle and Pedestrian Accommodations**

The project corridor is listed as a priority for the trail network in the 2012 Brooklyn Park Recreation and Parks Master Plan.

Several cross streets along the project corridor have sidewalks and/or trails approaching West Broadway Avenue, funneling those users to West Broadway Avenue. Some of these cross streets include 92nd Avenue North, Setzler Parkway, Maplebrook Parkway, and 85th Avenue North. The intersections of West Broadway Avenue at 84th Avenue North, 85th Avenue North and 93rd Avenue North (3 approaches) have marked crosswalks.

While some trail and sidewalk segments exist along the project corridor, and some of the shoulders along the roadway are suitable for use by pedestrians and bicyclists, the corridor has significant gaps in the system and presents challenges to pedestrian and bicycle access and mobility. Additionally, many of the in-place facilities most likely do not meet current Americans with Disabilities Act (ADA) design guidelines. The following is a summary of the pedestrian and bicycle facilities that do exist along the corridor:

- Sidewalk between 78th Avenue North and Candlewood Drive, 85th Avenue North to Maplebrook Parkway (west side only).
- Short portion of shared use trail on the east side of West Broadway Avenue from just north of Shingle Creek to the south driveway access to North Hennepin Community College. The trail can be accessed from West Broadway Avenue and connects to Candlewood Drive along the north side of Shingle Creek.
- Shared use trail on both sides of West Broadway Avenue from 93rd Avenue North to just north of TH 610.
- Marginally useable shoulders on West Broadway Avenue between Candlewood Drive and 83rd Avenue North on both sides of the roadway.
- Usable shoulder in the southbound direction between just north of 89th Avenue North and 93rd Avenue North.

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## APPENDIX 3: LETTERS FROM BROOKLYN PARK AND NORTH HENNEPIN COMMUNITY COLLEGE

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**RECREATION AND PARKS** 

BROOKLYN0155600 85th Ave. N., Brooklyn Park, MN 55443-1825 · Phone 763-493-8333 · Fax 763-493-8253 TDD 763-493-8381

Mr. Chad Ellos, P.E. Project Manager – Design Hennepin County Transportation Department 1600 Prairie Drive Medina, MN 55340

RE: College Park and park land adjacent to Shingle Creek

Dear Mr. Ellos:

Brooklyn Park understands that Hennepin County (the County) is in the process of completing environmental documentation for the West Broadway Avenue Reconstruction project. Part of that process includes understanding impacts to community property. The purpose of this letter is to provide information to the County regarding the disposition of College Park located adjacent to West Broadway Avenue and the unnamed park land adjacent to Shingle Creek and east of CSAH 103 (West Broadway Avenue).

During the continuing coordination activities between Brooklyn Park, the Blue Line Project Office, and the County, Brooklyn Park Recreation and Parks Department staff was made aware of the potential for the road reconstruction project to have some impact to College Park and the park land adjacent to Shingle Creek. The potential impacts include the addition of a multi-use trail, grassy back slopes, a storm water treatment facility, and excavation for floodplain mitigation on park property. The storm water treatment facility in College Park is expected to be underground and will not affect the current or planned uses of the space once construction is complete. The excavation for floodplain mitigation in the unnamed park will likely include creation of a small "backwater" area for Shingle Creek that could potentially affect some uses of the space but also provides additional aesthetic and habitat views. The remainder of the floodplain mitigation site will not affect the current or planned uses of the space once construction is complete.

The impacts of the trail and grassy slopes are anticipated to not exceed 4,353 sq. ft. (temporary easement: 1,183 SF | permanent right-of-way: 2,201 SF | utility easement (perm): 969 SF) in College Park and 36,782 sq. ft. (temporary easement: 31,360 SF | permanent right-of-way: 5,422 SF) in the park land adjacent to Shingle Creek. The underground storm water facility impacts are anticipated to not exceed 0.7 acre of both temporary and permanent easements in College Park. The excavation for floodplain mitigation storage is not anticipated to exceed 3.0 acres of both temporary and permanent easements in the park land adjacent to Shingle Creek. We understand that the final details of roadway design are still being completed and that the amount of impact affecting College Park is still being determined; however Brooklyn Park considers the current estimate of impacts acceptable and is looking forward to exploring ways to minimize these impacts and look for mutual benefit, as the design progresses.

The City looks forward to continuing productive discussions of the road reconstruction project and finding ways to minimize impacts.

Sincerely, Jody Yungers, Director Recreation and Parks Department



August 19, 2015

Ms. Chad Ellos, P.E. Project Manager – Design Hennepin County Transportation Department 1600 Prairie Drive Medina, MN 55340

RE: North Hennepin Community College Property – Ball fields and Environmental area

Dear Mr. Ellos:

North Hennepin Community College (NHCC) understands that Hennepin County (the County) is in the process of completing environmental documentation for the West Broadway Avenue Reconstruction project. Part of that process includes understanding impacts to community property. The purpose of this letter is to provide information to the County regarding the disposition of the college property located specifically around the two ball fields adjacent to West Broadway Avenue and the college environmental area east and south of the ball fields.

During the continuing coordination activities between the NHCC, the Blue Line Project Office, and Hennepin County, NHCC staff was made aware of the potential for the road reconstruction project to have some impact to the NHCC ball fields and environmental area. We understand that the final details of roadway design are still being completed and that the amount of encroachment onto the NHCC property and potential impact on the environmental area is still being determined. As the process and project proceeds, NHCC will work collaboratively with Hennepin County in exploring options for mitigation of the impacts.

I and my staff look forward to continuing our fruitful discussion regarding the road reconstruction project and finding ways to maximize its benefits, as well as the benefits of the Blue Line LRT project will bring to the NHCC campus community.

Sincerely,

Barbara Mcdonald Ed.D. President North Hennepin Community College

Cc: Dan Hall, Vice President of Finance and Facilities/CFFO

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APPENDIX 4: STORMWATER AND FLOODPLAIN TECHNICAL MEMORANDUM

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**Final Stormwater Technical Memorandum** 

То:	Brandi Poppenhagen, PE
From:	Lisa Goddard, PE
Date:	August 21, 2015
Subject:	West Broadway (CSAH 103) Preliminary Stormwater Management Plan

# Introduction

## Purpose

This Stormwater Technical Memorandum has been prepared in support of the West Broadway Avenue (CSAH 103) project Environmental Assessment Worksheet (EAW). The objective of this memorandum is to evaluate the West Broadway project's potential stormwater impacts within the study area and to identify potential mitigation measures. This includes the following:

- Identify regulatory requirements that will set forth mitigation standards that are specific to stormwater management.
- Determine how the proposed West Broadway improvements would affect existing drainage patterns and nearby water resources.
- Identify stormwater best management practices (BMPs) that would be used to satisfy current regulatory requirements for the West Broadway corridor.
- Determine approximate size and location for BMPs along the corridor.

This report contains qualitative and quantitative design recommendations for the West Broadway corridor that will be used by the consultant team preparing the EAW and will provide information on how the project would meet various regulatory requirements. A separate technical memorandum has been prepared to discuss floodplains in the corridor. The analysis of wetlands adjacent to the project limits and the potential impacts to those is being performed by others.

## **Data Collection**

The storm sewer and hydrology data employed for this study was obtained from a variety of sources. The following is a brief summary of the data used.

## Coordination with City Staff

Meetings and discussions with staff from the City of Brooklyn Park and the watershed management organization were held to obtain a better understanding of existing systems and their respective criteria for evaluating and designing new drainage systems and BMPs.

## Hydrology

Existing drainage boundaries from the 2009 Brooklyn Park Local Water Management Plan were refined and updated using contour data from a flight of the corridor and 2012 Hennepin County LiDAR data. The 1995 Brooklyn Park Comprehensive Stormwater Management Plan listed discharge limits for subwatersheds and peak outflows from ponds along the corridor. After discussion with the City, it was determined that areas where



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drainage boundaries had not changed significantly were held to these discharge rates and that they were still applicable. Areas that experienced significant changes in land use as determined by comparing aerial images and recent construction site plans would also be held to the 1995 discharge limits. In addition, ponds that discharged to creeks and channels within the Setzler Pond/Century Channel subwatershed were designed to limit discharge to 0.1 cubic-feet per second per acre of tributary drainage area.

## **Record Drawings**

A variety of record drawings were collected by Hennepin County for the West Broadway (CSAH 103) project and others were collected for the Blue Line LRT Extension project. This information along with storm sewer maps from the Local Water Management Plan were used to determine the connectivity of the existing ponds and storm sewer system and to determine preliminary routing for possible connections and trunk lines for West Broadway.

# **Regulatory Environment**

The project is located within the Shingle Creek and West Mississippi watersheds. In addition to the watershed organizations, there are other local and state agencies that play a role in stormwater management within the study area. These include:

- Shingle Creek and West Mississippi Watershed Management Commissions (SCWMC and WMWMC, or SCWM WMC when discussed in reference to their joint watershed management plan and rules)
- Minnesota Pollution Control Agency (MPCA)
- City of Brooklyn Park

Regulatory and permitting authority for stormwater management for the West Broadway Avenue project falls to the City of Brooklyn Park, the MPCA, and also the SCWM WMC. Regulations change periodically, and the West Broadway project will be subject to regulations in effect when the design is submitted for approval by the permitting authorities. A matrix comparing the current requirements of the various agencies is included in Appendix A.

## Shingle Creek and West Mississippi Watershed Management Commissions

The SCWMC and WMWMC are two separate water management organizations (WMOs); however, they plan and conduct business jointly, managing waters within their boundaries. Each is governed by the Joint Powers Agreements that are held between the watershed organizations and the communities/members that are located within the boundaries of the WMOs. The communities within the boundaries include parts of Brooklyn Center, Brooklyn Park, Crystal, Maple Grove, Minneapolis, New Hope, Osseo, Plymouth, Robbinsdale, and Champlin.

The SCWM WMC manages waters through its Third Generation Watershed Management Plan, which was adopted in 2013. This Plan complies with the water resource protection requirements under Minnesota Statues 103A through 103G in conformance with Minnesota Rules Chapters 8410 and 8420.

The SCWM WMC requires project reviews for non-single family detached projects that are 0.5 acres in size or larger, single family detached projects that are 1.0 acres in size or larger, and linear projects that create one or more acres of new impervious surface. The rules and standards of the SCWM WMC must be met for the *net new impervious surface*.



The SCWM WMC requires a project's Stormwater Management Plan to be consistent with all applicable management rules and standards. Specific BMPs that are identified include detention and infiltration systems. Each new or revised crossing of Shingle Creek is required to retain adequate hydraulic capacity with no adverse impact to conveyance of the 100-year flow. The following provides a summary of the design requirements for rate control, water quality, and water quantity.

## Rate Control Requirements

Runoff rates for the proposed activity shall not exceed existing runoff rates for the 2-year, 10-year, and 100year critical storm events for the project location as set forth in the NOAA Atlas 14 Volume 8, published in June 2013, or its successor, using the online NOAA Precipitation Frequency Data Server or a similar source. The applicant must document the location and event depths used. If an approved local water management plan requires more restrictive rate control, then the more restrictive rate shall govern. Runoff rates may be restricted to less than the existing rates when necessary for the public health and general welfare of the watershed. Member cities and project review applicants shall not exceed discharge rates at City boundaries as determined in the Commission's hydrologic model. Regional detention basins shall be utilized to manage peak discharge rates and meet water quality objectives when feasible.

## Water Quality Requirements

Stormwater must be treated prior to discharge to remove 60 percent of phosphorus and 85 percent of total suspended solids. Treatment may be provided by one or more permanent sedimentation and water quality ponds, infiltration practices, or a combination of BMPs that together will meet removal requirements.

If permanent sedimentation and water quality ponds are used they shall be designed to the Wet Pond Design Standards set forth in Appendix A of the SCWM WMC Rules and provide:

- Water quality features consistent with NURP criteria and best management practices.
- A permanent wet pool with dead storage of at least the runoff from a 2.5-inch storm event.

Runoff may be directed to a downstream facility within the same hydrologic subwatershed that has sufficient capacity to provide the required treatment. This means that no treatment may be required for an individual development provided there is a regional facility designed and constructed to accommodate the flow from this property.

The applicant may meet both the treatment requirement and the volume requirement by infiltrating all site runoff from a 1.3 inch rain event (see Water Quantity Requirements in the following sub-section).

### Water Quantity Requirements

Volume control BMPs must be incorporated into the site design to minimize the creation of new impervious surface and reduce existing impervious surfaces, minimize the amount of directly connected impervious surface, preserve the infiltration capacity of the soil, and limit increases in runoff volume exiting the site to the extent feasible considering site-specific conditions. Stormwater runoff volume abstraction shall be provided onsite in the amount equivalent to one inch of runoff generated from new impervious surfaces for linear projects.

When using infiltration for volume reduction, runoff must be infiltrated within 48 hours using accepted BMPs for infiltration, such as infiltration trenches, rainwater gardens (also known as bioretention basins and rain gardens), or infiltration basins. Infiltration volumes and facility sizes shall be calculated based on the measured infiltration rate determined by a double-ring infiltrometer test(s) conducted to the requirements of ASTM Standard D3385 at the proposed bottom elevation of the infiltration area. Other testing methods may be used with the approval of the Commission's Engineer. The measured infiltration rate shall be divided by the appropriate correction factor



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selected from the Minnesota Stormwater Manual. This site investigation must be conducted by a licensed soil scientist or engineer. A post-construction percolation test must be performed on each infiltration practice and must demonstrate that the constructed infiltration rate meets or exceeds the design infiltration rate prior to project acceptance by the city.

#### Infiltration BMP Requirements

- Infiltration areas will be limited to the horizontal areas subject to prolonged wetting.
- Stormwater runoff must be pretreated to remove solids before discharging to infiltration areas to maintain the long term viability of the infiltration areas. Examples of pretreatment BMPs can be found in "Protecting Water Quality in Urban Areas" (MPCA, 2000, as amended); the "Minnesota Urban Small Sites BMP Manual" (Metropolitan Council 2001, as amended); the "Minnesota Stormwater Manual" (MPCA, 2005, as amended) and other BMP guidance manuals.
- Design and placement of infiltration BMPs shall be done in accordance with the Minnesota Department of Health guidance "Evaluating Proposed Stormwater Infiltration Projects in Vulnerable Wellhead Protection Areas," as amended.
- Constructed bioretention and infiltration practices such as rain gardens, infiltration trenches, and infiltration basins shall not be used in:
  - Fueling and vehicle maintenance areas;
  - Areas with less than 3 feet separation from the bottom of the infiltration system to the elevation of seasonal high groundwater;
  - Areas with runoff from industrial, commercial and institutional parking lots and roads and residential arterial roads with less than 5 feet separation distance from the bottom of the infiltration system to the elevation of seasonal high groundwater;
  - Areas within 400 feet of a community water well, within 100 feet of a private well, or within a
    delineated 1-year time of travel zone in a wellhead protection area;
  - Sites containing contaminated soils or groundwater.

Where infiltration is not advisable or infeasible due to site conditions, biofiltration must be provided for that part of the abstraction volume that is not abstracted by other BMPs. Where biofiltration is infeasible, at a minimum filtration through a medium that incorporates organic material, iron fillings, or other material to reduce soluble phosphorus must be provided.

Runoff may be directed to a downstream facility within the same hydrologic subwatershed that has sufficient capacity to provide the required volume management. This means that no volume management may be required for an individual development provided there is a regional facility designed and constructed to accommodate the volume from this property

Credit towards compliance with the abstraction requirement may be achieved by meeting post construction soil quality and amendment depth requirements, which are described in more detail in the SCWM WMC Rules.

#### **Detention Basin BMP Requirements**

- An outlet structure to control the 2-year, 10-year, and 100-year critical storm events to predevelopment runoff rates. Said outlet structure will be required to control critical storm events to less than predevelopment runoff rates if downstream facilities have insufficient capacity to handle the increased flow.
- An identified overflow spillway sufficiently stabilized to convey a 100-year critical storm event.
- A normal water elevation above the ordinary high water level (OHW) of adjacent waterbodies.



- Access for future maintenance.
- An outlet skimmer to prevent migration of floatables and oils for at least the two-year storm event. Baffled weirs and wooden skimmers are not allowed.
- Water quality features consistent with NURP criteria and best management practices.
- A permanent wet pool with dead storage of at least the runoff from a 2.5-inch storm event.

The SCWM WMC Rules contain additional details on design standards for BMPs.

## **Minnesota Pollution Control Agency**

### NPDES Construction Stormwater Permit

The MPCA administers the National Pollutant Discharge Elimination System (NPDES) Construction Stormwater Permit program in the State of Minnesota (MN 115; MN Rule 7050). The NPDES permit program requires creation of a site-specific Storm Water Pollution Prevention Plan (SWPPP). The SWPPP must detail temporary and permanent erosion prevention and sediment control BMPs that would be utilized during construction. The NPDES permit also requires permanent treatment of stormwater runoff at sites where construction activity results in a net increase of more than one acre of impervious surface area. The NPDES permit requires treatment for the water quality volume, which is equivalent to one-inch of runoff from the new impervious surface created by the project. The primary treatment mechanism preferred by the NPDES permit is infiltration, but other BMPs are allowed when site conditions are not conducive for infiltration. The SCWM WMC rules are more stringent, and the stormwater management system for the project will be designed for approval by the SCWM WMC.

#### MPCA NPDES Infiltration BMP Requirements Include:

- At least one inch of runoff from the new impervious surface must be infiltrated, where site conditions allow.
- Ponding duration drawdown time of 48 hours.
- Filtration BMPs must be designed to remove 80 percent of total suspended solids (TSS).

#### MPCA NPDES Wet Sedimentation Basin BMP Requirements Include:

- Limiting the maximum discharge rate from a pond to 5.66 cubic feet per second, per acre of pond surface area.
- A minimum dead pool volume for wet sedimentation basins of 1,800 cubic feet per acre draining to the pond. This represents the total drainage area, which may be much larger than the project area.
- The permanent pool average depth (basin volume/basin surface area) shall be at least three feet, with a maximum depth of up to 10 feet.

### Impaired Waters and TMDLs

Section 303(d) of the Clean Water Act (CWA) requires states to assess all waters to determine if they meet water quality standards and to conduct total maximum daily load (TMDL) studies in order to set pollutant reduction goals. Project areas that outlet within one mile of MPCA-designated impaired or special waters must incorporate additional BMPs, including stricter stormwater treatment requirements. Shingle Creek is an impaired water that receives discharge from the West Broadway project. Shingle Creek is impaired for chloride and biotic integrity/dissolved oxygen, and has an approved TMDL plan. The TMDL plan calls for making physical improvements to Shingle Creek to improve aeration and enhance habitat, as well as undertake BMPs in the watershed to reduce nutrient loading, reduce stormwater volume to Shingle Creek, and increase infiltration to enhance baseflow. The chloride TMDL calls for a reduction in the use of sodium chloride for ice control in the watershed.

West Broadway (CSAH 103) Reconstruction



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## **City of Brooklyn Park**

With the exception of drainage to the Setzler Pond/Century Channel system, the City of Brooklyn Park has adopted the SCWM WMC requirements for stormwater management. Development of previously open space areas draining to the Setzler Pond/Century Channel system are required by the City to control their discharge rates to 0.1 cubic-foot per second for every acres of area. The City works with the SCWM WMC on the permit reviews to ensure the stormwater management requirements are met.

# **Drainage Design Approach**

## **Existing Conditions**

The West Broadway construction project extends from approximately Candlewood Drive N to the Holiday Gas Station between 93rd Avenue N (CSAH 30) and TH610. The project also includes reconstruction of 93rd Avenue N from roughly 500 feet west of the intersection with West Broadway to Louisiana Avenue N. The reconstruction of 93rd Avenue N west of the project limits will be built as a separate project, but the existing and proposed impervious surface numbers in this memorandum include the full reconstruction area of 93rd Avenue N as shown on Figure 3 of 3 in Appendix B. The stormwater that is directed toward West Broadway is predominately runoff from areas to the west of West Broadway. Approximately 60 percent of the roadway drains to Shingle Creek, 33 percent drains into Setzler pond and DNR #559 W, and seven percent drains into the floodplain/ponds within TH610. These areas are described in more detail in the following sections. See Appendix B for figures showing the existing flow patterns and receiving waters.

## Drainage to Shingle Creek from the South

In this section of the project, most of West Broadway has an urban drainage system, in which runoff is contained by curb and gutter and flows into catch basins and storm sewer. The portion immediately south of the Shingle Creek crossing has a rural drainage system, in which runoff from the roadway flows directly into roadside ditches. The existing storm sewer that serves the project also carries stormwater from the portion of West Broadway south of the project limits to just north of Brooklyn Boulevard, a residential area to the southeast, and commercial areas to the southwest before discharging directly into Shingle Creek downstream of the crossing without treatment.

## Drainage to Shingle Creek from the North

The portion of West Broadway from Shingle Creek to roughly Maplebrook Parkway N consists of both rural and urban drainage systems. Inlets in the roadside ditches and catch basins in the street route the runoff into an existing trunk storm sewer under West Broadway. In addition to the road runoff, the trunk storm sewer serves large offsite areas consisting of single- and multi-family homes, the North Hennepin Community College (NHCC), and parks before discharging to Shingle Creek downstream of the crossing. Runoff from the rural roadway section receives some amount of water quality treatment through vegetative filtering and rate attenuation when flowing through ditches. However, much of the roadway runoff receives no treatment.

## Drainage to Setzler Pond and the DNR Wetlands (#559W)

DNR #559W is located between Setzler Parkway and 92nd Avenue N and was bisected with the original construction of West Broadway. DNR #559W receives stormwater runoff from West Broadway between Setzler Parkway and 93rd Avenue, which has a rural drainage system. Roadway runoff receives some amount of water quality treatment through vegetative filtering prior to reaching the wetland. Although it was not designed as a treatment basin, the wetland provides additional water quality treatment via sedimentation and plant uptake, as well as rate attenuation. DNR #559W discharges through an existing culvert in the southwest corner of the west



wetland. This culvert travels west until connecting into the trunk line traveling beneath Wyoming Avenue N. This trunk line discharges into Setzler pond.

Setzler Pond is located in the NW quadrant of the intersection of 89th Avenue N and West Broadway. Runoff from a portion of West Broadway between 89th Avenue N and Setzler Parkway is conveyed to the pond via ditches. Setzler Pond was created as a regional rate control pond in the location of a public watercourse. Much of the stormwater which flows into Setzler pond is runoff from the commercial and industrial land surrounding the pond from the north and west, as well as large contributing areas in the cities of Maple Grove and Osseo. The channel is known as either Century Channel or Edinbrook Channel, and discharges into Mattson Brook, east of West Broadway. Mattson Brook ultimately discharges into the Mississippi River. Setzler Pond discharges through an existing culvert traveling below West Broadway, reconnecting into Century Channel.

## 93rd Avenue N (CSAH 30) Drainage

The existing 93rd Avenue corridor has a rural drainage system. A portion of the drainage area to the west of West Broadway drains into ditches and into the westerly DNR #559W basin. A portion of westbound 93rd Avenue drains into a landlocked ditch. This ditch acts as an infiltration basin, and overflows from it during extremely heavy storms would appear to flow toward the commercial parking lot to the north. The remainder of this section of the corridor flows to the west and into an existing trunk line traveling south beneath Wyoming Avenue N.

The portion of the CSAH 30 drainage area to the east of West Broadway flows east through the adjacent ditches into existing inlets. These inlets travel to existing ponds which connect downstream to Century Channel.

## Drainage to the TH 610 Ponding System

West Broadway between 93rd Avenue and the Holiday Gas Station has an urban drainage system with a trunk storm sewer running down the east gutter line. A small portion to the northern most extent of the West Broadway project immediately north of 93rd Avenue drains into an existing infiltration basin on the east side of West Broadway. This basin has an overflow inlet which ties into the existing trunk line. However, the majority of West Broadway in this section drains directly into the trunk line, which then discharges into existing stormwater treatment basins located inside the infield area in the southeast quadrant of the TH 610 interchange.

## **Proposed Conditions**

### **Proposed Reconstruction**

Both West Broadway and 93rd Avenue will be converted to urban roadways, with curb and gutter throughout the project limits. The widening of both roadways and the addition of trails will fill in much of the existing roadside ditches. Table 1 below summarizes the changes in impervious cover that are expected to occur with this project. The table includes the proposed impervious surface from the reconstruction of 93rd Avenue N between Xylon Avenue N and Louisiana Avenue N. The proposed impervious numbers reflect the roadway construction, and do not include the impervious surface that will be constructed with the BLRT Extension project. Without mitigation, the added impervious surface will increase the quantity and peak discharge of runoff from the roadway due to the reduction in permeable surfaces capable of allowing rainwater to infiltrate into the ground. The elimination of the roadside ditches also eliminates the existing rate attenuation that was occurring for the roadway runoff. Typically, added impervious surface would also have the effect of increasing the pollutant loading to the water bodies that receive runoff from the corridor. These affects can be mitigated through the use of stormwater BMPs.

### Design Methodology

The preliminary stormwater management plan for this project includes a variety of types of BMPs to manage runoff from the reconstructed West Broadway, including wet stormwater treatment ponds, bioretention basins,



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underground detention BMPs (such as pipe galleries or storage tanks), hydrodynamic separators, tree trenches, and bioswales. The different BMPs provide varying levels of rate control and varying levels of water quality treatment. For instance, hydrodynamic separators provide no rate attenuation but are a valuable BMP to provide pretreatment for runoff discharging to infiltration and bioretention practices. The selection of BMPs will be refined during advanced preliminary design to account for additional soil and groundwater data acquired after publication of this memorandum, as well as further coordination with the City of Brooklyn Park.

The preliminary stormwater management plan includes potential locations of BMPs. To the extent practicable, BMPs are located within the proposed right-of-way with a few notable exceptions that will be described below and are sited adjacent to outfalls. Opportunities to collaborate with the City of Brooklyn Park and NHCC on combined stormwater management may also be considered as designs are developed further. All BMPs will be designed to accommodate runoff from the future Blue Line LRT Extension project. This includes runoff from the reconstruction of West Broadway Avenue south of the project limits, the LRT guideway, and LRT stations.

Stormwater ponds that are the only water quality treatment facility for project runoff will be designed to NURP standards with the dead pool sized to store runoff from a 2.5" event over the contributing drainage areas per SCWM WMC rules. Wet sedimentation forebays will be used in some instances to pretreat runoff going to an existing basin to mitigate for the added impervious surface. These forebays will be designed to meet the standards of the NPDES permit. The forebay along with the treatment occurring in the existing basin will meet the requirements of the SCWM WMC.

Infiltration or filtration BMPs provide quantity (rate and volume) control and water quality treatment and can be constructed as surface BMPs or underground practices. Much of Brooklyn Park has soil categorized into soil groups A or B and may be suitable for infiltration BMPs. However, most of the West Broadway corridor is also in a highly vulnerable portion of the Brooklyn Park Central Drinking Water Supply Management Area (DWSMA). Further coordination with city officials must occur to determine where infiltration is acceptable and if protective measures must be taken to ensure well safety.

Filtration BMPs can be utilized in locations where inclusion in the DWSMA, proximity to groundwater, or proximity to soil or groundwater contamination precludes the use of infiltration BMPs. They can also be used at treatment pond locations, by using the 10-foot bench above the normal water level as a filtration bench. This would allow a certain volume of water in the pond to filtrate through engineered soil and be collected in drain tile that would flow to the pond outfall. Soil borings should be taken during preliminary and final design to determine where infiltration or filtration BMPs may be appropriate.

Much of the existing drainage patterns will be maintained, but the West Broadway corridor drainage and a relatively small amount of offsite area draining onto the roadway will be redirected to several BMPs as listed in Table 2 below. Table 2 also provides a listing of the anticipated footprints for each of the BMPs. The BMP footprints shown in Table 2 include the area needed to provide the appropriate water quality volume to treat the additional impervious surface that will be constructed with the BLRT Extension project. They also include the water quality volume needed to treat the entire 93<sup>rd</sup> Avenue N project. The proposed stormwater management plan currently includes wet ponds in certain locations, which represent the expected worst-case footprint for the BMP in light of the potential DWSMA concerns and potential for high groundwater. Soil borings and piezometers will be drilled and further discussion with the City will occur to determine the feasibility of infiltration or filtration BMPs in these locations. Appendix B includes figures that show the proposed corridor drainage boundaries and a representation of where BMPs are proposed.


#### Drainage to Shingle Creek from the South

The portion of roadway south of Shingle Creek will drain north to a wet pond or infiltration/filtration BMP southwest of the West Broadway crossing of Shingle Creek before ultimately discharging to the creek. This BMP will also receive roadway runoff from as far south as Brooklyn Boulevard and will be designed in order to minimize the amount of impact to the developable land.

#### Drainage to Shingle Creek from the North

The design team is investigating the optimal storm sewer configuration for this section of the project due to the location of the existing trunk storm sewer along the east half of the roadway. It is likely that the offsite water currently carried in a 48-inch to 66-inch storm sewer system down the east side of West Broadway will remain separated from project runoff and continue to discharge to Shingle Creek as it does in the existing condition. To minimize the number of pipes crossing the future light-rail transit corridor, the drainage design currently proposes two trunk storm sewer lines, one along each outside gutter, for the proposed roadway drainage.

Underground BMPs (either for detention or infiltration/filtration) have been proposed at College Park and/or NHCC to treat water draining from just north of 85th Avenue to College Park before ultimately discharging to Shingle Creek. Underground BMPs in these locations will allow the space to continue to be utilized for parking (in the case of NHCC) or be located under a future parking lot (in the case of College Park).

The area between College Park and Shingle creek will be treated in a sedimentation basin on the west side of West Broadway and with a hydrodynamic separator on the east side of West Broadway before ultimately discharging to Shingle Creek.

#### Drainage to Setzler Pond and the DNR Wetlands (#559W)

A flow splitter and hydrodynamic separator are proposed at DNR Wetland #559W to maintain hydrology to this wetland and send additional runoff generated by new impervious directly to Setzler Pond for treatment. There is also the possibility of expanding sediment forebays already present at this wetland, such that a flow splitter may not be needed. Setzler Pond will continue to receive corridor drainage and offsite drainage. Because of the added impervious area that will be directed to this pond, additional volume will be created and a new outlet control structure will be added in order to provide water quality and rate control before discharging to Century Channel.

#### 93rd Avenue N (CSAH 30) Drainage

The most westerly portion of 93rd Avenue will continue to drain to the trunk storm sewer under Wyoming Avenue. However, due to concerns about pipe capacity, BMPs in the boulevard are proposed, such as tree trenches or bioswales. The majority of these BMPs will be constructed with the separate project, but are included in the analysis of this project because this area ultimately discharges to Setzler Pond, which is impacted by the West Broadway project. An existing fuel line that crosses 93rd Avenue east of West Broadway also limits the ability to route the easterly portion of 93rd Avenue to Setzler Pond. BMPs in the boulevard are also proposed for this area.

#### Drainage to the TH 610 Ponding System

The existing culvert just north of 93rd Avenue, which drains a small portion of roadway to a basin at the 610 Commerce Center, will be lengthened and the flow to the basin will be maintained. Runoff from the north end of the project will continue to be captured in the existing trunk storm sewer and discharge to the T.H. 610 ponds.

To the extent feasible, additional BMP types and locations will be considered throughout the corridor during preliminary engineering and final design.



Final Stormwater Technical Memorandum

#### Table 1. Change in Impervious Cover

Total Area (ac)	Existing Impervious (ac)	Existing Percent Impervious	Proposed Impervious Overall (ac)	Proposed Impervious New (ac)	Proposed Percent Impervious	Percent Impervious Increase
44	23	52%	29	6	66%	14%

#### **Table 2. Potential BMP Strategies**

Location	BMP Type (Bold text represents footprint used in Figures)	BMP Surface Area (square feet)				
South of Shingle Creek	Wet Pond or Bioretention	17,650 Wet Pond or 7,750 Bioretention				
Shingle Creek – Immediate Northwest Area	Wet Pond or Bioretention	4,950 Wet Pond or 800 Bioretention				
Shingle Creek – Immediate Northeast Area	Hydrodynamic Separator	N/A				
Options for Drainage between Maplebrook Parkway and College Park						
<ol> <li>College Park or NHCC (BMP treats both proposed trunk storm sewers)</li> </ol>	Underground Storage or Filtration	<b>28,350 Underground Detention</b> or 12,300 Underground Filtration				
<ol> <li>NHCC (BMP treats east trunk storm sewer only)</li> </ol>	Underground Storage or Filtration	8,550 Underground Detention or 5,950 Underground Filtration				
<ol> <li>College Park (BMP treats west storm sewer only)</li> </ol>	Underground Storage or Filtration	9,050 Underground Detention or 5,850 Underground Filtration				
Maplebrook Parkway to 93rd Avenue	Setzler Pond re-grading and Hydrodynamic Separator	Within same footprint as existing pond.				
93rd Avenue	Boulevard BMPs	Maximize Available Boulevard Space				

# Conclusion

The proposed West Broadway reconstruction will affect water resources in a variety of ways. The increased roadway and impervious surfaces and the decrease in ditch capacity will have the effect of increasing runoff quantity and pollutant loading. The preliminary stormwater management plan proposes several mitigation measures, including the use of existing regional facilities, expansion of existing facilities, and construction of new BMPs at key locations throughout the corridor near storm sewer outfalls. Further information is needed regarding DWSMA protection requirements, groundwater elevations, and soil types in order to finalize the selected BMP strategies. The stormwater management plan will need to be approved by the SCWM WMC and the City of Brooklyn Park, and therefore, to the extent practicable, adverse impacts due to the project will be mitigated.



# **APPENDIX A. Regulatory Matrix**

#### WEST BROADWAY (CSAH 103) RECONSTRUCTION

#### Water Resources - Regulatory Matrix

7/17/2015

<b>Requirements Summary</b>								
Organization	Rainfall Data	Rate Control	Water Quality (1)	Volume Control	Floodplain/Flood Control Requirements	Erosion and Sediment Control	Plan Review Process	Comments
SCWMC and WMWMC SCWMC Rules and Standards, dated April 2013 Applies to Segments C, BP2, and BP1	Atlas 14	Existing rates for 2-, 10-, and 100- year events	Remove 60% of P and 85% of TSS Use NURP ponds or infiltrate all site runoff from 1.3-inch event NURP pond dead storage requirement is runoff from 2.5- inch storm event over the contributing drainage area	1-inch of runoff from impervious surfaces.	Floodplain alteration/filling shall not cause a net decrease in flood storage capacity below the 100- year critical flood elevation unless it is shown that the proposed alteration or filling, together with the alteration or filling of all other land on the affected reach to the same degree of encroachment will not cause high water or aggravate flooding on other land and will not unduly restrict flood flows.	Meet the standards of the NPDES Permit; all erosion and sediment controls shall be installed before commencing the land disturbing activity, and shall not be removed until completion; the activity shall be phased when possible to minimize the disturbed areas subject to erosion at any one time.	The Commission reviews proposed land development and redevelopment projects affecting water resources. Projects are reviewed in accordance with the management standards and policies of the SCWMC and recommendations are made to the member City in which the project is located. It is the City's responsibility to enforce the Commission's recommendations. Linear projects that create one acre or more of new impervious surface must meet all Commission requirements for the <b>net new impervious surface</b> . Projects impacting wetlands where Commission is LGU must be reviewed regardless of size. Plans for developemtn within the 100-year floodplain as defined by the FIS must be reviewed.	
MPCA	NA	NA	Water quality volume of 1-inch of runoff from new impervious surfaces must be retained on site. If infiltration is prohibited,must use other methods of volume reduction and the water quality volume (or remainder if some volume (une (or remainder if some volume treated by a wet sedimentation basin, filtration system, regional ponding or equivalent methods prior to discharge of stormwater to surface waters. If use wet sedimentation pond to provide treatment, dead storage requirement is 1800 cubic feet per acre of surface area drained	Water quality volume of 1-inch of runoff from new impervious surfaces must be retained on site. If infiltration is prohibited,must use other methods of volume reduction and the water quality volume (or remainder if some volume reduction is achieved) must be treated by a wet sedimentation basin, filtration system, regional ponding or equivalent methods prior to discharge of stormwater to surface waters.	NA	See permit language for details on erosion and sediment control requirements.	SWPPP must be submitted to MPCA for review if the project size is 50 acres or more and will discharge to special or impaired waters. Application and SWPPP must be submitted at least 30 days before the start of the construction activity.	

<b>Requirements Summary</b>								
Organization	Rainfall Data	Rate Control	Water Quality (1)	Volume Control	Floodplain/Flood Control Requirements	Erosion and Sediment Control	Plan Review Process	Comments
City of Brooklyn Park		Must meet SCWMC standards.	Must meet SCWMC standards.	Must meet SCWMC standards.	Railroad tracks, roads, and	Must meet SCWMC standards.	Must submit application to City	
					bridges must be elevated above		Manager. SCWMC will review	
Email from Kevin Larson (City),					the regulatory flood protection		projects that fall within	
dated 2/4/14					elevation where failure of		watershed review authority.	
					facilities would result in danger			
Flood Hazard Area Overlay					to public healthy/safety or			
Ordinance (152.510)					where facilities are essential to			
					orderly function of area. None of			
					these uses shall increase flood			
					elevations. No fill, excavation, or			
					storage of materials or			
					equipment that obstruct flows or			
					increase flood elevations will be			
					permitted.			

(1) Wet stormwater pond design should follow the guidelines in the MPCA Stormwater Manual for dead storage depth, side slopes, and benches.



Final Stormwater Technical Memorandum

# **APPENDIX B. Water Resources Figures**







### WEST BROADWAY AVENUE (CSAH 103) RECONSTRUCTION FROM SOUTH OF CANDLEWOOD DRIVE TO NORTH OF 93RD AVENUE (CSAH 30)

Hennepin

WATER RESOURCES PRELIMINARY OVERVIEW FIGURE 3 OF 3 NOTES:

() LARGER SUBWATERSHED BOUNDARY TO SETZLER POND EXTENDS INTO OSSEO AND MAPLE GROVE.

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(2) DRAINS TO TH610 PONDS

(3) CSAH 103 STORMWATER MANAGEMENT PLAN INCLUDES TREATMENT FOR FUTURE CSAH 30/93RD AVE PROJECT.

NORTH 0 150 300 600 SCALE

DRAFT-WORK IN PROCESS

08/21/2015

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Brandi Poppenhagen, PE
Lisa Goddard, PE Erin Hunker, PE, CFM
August 21, 2015
Preliminary Floodplain Impacts and Mitigation Plan

# Introduction

### Purpose

This Floodplain Technical Memorandum has been prepared in support of the West Broadway Avenue (CSAH 103) project Environmental Assessment Worksheet (EAW). The objective of this memorandum is to evaluate the West Broadway project's potential impacts to floodplains within the study area and to identify potential mitigation measures. This includes the following:

- Identify regulatory requirements that will set forth mitigation standards that are specific to floodplain management.
- Identify potential mitigation areas that would be used to compensate for the floodplain impacts along the West Broadway corridor.

This report contains qualitative and quantitative design recommendations for the West Broadway corridor that will be used by the consultant team preparing the EAW and will provide information on how the project would meet various regulatory requirements.

### **Data Collection**

Flood Insurance Rate Maps (FIRMS) and Federal Emergency Management Agency (FEMA) Flood Insurance Study Numbers 27053CV001A and 27053CV002A were used to identify floodplains and floodways within the West Broadway project area. The floodplains within this area are associated with Shingle Creek and the Century Channel Ponds. All floodplain elevations were adjusted from National Geodetic Vertical Datum 1929 (NGVD 29) to North American Vertical Datum 1988 (NAVD 88) by adding 0.22 feet to the NGVD 29 elevations. FEMA 100-year floodplain and floodway GIS shapefiles were downloaded from the DNR floodplain/floodway ftp sites and used to determine the impacts of the West Broadway project. Century Channel Ponds 7 and 8 and a portion of the Shingle Creek floodplain had been omitted from the digitized GIS shapefile. These floodplain shapes were added by SRF Consulting Group staff, who hatched the LiDAR contours below the adjusted 100-year floodplain elevation listed in FIS 27053CV001A. These areas are shown on Figures 1 – 3 in Appendix A.

Two other floodplain areas shown in the GIS shapefiles are known to be incorrect, but they have not been corrected in the figures included in Appendix A. The City of Brooklyn Park is in the process of applying for a Letter of Map Revision (LOMR) from FEMA for a portion of the Shingle Creek floodplain on the west side of West Broadway, adjacent to the creek crossing. It is assumed that the LOMR will be approved, and the annotated DFIRM and hydraulic modeling prepared for the LOMR was used to determine the floodplain impacts at this location. The GIS shapefiles will be updated to reflect the LOMR once it has been approved.



The second area is Pond 5, which is located in the northeast quadrant of 93<sup>rd</sup> Avenue N and West Broadway Avenue. The 610 Commerce Site was recently constructed at this location, and it is unknown at this time if the floodplain elevation has been altered. Based upon discussions with City staff, a LOMR was not submitted for the impact to the floodplain of Pond 5, but based on aerial imagery, it is clear that the boundary shown on the FIRM is no longer accurate.

# **Regulatory Environment**

The project is located within the Shingle Creek and West Mississippi watersheds. Floodplain impacts occur to water resources in both watersheds. In addition to the watershed organizations, there are other local and state agencies that play a role in floodplain management and impacts to water resources within the study area. These include:

- Shingle Creek and West Mississippi Watershed Management Commissions (SCWMC and WMWMC, or SCWM WMC when referred to in reference to their joint watershed management plan)
- City of Brooklyn Park
- Federal Emergency Management Agency (FEMA)
- Minnesota Department of Natural Resources (DNR)

Regulatory and permitting authority for floodplain impacts for the West Broadway project falls to the City of Brooklyn Park and the SCWM WMC. The other agencies listed are responsible for review and permitting of surface water related issues resulting from construction of the project. Regulations change periodically, and the West Broadway project will be subject to regulations in effect when the design is submitted for approval by the permitting authorities.

### Shingle Creek and West Mississippi Watershed Management Commissions

The SCWMC and WMWMC are two separate water management organizations (WMOs); however, they plan and conduct business jointly, managing waters within its boundaries. Each are governed by the Joint Powers Agreement that is held between the watershed organization and the communities/members that are located within the boundaries of the WMOs. The communities within the boundaries include parts of Brooklyn Center, Brooklyn Park, Crystal, Maple Grove, Minneapolis, New Hope, Plymouth, Robbinsdale, and Champlin.

The SCWM WMC manages waters through its Third Generation Watershed Management Plan, which was adopted in 2013. This Plan complies with the water resource protection requirements under Minnesota Statues 103A through 103G in conformance with Minnesota Rules Chapters 8410 and 8420.

The SCWM WMC's rules address floodplain alteration within the watershed. No person or political subdivision shall alter or fill land below the 100-year critical flood elevation of any public waters, public waters wetland or other wetland without first obtaining an approved project review from the Commission. Floodplain alteration or filling shall not cause a net decrease in flood storage capacity below the projected 100-year critical flood elevation unless it is shown that the proposed alteration or filling, together with the alteration or filling of all other land on the affected reach of the waterbody to the same degree of encroachment as proposed by the applicant, will not cause high water or aggravate flooding on other land and will not unduly restrict flood flows. The SCWM WMC also requires compensatory storage for floodplain fill.



The SCWM WMC also requires approval of a project review of any new or improved crossing of Shingle Creek. The crossings shall retain adequate hydraulic capacity based on the hydraulic model of the creek, not adversely affect water quality, represent the "minimal impact" solution to a specific need with respect to all reasonable alternatives, and allow for future erosion, scour, and sedimentation maintenance considerations.

## **City of Brooklyn Park**

The City of Brooklyn Park has adopted zoning regulations to manage land uses in the mapped floodplain. These regulations include the minimum federal and state regulations, which are enforced in the 1-percent chance (100-year) floodplain that is mapped on the Flood Insurance Rate Map (FIRM) for Brooklyn Park. The Brooklyn Park ordinance requires that no fill, excavation, or storage of materials or equipment that obstruct flows or increase flood elevations will be permitted within the flood fringe or floodway.

### Federal Emergency Management Agency

Executive Order (EO) 11988 requires all federal agencies to evaluate and, to the extent possible, avoid adverse impacts to floodplain areas which may result from actions they administer, regulate, or fund. EO 11988 specifically requires floodplain impacts to be considered in the preparation environmental documents. FEMA, under that National Flood Insurance Program (NFIP) has the authority to regulate floodplains and floodways.

Executive Order 13690, Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input, was implemented on January 30, 2015. The EO 13690 amends EO 11988 and states that the floodplain shall be:

- (1) The elevation and flood hazard area that result from using a climate-informed science approach that uses the best-available, actionable hydrologic and hydraulic data and methods that integrate current and future changes in flooding based on climate science. This approach will also include an emphasis on whether the action is a critical action as one of the factors to be considered when conducting the analysis.
  - a. This could mean using flow rates based on the new precipitation intensity-duration-frequency curves, called Atlas 14, or using flows based on regression equations using more recent stream gage data. However, according to the FAQ section of the National Oceanic and Atmospheric Administration (NOAA) website (http://www.nws.noaa.gov/oh/hdsc/FAQ.html#1.5), Atlas 14 volumes are "based on the assumption of stationary climate." It appears that the project's use of Atlas 14 precipitation frequencies would not qualify as a climate-informed science approach based on NOAA guidance.
- (2) The elevation and flood hazard area that result from using the freeboard value, reached by adding an additional two feet to the base flood elevation for non-critical actions and by adding an additional three feet to the base flood elevation for critical actions. The term 'critical action' shall mean any activity for which even a slight chance of flooding would be too great.
- (3) The area subject to flooding by the 0.2 percent (500-year) annual chance flood.
- (4) The elevation and flood hazard area that results from using any other method identified in an update to the Federal Flood Risk Management Standard (FFRMS).

The West Broadway project is using Option 2, Noncritical Action (100-year elevation plus two feet of freeboard) to determine the elevation of the roadway profile, which will ensure the intent for resilient infrastructure in EO 13690 is met.

Rivers and streams for which FEMA has prepared detailed engineering studies may have designated floodways. The floodway is the area of the floodplain that must remain free from obstruction so that the 100-year flood can be conveyed downstream. Placing fill or buildings in the floodway may block the flow of water and increase flood elevations. Such activities in the floodway are generally restricted and require mitigation in the form of



compensatory storage volume to offset the lost floodway storage. Similarly, activities in the floodplain that reduce flood storage capacity are also restricted and would require compensatory storage volume.

### **Minnesota Department of Natural Resources**

On behalf of FEMA, the DNR and the local government units (i.e., the cities and watershed management organizations) also regulate activities that may impact floodplains, including activities such as construction, excavation, or deposition of materials over, or under waters that may affect flood stage, floodplain, or floodway boundaries.

The DNR has developed regulatory standards for floodplain development within the State. Local government units (LGUs) must at a minimum adopt these standards. The requirement for allowing fill within the flood fringe is that it generally cannot:

- Increase the 100-year flood elevation more than 1/2 foot above the natural unobstructed condition, or
- Increase the 100-year flood elevation if the filling would negatively impact existing floodplain development (even if the increase would be less than <sup>1</sup>/<sub>2</sub> foot)

# **Floodplain Impacts and Mitigation**

The West Broadway reconstruction project extends from approximately Candlewood Drive N to the Holiday Gas Station between 93rd Avenue N (CSAH 30) and TH610 at the north end. There are several floodplains within the project area that will be impacted by the reconstruction of West Broadway Avenue. The following sections include a summary of the impacts and identify potential on-site floodplain storage mitigation areas that have been preliminarily evaluated for the project.

### **Shingle Creek**

The 100-year floodplain and floodway associated with Shingle Creek crosses West Broadway Avenue at the existing culvert crossing. The mapped floodplain is wider on the upstream (west) and downstream (east) ends of the crossing. As mentioned previously, the City of Brooklyn Park is in the process of getting a LOMR approved for this area, which reduces the floodplain extents on the upstream side of the culvert to account for fill that was placed within the property directly adjacent to West Broadway on the south side of Shingle Creek and a floodplain mitigation area that was constructed on the opposite side of the Creek from the impacted property.

As part of this project, West Broadway Avenue will be expanded to fit the BLRT Extension project and incorporate trails into the roadway section. The profile will be raised to account for the floodplain freeboard requirements in EO 13690. These changes will result in floodplain fill impacts to the Shingle Creek floodplain. The total proposed floodplain fill for the Shingle Creek Floodplain is 7,500 cubic yards.

Several potential floodplain mitigation areas have been identified along the Shingle Creek floodplain. The mitigation would include excavation of adjacent ground below the 100-year floodplain elevation to provide compensatory floodplain storage for the fill placed within the floodplain. See Figures 1 and 2 in Appendix A of this memorandum for locations of the potential floodplain mitigation areas.

### **Century Channel Ponds**

The Century Channel Ponds include Setzler Pond and DNR Wetland #559W. Historically, these basins were part of Century Channel, which now consists of a series of wetlands, ponds, and culverts that discharge to Mattson Brook



east of West Broadway, and ultimately to the Mississippi River. The Century Channel Ponds were added to the Hennepin County FIS and FIRM through a LOMR in the early 2000s.

#### Setzler Pond

Setzler Pond is located in the northwest quadrant of the intersection of 89<sup>th</sup> Avenue N and West Broadway. The expansion of West Broadway will result in floodplain fill impacts to Setzler Pond. The total proposed floodplain fill is 500 cubic yards. The potential mitigation for the floodplain fill placed within the floodplain of Setzler Pond is shown on Figure 3 in Appendix A.

#### DNR Wetland (#559W)

DNR #559W is located between 92nd Avenue N and Setzler Parkway, and is bisected by West Broadway Avenue. The expansion of West Broadway will result in 5,500 cubic yards of fill within the floodplain of DNR #559W. The potential mitigation for the floodplain fill placed within the floodplain of this wetland is shown on Figure 3 in Appendix A.

#### Pond 5

Pond 5 of the Century Channel Ponds is located in the northeast quadrant of 93<sup>rd</sup> Avenue N (CSAH 30) and West Broadway Avenue. The Pond 5 floodplain was recently impacted by development, and it is unknown at this time if the floodplain elevation or boundary has been altered.

# Conclusion

This Floodplain Technical Memorandum has been prepared in support of the EAW for the West Broadway Avenue project. The memorandum includes a summary of the regulatory environment for floodplain management within the project area, a summary of the proposed floodplain impacts from the project, and identifies potential floodplain mitigation areas within the project corridor. Figures 1 through 3 in Appendix A show the locations of the floodplains, proposed impacts, and potential mitigation sites. The information in this memorandum will be used by the consultant team preparing the EAW and will provide information on how the project would meet various regulatory requirements.



# **APPENDIX A. Floodplain Figures**











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### APPENDIX 5: AGENCY LETTERS AND RESPONSES

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Kelly Garvey HDR Engineering 701 Xenia Ave South, Suite 600 Minneapolis, MN 55416

May 7<sup>th</sup>, 2015

Lisa Joyal, Endangered Species Review Coordinator Division of Ecological and Water Resources Minnesota Department of Natural Resources 500 Lafayette Road, Box 25 St. Paul, MN 55155

RE: County State Aid Highway (CSAH) 103 (West Broadway Avenue) Reconstruction Project Environmental Assessment Worksheet (EAW)

Dear Lisa,

HDR Engineering on behalf of Hennepin County (County) is requesting the Minnesota Department of Natural Resources (MDNR) input on the following project. The County is proposing to reconstruct CSAH 103 (West Broadway Avenue) in the City of Brooklyn Park from south of Candlewood Drive to north of CSAH 30 (93<sup>rd</sup> Avenue). The project is approximately two miles in length. The roadway needs to be reconstructed to address its poor pavement condition, its inability to move traffic efficiently and areas of poor safety performance. The project will be located in T199N, R21W Sections 7, 8, 17, 18 19 and 20 of Hennepin County. The existing roadway is a mixture of two-lanes (one in each direction) with areas near intersections where it was widened with turn lanes and/or additional through lanes.

The MDNR provided input on this project in 2008 when a draft EAW was put out for review, however, never finalized. At that time the project was issued the following correspondence reference number ERDB 20080777 and the query results showed that there were no known occurrences of rare species or other significant natural features within an approximate 1 mile radius of the project area. HDR queried the MDNR Natural Heritage Information System data on May 7, 2015 under our license agreement (LA-717) for rare species or other significant natural features that may be known to occur within an approximate one mile radius of the proposed project. The results were the same as the 2008 query which showed there were no known occurrences of rare species or other significant natural features.

The project would consist of reconstructing West Broadway Avenue from south of Candlewood Drive to north 93<sup>rd</sup> Avenue to four lanes (two in each direction) with dedicated left turn lanes and shared use paths on either side of the road. The proposed roadway cross section includes a wide center median to accommodate potential future transit service. Currently, a light rail transit project known as the Blue Line extension is under development. The light rail project would run down the center of West Broadway Avenue. The schedule for the Blue Line extension currently is running parallel with the West Broadway

Avenue reconstruction project schedule; therefor the two projects are being closely coordinated with respect to impacts and design considerations.

Construction and operation methods that will cause or involve physical manipulation of the environment within the construction limits are expected to include:

- Excavation and removal of poor soils not suitable for the roadway construction
- Demolition and removal of related sewer and water facilities
- Trench excavation for storm sewer and watermain installation
- Stormwater Treatment Pond excavation
- · Grading of roadway base to prepare for concrete curb construction and bituminous paving
- Grading of trail to prepare for bituminous paving
- · Grading of sidewalk to prepare for concrete paving
- Curb and gutter installation
- Bituminous paving of the roadway and multi-use trail
- Concrete paving of the sidewalk
- Temporary and permanent erosion control and turf establishment
- Traffic signal construction and upgrades
- Trench excavation for relocation and burial of private utilities

We are requesting MDNR's review and approval of the findings identified above. We appreciate any information you can provide that will help us evaluate project impacts. We would like your input by June 8, 2015, if possible. If you have questions please contact Kelly Garvey (HDR Engineering), 763-591-5453.

Sincerely,

Kelly Garvey HDR Environmental Project Manager

"Enclosure"

Hi Kelly,

I have reviewed your assessment of the potential for the above project to impact rare features, and concur with your assessment. Thank you for notifying us of this project, and for the opportunity to provide comments.

Have a great weekend, Samantha Bump NHIS Review Specialist (651) 259-5091 Division of Ecological and Water Resources Minnesota Department of Natural Resources 500 Lafayette Road, Box 25 St. Paul, MN 55155

samantha.bump@state.mn.us www.mndnr.gov/eco



#### DEPARTMENT OF THE ARMY ST. PAUL DISTRICT, CORPS OF ENGINEERS 180 FIFTH STREET EAST, SUITE 700 ST. PAUL MINNESOTA 55101-1678

05/12/2015

REPLY TO ATTENTION OF Operations Regulatory (MVP-2015-01496-MMJ)

#### THIS IS NOT A PERMIT

Kelly Garvey HDR Engineering 701 Xenia Ave. South, Suite 600 Minneapolis, MN 55416

Dear Ms. Garvey:

We have received your submittal described below. You may contact the Project Manager with questions regarding the evaluation process. The Project Manager may request additional information necessary to evaluate your submittal.

File Number: MVP-2015-01496-MMJ

Applicant: Hennepin County

Project Name: Hennepin County / CSAH 103 Reconstruction Project

Received Date: 05/11/2015

Project Manager: Melissa Jenny U.S. Army Corps of Engineers Regulatory Branch 180 Fifth Street East, Suite 700 St. Paul, Minnesota 55101-1678 651-290-5363

Additional information about the St. Paul District Regulatory Program can be found on our web site at http://www.mvp.usace.army.mil/missions/regulatory.

Please note that initiating work in waters of the United States prior to receiving Department of the Army authorization could constitute a violation of Federal law. If you have any questions, please contact the Project Manager.

Thank you.

U.S. Army Corps of Engineers St. Paul District Regulatory Branch

### Minnesota Historical Society

#### STATE HISTORIC PRESERVATION OFFICE

June 11, 2015

Kelly Garvey Environmental Project Manager HDR Engineering 701 Xenia Ave S, Suite 600 Minneapolis, MN 55416

RE: CSAH 103 (West Broadway Avenue) Reconstruction Project From south of Candlewood Drive to north of CSAH 30 (93<sup>rd</sup> Avenue) Brooklyn Park, Hennepin County SHPO Number: 2015-1961

Dear Ms. Garvey:

Thank you for the opportunity to review and comment on the above project. Because we have been provided indication that this is a Hennepin County project, information received on 11 May 2015 has been reviewed pursuant to the responsibilities given the Minnesota Historical Society by the Minnesota Historic Sites Act and the Minnesota Field Archaeology Act.

Based on our review of the project information recently submitted, our records indicate that there are no properties listed in the National or State Registers of Historic Places and no known or suspected archaeological properties in the "Project Footprint" as indicated on the map submitted with your May 7<sup>th</sup> letter.

It is our understanding that this proposed road improvement project is being designed in coordination with the proposed Metro Blue Line Extension Light Rail Transit (BLRT) corridor, but that this current project is being funded with local funds. As you know, we are currently participating in consultation on the BLRT project with the Federal Transit Administration and their delegated agent for purposes of Section 106 review, the Minnesota Department of Transportation's Cultural Resources Unit (CRU).

Because this comment letter does not address the requirements of Section 106 of the National Historic Preservation Act of 1966, we request clarification regarding whether or not this proposed project is considered part of the BLRT federal undertaking or if it meets the definition of a separate federal "undertaking" per 36 CFR 800.16.

Please feel free to contact me if you wish to discuss this further. I can be reached at 651-259-3456 or sarah.beimers@mnhs.org.

Sincerely,

Sarang. Barners

Sarah J. Beimers, Manager Government Programs and Compliance

cc: Greg Mathis, Minnesota Department of Transportation CRU

Kelly Garvey HDR Engineering 701 Xenia Ave South, Suite 600 Minneapolis, MN 55416

June 19, 2015

Sarah Beimers Management of Government Programs and Compliance State Historic Preservation Office Minnesota Historical Society 345 Kellogg Blvd W St. Paul, MN 55102

RE: County State Aid Highway (CSAH) 103 (West Broadway Avenue) Reconstruction Project Environmental Assessment Worksheet (EAW)

Dear Ms. Beimers,

Thank you for your review of the CSAH 103 Reconstruction Project. HDR is providing clarification on behalf of Hennepin County to address your comments submitted in a letter dated June 11, 2015. The CSAH 103 project is not considered part of the BLRT federal undertaking. The CSAH 103 project has a separate purpose and need and has independent utility; were the BLRT project delayed or eliminated, the CSAH 103 reconstruction would still need to take place. In addition, the CSAH 103 project does not meet the definition of a separate federal undertaking because it is not being funded or being carried out by a federal agency. We appreciate your review. If you have further questions please contact Kelly Garvey (HDR Engineering) at 763-591-5453.

Sincerely,

Kelly Garvey U HDR Environmental Project Manager

cc: Jennifer Lowry, Hennipen County Chad Ellos, Hennepin County Greg Mathis, Minnesota Department of Transportation CRU

### **APPENDIX 6: TRAFFIC TECHNICAL MEMORANDUM**

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### MEMORANDUM

Re:	Hennepin County CSAH 103 EAW Traffic Analysis
Date:	August 4, 2015
	Bud Williams
From:	Marc Briese
To:	Brandi Popenhagen

#### 1.0 Existing and Forecast Corridor Traffic Demand

Existing and future traffic demands were analyzed along the County State Aid Highway (CSAH) 103 (West Broadway Avenue) corridor for use the in CSAH 103 Environmental Assessment Worksheet. **Table 1** displays planning level capacity analysis using existing and 2040 forecast average annual daily traffic (AADT) volumes. Existing volumes were based on a combination of 2012 and 2014 counts. Planning level capacity thresholds for 2-lane and 4-lane alternatives were taken from the Hennepin County Planning Division and are 14,700 and 29,200, respectively. The table shows that the existing traffic volume of the segment between CSAH 109 (85<sup>th</sup> Avenue North) and CSAH 30 (93<sup>rd</sup> Avenue North) is only 1,400 vehicles per day (vpd) below the capacity threshold for a two-lane section, while the projected volumes for the same segment would exceed the capacity of a two-lane section by 2,300 vpd. The segment south of 85<sup>th</sup> Avenue North is within 3,200 vpd of its capacity today and is expected to exceed available capacity by 1,000 vpd in 2040. Please note the significant findings shaded in red in the table.

			AA	DT	Over/Under Capacity <sup>2</sup>		
Location on CSAH 103 (W Broadway Blvd)	Existing Design	Section Capacity <sup>1</sup>	Existing (2012 & 2014)	Forecast (2040)	Existing (2012 & 2014)	Forecast No Build	
Between TH 610 and 93rd Ave	4-lane divided	29,200	13,900	20,000	15,300	9,200	
Between 93rd Ave and 85th Ave	2-lane	14,700	13,300	17,000	1,400	(2,300)	
Between 85th Ave and Brooklyn Blvd	4-lane undivided	20,000	16,800	21,000	3,200	(1,000)	

#### Table 1: Existing and Forecast AADT and Capacity Analysis

Source: Kimley-Horn

<sup>1</sup> Planning level capacities are highly dependent on assumptions used such as access spacing, peak hour percent, directional distribution, saturation flow rates, etc. Values should not be used for operational analysis or final design.

<sup>2</sup> Positive numbers indicate that additional capacity is available. Negative numbers indicate over capacity.

#### 2.0 Existing and Forecasted Intersection Turning Movement Volumes

Turning movement volumes were collected for the AM and PM peak hour at all the intersections between 78th Avenue North and 94th Avenue North and are show in **Tables 2 and 3** below:

Internetien.	N	orthbou	nd	Sc	outhbou	nd	E	astboun	d	v	/estbou	nd
Intersection	Left	Thru	Right									
CSAH 103 / 94th Ave N	63	282	-	-	842	131	50	-	94			-
CSAH 103 / CSAH 30 (93rd Ave N)	54	190	25	27	599	310	114	153	26	72	244	41
CSAH 103 / 92nd Ave N	11	242	0	4	611	82	5	1	4	12	3	22
CSAH 103 / Setzler Pkwy	15	200	16	20	580	27	5	0	4	62	0	48
CSAH 103 / 89th Ave N	5	220	-		598	48	11	-	8	-		-
CSAH 103 / Maplebrook Pkwy	5	176	9	3	589	14	34	3	17	46	5	15
CSAH 103 / CSAH 109 (85th Ave N)	55	117	62	65	491	96	40	305	115	182	415	33
CSAH 103 / 84th Ave N	2	223	57	139	648	1	3	0	_ 5	_ 15	0	8
CSAH 103 / College Park Dr	8	280	-		662	6	2	-	40			-
CSAH 103 / 82nd Ave N	11	360	-	-	697	5	3	_	38	-	-	-
CSAH 103 / Candlewood Dr		348	22	16	719				-	87	-	23
CSAH 103 / 78th Ave N	0	344	3	11	794	1	0	0	1	7	0	26
Source: Kimley Horn Design Team												

#### Table 2: 2014 AM Peak Hour Turning Movement Volumes

#### Table 3: 2014 PM Peak Hour Turning Movement Volumes

	N	orthbou	nd	Sc	outhbou	nd	E	astboun	d	Westbound		
Intersection	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
CSAH 103 / 94th Ave N	65	878	-		579	82	110	-	91			
CSAH 103 / CSAH 30 (93rd Ave N)	26	577	74	78	383	209	298	222	47	53	132	68
CSAH 103 / 92nd Ave N	8	609	5	17	455	11	64	0	32	4	0	4
CSAH 103 / Setzler Pkwy	2	572	58	44	445	2	26	1	10	26	0	24
CSAH 103 / 89th Ave N	8	582			462	19	50		29			
CSAH 103 / Maplebrook Pkwy	14	554	51	12	446	33	26	6	9	24	2	10
CSAH 103 / CSAH 109 (85th Ave N)	131	437	338	70	310	99	138	707	160	142	393	44
CSAH 103 / 84th Ave N	6	809	47	87	521	4	6	0	4	72	2	91
CSAH 103 / College Park Dr	52	855		1222	592	5	7		33	232		
CSAH 103 / 82nd Ave N	32	939	_	-	622	3	7	_	19	-	-	-
CSAH 103 / Candlewood Dr		951	113	27	614	_			-	63	-	20
CSAH 103 / 78th Ave N	11	1033	15	31	638	8	3	0	5	8	1	28
Source: Kimley Horn Design Team												

Year 2040 forecast turning movement volumes for the two build alternatives were developed for the AM and PM peak hour at all of the intersections between 78<sup>th</sup> Avenue North and 94<sup>th</sup> Avenue North. Shown in **Table 4** are the existing and assumed forms of traffic control for each intersection that were used for the purposes of modeling and trip distribution. **Tables 5 and 6** include AM and PM projected turning movement counts for the 2040 No-Build scenario. **Tables 7 through 10** below include AM and PM projected turning movement volumes for two 2040 scenarios: "Build-01" and "Build-02." "Build-01" includes right-in-right-out access at intersection of West Broadway Avenue with Maplebrook Parkway/Maplebrook Terrace. It also includes a traffic signal at the intersection of 85<sup>th</sup> Avenue South and Maplebrook Parkway which maintains its existing full movement functionality (outside of immediate study area). The "Build-02" scenario includes a traffic signal at the intersection of West Broadway Avenue and Maplebrook Parkway/Maplebrook Terrace, maintaining its full movement functionality. "Build-02" also maintains the existing full movement, thru-stop traffic control at the intersection of 85<sup>th</sup> Avenue South and Maplebrook Parkway.

Intersection	Inters	ection Traffic Contro	bl
	Existing and No-Build <sup>1</sup>	Build-01 <sup>2</sup>	Build-02 <sup>2</sup>
CSAH 103 / 94th Ave N	Thru-stop	Signal	Signal
CSAH 103 / CSAH 30 (93rd Ave N)	Signal	Signal	Signal
CSAH 103 / 92nd Ave N	Thru-stop	Thru-stop (RIRO)	Thru-stop (RIRO)
CSAH 103 / Setzler Pkwy	Thru-stop	Signal	Signal
CSAH 103 / 89th Ave N	Thru-stop	Thru-stop (RIRO)	Thru-stop (RIRO)
CSAH 103 / Maplebrook Pkwy	Thru-stop	Thru-stop (RIRO)	Signal
CSAH 103 / CSAH 109 (85th Ave N)	Signal	Signal	Signal
CSAH 103 / 84th Ave N	Signal	Thru-stop (RIRO)	Thru-stop (RIRO)
CSAH 103 / College Park Dr	Thru-stop	Signal	Signal
CSAH 103 / 82nd Ave N	Thru-stop	Thru-stop (RIRO)	Thru-stop (RIRO)
CSAH 103 / Candlewood Dr	Thru-stop	Signal	Signal
CSAH 103 / 78th Ave N	Thru-stop	Thru-stop (RIRO)	Thru-stop (RIRO)

Table 4: Existing and Assumed Form of Intersection Traffic Control

<sup>1</sup> Thru-stops incude full access movements

<sup>2</sup> Thru-stops incude right-in-right-out (RIRO) access only

	N	orthbou	nd	Sc	outhbou	nd	E	astboun	d	V	/estbou	nd
Intersection	Left	Thru	Right									
CSAH 103 / 94th Ave N	80	475	0	0	1160	200	70	0	100	0	0	0
CSAH 103 / CSAH 30 (93rd Ave N)	55	270	45	110	750	405	140	255	25	105	380	145
CSAH 103 / 92nd Ave N	15	345	0	5	780	100	5	5	5	15	0	25
CSAH 103 / Setzler Pkwy	15	290	20	30	740	30	5	0	5	70	0	60
CSAH 103 / 89th Ave N	10	330	0	0	770	45	15	0	15	0	0	0
CSAH 103 / Maplebrook Pkwy	5	280	10	5	770	20	40	5	35	65	10	20
CSAH 103 / CSAH 109 (85th Ave N)	60	195	70	85	660	125	45	330	130	200	445	45
CSAH 103 / 84th Ave N	0	315	135	155	835	1	5	0	5	20	0	10
CSAH 103 / College Park Dr	10	440	0	0	850	10	5	0	45	0	0	0
CSAH 103 / 82nd Ave N	10	450	0	0	880	20	5	0	40	0	0	0
CSAH 103 / Candlewood Dr	0	435	25	20	905	0	0	0	0	95	0	25
CSAH 103 / 78th Ave N	0	435	5	15	985	5	0	0	1	10	0	30
Source: HDR / Kimley Horn Design Tean	า			-			-			-		

Table 5: 2040 AM Peak Hour Turning Movement Volumes No-Build

Table 6: 2040 PM Peak Hour Turning Movement Volumes No-Build

	N	orthbou	nd	Sc	Southbound			astboun	d	Westbound		
Intersection	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
CSAH 103 / 94th Ave N	75	1225	0	0	900	125	130	0	110	0	0	0
CSAH 103 / CSAH 30 (93rd Ave N)	25	715	105	225	500	285	380	335	45	85	215	205
CSAH 103 / 92nd Ave N	10	775	0	25	595	15	70	0	40	5	0	5
CSAH 103 / Setzler Pkwy	5	725	65	55	580	5	30	1	10	30	0	30
CSAH 103 / 89th Ave N	10	745	0	0	605	20	50	0	45	0	0	0
CSAH 103 / Maplebrook Pkwy	25	705	60	15	610	30	30	10	20	35	5	20
CSAH 103 / CSAH 109 (85th Ave N)	155	575	385	85	450	130	165	745	190	170	425	50
CSAH 103 / 84th Ave N	0	1010	_80	_100	_705_	5	5	0	_ 5	80	2	100
CSAH 103 / College Park Dr	65	1080	0	0	780	10	15	0	30	0	0	0
CSAH 103 / 82nd Ave N	35	1140	0	0	810	5	10	0	20	0	0	0
CSAH 103 / Candlewood Dr	0	1160	130	30	800	0	0	0	0	75	0	20
CSAH 103 / 78th Ave N	15	1265	5	15	840	25	0	0	1	10	0	30
Source: HDR / Kimley Horn Design Tean	n											

#### Table 7: 2040 AM Peak Hour Turning Movement Volumes "Build-01"

		North	bound			South	bound		Eá	astbour	nd	Westbound		
Intersection	U-turn	Left	Thru	Right	U-turn	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
CSAH 103 / 94th Ave N	-	80	475	-	-	-	1160	200	70	-	100	-	-	-
CSAH 103 / CSAH 30 (93rd Ave N)	15	25	715	105		110	750	405	140	255	25	105	380	145
CSAH 103 / 92nd Ave N	-		360	10	-		800	115	-		15		-	40
CSAH 103 / Setzler Pkwy	90	15	290	20	15	30	740	30	5	0	5	70	0	60
CSAH 103 / 89th Ave N	-	-	420	-	-	-	850	55	-	-	30	-	-	-
CSAH 103 / Maplebrook Pkwy	-	-	330	15	-		850	30	- 1	-	75	-	-	95
CSAH 103 / CSAH 109 (85th Ave N)		60	190	_ 70	55	80	660	125	50	330	130	200	445	45
CSAH 103 / 84th Ave N	-	-	315	65	-		990	1	-	-	5	-	-	5
CSAH 103 / College Park Dr	10	_ 10	370	70	-	155	830	10	5	0	45	20	0	5
CSAH 103 / 82nd Ave N	-	-	465	-	-		880	20	-	-	45	-	-	-
CSAH 103 / Candlewood Dr	10	-	435	25	5	20	905	-	-	-	-	95	-	25
CSAH 103 / 78th Ave N	-	-	430	15	-	-	1005	5	-	-	1	-	-	35
Source: Kimley Horn Design Team														

Intersection		North	bound			South	bound		Eastbound			Westbound		
	U-turn	Left	Thru	Right	U-turn	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
CSAH 103 / 94th Ave N	-	75	1225	-	-	-	900	125	130	-	110	-	-	-
CSAH 103 / CSAH 30 (93rd Ave N)	15	25	715	105	-	225	500	285	380	335	45	85	215	205
CSAH 103 / 92nd Ave N			855	25	-	-	625	25	-	-	110	-	-	10
CSAH 103 / Setzler Pkwy	75	5	725	65	95	55	580	5	30	1	10	30	0	30
CSAH 103 / 89th Ave N			870		-		670	30		-	100			-
CSAH 103 / Maplebrook Pkwy		-	810	85		-	710	60	-	-	60	-	-	60
CSAH 103 / CSAH 109 (85th Ave N)	-	155	570	385	105	85	450	130	165	745	190	170	425	50
CSAH 103 / 84th Ave N	_		1060	50	-	-	805	5	-	_	5	-	-	50
CSAH 103 / College Park Dr	35	65	1050	30	-	100	700	10	15	0	30	80	2	50
CSAH 103 / 82nd Ave N			1185	_	-	-	810	40		-	30		-	
CSAH 103 / Candlewood Dr	25		1160	130	10	30	800	-	-	-	-	75	-	20
CSAH 103 / 78th Ave N	-	-	1275	50	-	-	875	25	-	-	10	-	-	40
Source: Kimley Horn Design Team	Source: Kimley Horn Design Team													

#### Table 8: 2040 PM Peak Hour Turning Movement Volumes "Build- 01"

Table 9: 2040 AM Peak Hour Turning Movement Volumes "Build-02"

Intersection		North	bound			South	bound		Eastbound			Westbound		
	U-turn	Left	Thru	Right	U-turn	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
CSAH 103 / 94th Ave N	-	80	475	-	-	-	1160	200	70	-	100	-	-	-
CSAH 103 / CSAH 30 (93rd Ave N)	30	55	270	45		110	750	405	140	255	25	105	380	145
CSAH 103 / 92nd Ave N	_	-	360	10		-	800	115	-	-	15		-	40
CSAH 103 / Setzler Pkwy	5	15	290	20	15	30	740	30	5	0	5	70	0	60
CSAH 103 / 89th Ave N			335				765	55		- 1	30	-		
CSAH 103 / Maplebrook Pkwy	0	5	270	10	10	5	765	15	40	5	30	70	10	15
CSAH 103 / CSAH 109 (85th Ave N)		60	190	70		80	660	125	50	330	130	200	445	45
CSAH 103 / 84th Ave N			315	65		_	990	1		-	5			5
CSAH 103 / College Park Dr	10	10	370	70		155	830	10	5	0	45	20	0	5
CSAH 103 / 82nd Ave N	-		465	<u> </u>		-	880	20		-	45		-	
CSAH 103 / Candlewood Dr	10		435	25	5	20	905	- 1	-	-	-	95		25
CSAH 103 / 78th Ave N	-	-	430	15	-	-	1005	5	-	-	1	]	-	35
Source: Kimley Horn Design Team														

#### Table 10: 2040 AM Peak Hour Turning Movement Volumes "Build-02"

Interne stien		North	bound			South	bound		Eastbound			Westbound		
Intersection	U-turn	Left	Thru	Right	U-turn	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
CSAH 103 / 94th Ave N	-	75	1225	-	-	-	900	125	130	-	110	-	-	-
CSAH 103 / CSAH 30 (93rd Ave N)	15	25	715	105		225	500	285	380	335	45	85	215	205
CSAH 103 / 92nd Ave N			855	25			625	25	-	-	110	-	-	10
CSAH 103 / Setzler Pkwy	10	5	725	65	95	55	580	5	30	1	10	30	0	30
CSAH 103 / 89th Ave N	-		805		-		605	30			100			
CSAH 103 / Maplebrook Pkwy	0	20	705	60	50	10	610	35	30	10	15	35	5	15
CSAH 103 / CSAH 109 (85th Ave N)		155	570	385		85	450	130	165	745	190	170	425	50
CSAH 103 / 84th Ave N	-	-	1060	50			805	5	-	-	_5	-	-	50
CSAH 103 / College Park Dr	35	65	1050	30		100	700	10	15	0	30	80	2	50
CSAH 103 / 82nd Ave N		-	1185	-		-	810	_40	-	-	30	-	-	-
CSAH 103 / Candlewood Dr	25	-	1160	130	10	30	800	-	-	-	-	75	-	20
CSAH 103 / 78th Ave N	-	-	1275	50	-	-	875	25	-	-	10	-	-	40
Source: Kimley Horn Design Team														

#### **3.0 Traffic Operations Analysis**

An analysis of how well West Broadway Avenue moves traffic along the facility revealed that long delays and excessive queues exist at its intersection with 93<sup>rd</sup> Avenue North specifically in the PM peak hour. Long delays are also experienced at 92<sup>nd</sup> Avenue for vehicles trying to cross or turn onto West Broadway Avenue in the PM peak hour. As traffic continues to grow at these intersections, as well as at other intersections along the corridor, it is expected that delays and queues would become worse.

The analysis of how well traffic flows along West Broadway Avenue was developed using traffic simulation software. The existing AM and PM peak hour traffic volumes were analyzed along the network using existing traffic control (signals and stop signs), existing signal timing, and existing roadway geometry. The analysis measures the roadways ability to move traffic along the corridor by accounting for delay that is experienced at intersections. This delay is then given a letter grade A-F, known as Level of Service (LOS). The future build alternative AM and PM peak hour volumes were also analyzed. The border of LOS D and LOS E is often used in urban areas as the threshold for acceptable and unacceptable operations.



Figure 1 Intersection Level of Service by Average Delay

**Figure 1** depicts a graphical interpretation of delay times that define level of service. The delay thresholds are lower for unsignalized intersections than signalized intersections due to the public's level of acceptable delays for the two different traffic control types.
#### **EFFECTIVE STOARAGE LENGTH**

**Table 11** shows the effective storage length for Existing Conditions and the 2040 No-Build, plus the 2040 Build-01 and Build-02 alternatives. These values are used to compared to the maximum expected queue length to determine queuing problems at the intersections. The storage length for through lanes is measured to the nearest upstream full access public intersection, unless otherwise noted.

### Table 11: Effective Storage Length

		201	4 Existing	and			20	40		
Scenario		20	40 No-Bu	ild		Build-01			Build-02	
	Appr	Effe	ective Sto	rage	Effe	ective Sto	rage	Effe	ective Sto	rage
Intersection		LT	Th	RT	LT	Th	RT	LT	Th	RT
	NB	225	600	600	225	600	600	225	600	600
CSAH 103 / CSAH 30 (93rd Ave N)	EB	215	1220	1220	360	1220	1220	360	1220	1220
	SB	375	785	785	375	785	785	375	785	785
	WB	290	1220	1220	290	1220	1220	290	1220	1220
		1250	950 1250	1250		950	1250		950	1250
CSAH 103 / 92nd Ave N	<u>EB</u> SB	600	600	1230		600	1230		600	1230
	WB	430	430	430			430			430
	NB	195	870	350	350	870	870	350	870	870
	EB	275	275	275	275	275	275	275	275	275
CSAH 103 / Setzler Pkwy	SB	250	950	250	350	950	950	350	950	950
	WB	275	275	275	275	275	275	275	275	275
CSAH 103 / 89th Ave N	NB	650	650			650			650	
	EB	1900		1900			1900			1900
	SB		870	870		870	870		870	870
	WB									
CSAH 103 / Maplebrook Pkwy	NB	1110	1110	215		1110	215	330	1110	1110
	EB	260	260	260		650	260	200	260	200
		170	170	170		030	170	170	170	170
		270	270	270	270	270	270	270	270	270
	FB	375	375	375	375	375	375	375	375	375
CSAH 103 / CSAH 109 (85th Ave N)	SB	360	645	645	360	645	645	360	645	645
	WB	440	1000	725	440	1000	725	440	1000	725
	NB	400	250	250		250	250		250	250
CSAH 103 / 84th Ave N	EB	640	640	640			640			640
	SB	265	265	265		265	265		265	265
	WB	115	115	115			115			115
	NB	800	800		250	800	800	250	800	800
CSAH 103 / College Park Dr	EB	760		760	150	760	760	150	760	760
			205	205	150	205	205	550 150	205	205
		815	815			815			815	
	FB	300		300			300			300
CSAH 103 / 82nd Ave	SB		800	800		800	800		800	800
	WB									
	NB		715	715	250	715	715	250	715	715
CSAH 103 / Candlewood Dr	EB									
	SB	815	815		250	815		250	815	
	WB	150		150	150		150	150		150
	NB	300	540	540		540	540		540	540
CSAH 103 / 78th Ave N	EB	450	450	450			450			450
	SB	175	175	175		/15	175		/15	175
	WR	1/5	1/5	1/5			1/5			1/5
Source: Kimley/Horn										

### AM PEAK HOUR

**Table 12** shows the AM peak hour level of service and intersection delay, **Table 13** shows the AM peak hour delay and **Table 14** shows the maximum queue length for each approach. Existing conditions, 2040 No-Build, and the two 2040 Build scenarios are included. The tables show that all intersections currently operate at LOS C or better during the AM peak hour under existing conditions. Under the 2040 No-Build scenario, the two intersections of West Broadway Avenue with 93<sup>rd</sup> Avenue and 84<sup>th</sup> Avenue are expected to experience severe delay and queuing, as summarized below:

- West Broadway Avenue / 93<sup>rd</sup> Avenue
  - o Overall average intersection delay of 113 seconds, corresponding to intersection LOS F
  - o LOS E for the southbound movement
  - o LOS F for the eastbound and westbound movements
  - o Queues that exceed available queuing for multiple movements
- West Broadway Avenue / 84<sup>th</sup> Avenue
  - o Overall average intersection delay of 57 seconds, corresponding to intersection LOS E
  - LOS F for the eastbound approach

All intersections are expected to operate at LOS D or better in both of the Build alternatives. Additionally, no queues are expected to exceed available storage length for either Build scenarios.

On Table 14, yellow highlighting indicates expected queues that exceed available storage.

# Table 12: 2014 AM Peak Hour Level of Service and Intersection Delay

			2014			2040		2040						
Scenario		Exist	ing Con	dition		No-Buile	t		Build-01	L		Build-02	2	
	Appr	L	DS .	Delay	LOS		Delay	LOS		Delay		LOS		
Intersection		by	by	by	by	by	by	by	by	by	by	by	by	
		Appr	Inters	Inters	Appr	Inters	Inters	Appr	Inters	Inters	Appr	Inters	Inters	
	NB	c			D			C			C			
CEAH 102 / CEAH 20 (02rd Ave N)	EB	D	C	20.1	F	-	112	C	C	27 1	C	C	21.6	
CSAR 105 / CSAR 50 (9510 AVE N)	SB	С	Ľ	50.1	E	- F	115	С	C	52.1	С	C	51.0	
	WB	D			F			С			С			
	NB	A			A			Α			A			
CSAH 103 / 92nd Ave N	EB	A	А	1.9	C	А	8.3	A	А	1.6	A	Α	1.6	
	SB	A			В			A			A			
	WB ND	A			ر ۸			A P			A			
CSAH 103 / Setzler Pkwy		R			B			C			C A			
	SB	Ā	A	1.7	A	A	5.0	В	C	15.0	A	A	9.9	
	WB	A			c			Č			C			
CSAH 103 / 89th Ave N	NB	Α			А			Α			Α			
	EB	В	۸	23	В	Λ	21	Α	^	0.0	Α	^	0.8	
	SB	A	^	2.5	А		2.1	Α	^	0.5	Α	^	0.0	
	WB													
CSAH 103 / Maplebrook Pkwy	NB	A			A			A			A			
	EB	В	А	2.2	C	А	4.6	A	А	1.1	D	Α	8.2	
	SB				A			A			A			
		C A						А С			C			
	FB	c	С	31.0	c		22.6	D		26.4	D		35.7	
CSAH 103 / CSAH 109 (85th Ave N)	SB	D			D	C	32.6	D	D	36.1	D	D		
	WB	с			С			С			С			
	NB	Α			С			Α			Α			
CSAH 103 / 84th Ave N	EB	В	В	11.0	F	E	57.4	Α	A A A A	0.7	Α	Α	0.7	
	SB	В	5	11.0	В			Α			A			
	WB	D			B			A			A			
	NB	A			A			A			A			
CSAH 103 / College Park Dr	EB CD		Α	0.6	A 	Α	2.5	A 	Α	6.9	A A	Α	6.7	
	JD W/B	<u> </u>						D			D			
	NB	Α			А			A			A			
CSAU 102 / 82nd Avo	EB	A	٨	0.5	А		1 5	А	^	0.7	А	^	0.7	
CSAH 105 / 82110 AVE	SB	А	A	0.5	А	A	1.5	А	A	0.7	Α	A	0.7	
	WB													
	NB	A			А			Α			A			
CSAH 103 / Candlewood Dr	EB		А	1.8		А	2.2		Α	6.1		Α	6.3	
	SB	A			A			A			A			
	NB				Δ			Δ			Δ			
	FB	A			ĉ			A			A			
CSAH 103 / 78th Ave N	SB	A	A	0.3	Ă	A	1.0	A	A	0.6	A	A	0.6	
	WB	A			A			A			A			
Source: Kimley/Horn														

### Table 13: AM Peak Hour Delay

Scenario	20	)14	20	40	2040					
Scenario		Existing	Condition	No-I	Build	Buil	d-01	Buil	d-01	
	Appr	De	lay	De	lay	De	lay	De	lay	
Intersection		by Appr	by Inters	by Appr	by Inters	by Appr	by Inters	by Appr	by Inters	
	NB	27.4		46.5		31.4		30.9		
CSAH 103 / CSAH 30 (93rd Ave N)	EB	37.7	30.1	92.8	113.0	33.7	32.1	32.6	31.6	
	SB	25.1		/6.1		32.8		32.4		
		17		19		0.3		03		
CCALL 102 ( 02md Ave N	EB	9.7	1.0	23.9	0.2	6.6	1.0	6.6	1.0	
CSAH 103 / 92nd Ave N	SB	1.6	1.9	10.2	8.3	1.9	1.0	1.8	1.6	
	WB	7.8		17.8		5.9		6.0		
	NB	0.8		1.3		16.7		7.3		
CSAH 103 / Setzler Pkwy	EB	12.1	1.7	14.2	5.0	27.2	15.0	26.3 7.2	9.9	
	<u>SD</u> WB	7.8		4.9		27.3		32.2		
	NB	0.3		0.9		0.3		0.3		
CSAH 103 / 89th Ave N	EB	11.3	22	10.8	21	6.7	0.9	6.2	0.8	
	SB	2.7	2.5	2.3	2.1	1.0	0.5	0.9	0.0	
	WB									
CSAH 103 / Maplebrook Pkwy		1.3		1.3		0.6		2.7		
	SB	1.1	2.2	2.4	4.6	0.2	1.1	3.3	8.2	
	WB	8.5		22.7		5.2		46.7		
	NB	26.7		43.3	32.6	21.6	36.1	22.9	35.7	
CSAH 103 / CSAH 109 (85th Ave N)	EB	27.9	31.0	27.2		37.2		37.4		
	SB	35.5		36.4		41.2		42.4		
	NB	2.6		28.6		0.8		0.7		
	EB	15.5	11.0	> 200		8.5	0.7	6.6	0.7	
CSAH 103 / 84th Ave N	SB	13.3	11.0	19.8	57.4	0.7	0.7	0.6		
	WB	39.0		15.0		4.5		4.7		
	NB	0.4		0.6		7.3		7.3		
CSAH 103 / College Park Dr	EB	6.1	0.6	8.3	2.5	9.8 5.7	6.9	9.4 5.5	6.7	
	WB					40.4		40.9		
	NB	0.4		0.7		0.3		0.3		
CSAH 103 / 82nd Ave	EB	5.9	0.5	8.2	15	6.7	07	6.5	07	
	SB	0.2	0.5	1.7	1.5	0.6	0.7	0.6	0.7	
	WB									
	FR			0.4		2.2		2.4		
CSAH 103 / Candlewood Dr	SB	0.2	1.8	1.6	2.2	3.2	6.1	3.4	6.3	
	WB	17.8		14.1		43.1		43.0		
	NB	0.2		0.2		0.6		0.5		
CSAH 103 / 78th Ave N	EB	0.0	0.3	17.9	1.0	6.6	0.6	6.6	0.6	
	SB WB	0.2		1.1		0.4		0.4		
Source: Kimley/Horn	VV D	0.7		0.0		0.5		0.2		

Table 14: AM Peak Hour Maximum Queue Length

			2014			2040				20	40			
Scenario		Exist	ing Con	dition		No-Build	ł		Build-01	L		Build-02	2	
	Appr	٦v	lax Que	ue	N	lax Que	ue	N	lax Que	ue	Max Queue			
Intersection		LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	
	NB	120	205	205	220	448		135	150	150	130	150	145	
CSAH 103 / CSAH 30 (93rd Ave N)	EB	170	215	210	296	665		130	160	160	125	160	160	
	SB	65	495	145	484	860	828	145	495	310	145	495	325	
	NB NB	90 60	535 60	60	340	1321			220	0		240	235	
	EB	45	45	45	57	47				45			45	
CSAH 103 / 92nd Ave N	SB	10	15	5	17	13			65	65		55	55	
	WB	55	55	55	69					85			85	
CSAH 103 / Setzler Pkwy	NB	20	0	25	26			170	90	85	70	85	85	
	EB	30	35	35	23	23		15	15	15	20	20	20	
		20	10	10	30 80	63		85 130	225	230	90 135	1/5	1/5	
	NB	5	5		33	05			5			40		
CSAH 103 / 89th Ave N	EB	75		85	52					65			65	
	SB		0	0		4			10	10		5	5	
	WB													
CSAH 103 / Maplebrook Pkwy	NB	20	0		30	0.2			0	0	50	55	50	
		10	5	95		92 28			5	5	40	95	115	
	WB	60	60	60		154				65	120	125	145	
	NB	80	80	5	120	182		105	95	95	120	90	90	
CSAH 103 / CSAH 109 (85th Ave N)	EB	85	170	100	90	179		115	225	225	105	225	225	
	SB	105	245	170	139	376		190	370	365	110	395	395	
	WB	230	180	0	262	202		245	195	195	230	195	195	
		20	50 25	50 25	254	221			5	5		0	10	
CSAH 103 / 84th Ave N	SB	180	15	15	219	233			5	10		15	0	
	WB	30	25	25	39	39	31			40			40	
	NB	20	5			54		60	100	95	65	80	80	
CSAH 103 / College Park Dr	EB	35		45	57			30	40	40	20	35	35	
	SB		40	55				105	120	125	115	115	125	
	NB	20	0			68			0		40	0		
	FB	50		50	60	00				55			50	
CSAH 103 / 82hd Ave	SB		5	5					30	30		35	40	
	WB													
	NB		5	5					50	70		45	70	
CSAH 103 / Candlewood Dr	EB	10				19			80			95		
	WB	90		95	132	49		145		50	145		50	
	NB	0	0	0	102				0	0		0	0	
CSAH 102 / 78th Ave N	EB	0	0	0	24					40			40	
CAR 105 / 70th Ave N	SB	15	0	0	29				0	0		0	0	
	WB	65	70	70	56					85			85	
Source: Kimley/Horn														

### **PM PEAK HOUR**

**Table 15** shows the PM peak hour level of service and intersection delay, **Table 16** shows the PM peak hour delay, and **Table 17** shows the maximum queue length for each approach. Existing conditions, 2040 No-Build, and the two 2040 Build scenarios are included. All intersections and approaches currently operate at LOS D or better and have queues that do not exceed available storage, with the following exceptions:

- West Broadway Avenue / 93<sup>rd</sup> Avenue: LOS F for the eastbound approach
- West Broadway Avenue / 92<sup>nd</sup> Avenue: LOS E for the eastbound approach
- West Broadway Avenue / Candlewood Drive: LOS E for the westbound approach
- West Broadway Avenue / 93<sup>rd</sup> Avenue: queues exceed available storage for northbound through and right turn, and for the eastbound left turn.

Under the 2040 No-Build scenario, several intersections are expected to experience severe delays and excessive queuing. Tables 15-17 display complete results, but below is a summary of some of the most extreme expected delays and queuing:

- West Broadway Avenue / 93<sup>rd</sup> Avenue: overall intersection LOS F
  - All four approaches with LOS F
- West Broadway Avenue / 92<sup>nd</sup> Avenue: overall intersection LOS F
  - o All approaches except southbound with LOS F
- West Broadway Avenue / Setzler Parkway: overall intersection LOS F
  - o All approaches except southbound with LOS F
- West Broadway Avenue / 89<sup>th</sup> Avenue: overall intersection LOS D
  - Eastbound approach with LOF F
- West Broadway Avenue / 84<sup>th</sup> Avenue: overall intersection LOS E
  - o Eastbound approach with LOS F
- West Broadway Avenue / Candlewood Drive: overall intersection LOS A
  - Westbound approach with LOS E
- Excess queuing for one or more movements at the six intersections of West Broadway Avenue with 93<sup>rd</sup> Avenue, 92<sup>nd</sup> Avenue, Setzler Parkway, 85<sup>th</sup> avenue, 84<sup>th</sup> Avenue, and Candlewood Drive

All intersections are expected to operate with acceptable levels of delay, with no intersections expected to operate worse than LOS D under either Build scenario. The two West Broadway Avenue intersections at 93<sup>rd</sup> Avenue and 85<sup>th</sup> Avenue North are the only intersections expected to operate with a LOS D, with between 37 and 54 seconds of average intersection delay. The only individual movements with LOS E are both at 85<sup>th</sup> Avenue. The EB movement is expected to experience an average delay of 67 seconds under the Build-01 scenario, while the SB movement is expected to operate to operate with an average delay of 55 seconds under the Build-02 scenario. No movements are expected to operate at LOS F.

The vast majority of intersection movements have expected maximum queues for both Build conditions that do not exceed available storage. There are a few exceptions.

- West Broadway Avenue / College Park Drive. Under the Build-01 scenario, the WB left turn is expected to have a queue that exceeds its 150' storage length by five feet. This is within the margin of error in the model and should not be considered a major concern.
- West Broadway Avenue / 85<sup>th</sup> Avenue:
  - Under both the Build-01 and Build-02 scenarios, the NB through and right turn movements are expected to exceed available storage by between 250 and 300 feet. These queuing concerns exist because of the close proximity of the access into the commercial/retail center in the southwest quadrant of West Broadway Avenue / 85<sup>th</sup> Avenue. Closing the median in this location and only allowing right-right-out access would alleviate the northbound queuing concern, but may not be a feasible option.
  - Under both the Build-01 and Build-02 scenarios, the eastbound through and right turn movements are expected to exceed available storage by between 100 and 220 feet. This queuing concerns exists because of the close proximity of the access into the same commercial/retail center identified above, in the southwest quadrant of West Broadway / 85<sup>th</sup> Avenue. There are no feasible options to alleviate this queuing concern. However, the practical implication of this identified queuing issue is that the queues on the eastbound 85<sup>th</sup> Avenue approach will regularly block the entrance/exit to the commercial/retail center. Vehicles intending to turn into the center will have to wait until the queue has dissipated. Likewise, vehicles intended to exit the center onto eastbound 85<sup>th</sup> Avenue will have to wait for the queue to dissipate before entering the traffic stream.

Please note significant findings highlighted in red or yellow on Tables 15-17. On Table 17, yellow highlighting indicates expected queues that exceed available storage.

# Table 15: PM Peak Hour Level of Service and Intersection Delay

Scorazio		2014				2040				20	40		
Scenario		Exist	ing Con	dition		No-Buil	ł		Build-01	L		Build-02	2
	Appr	L	os	Delay	L(	DS .	Delay	L	DS .	Delay	L	DS .	Delay
Intersection		by	by	by	by	by	by	by	by	by	by	by	by
		Appr	Inters	Inters	Appr	Inters	Inters	Appr	Inters	Inters	Appr	Inters	Inters
	NB	D			F			D			D		
(SAH 103 / CSAH 30 (93rd Ave N)	EB	F	П	53.0	F	E.	> 200	D	р	38.4	D	D	37.4
	SB	С		55.0	F		200	С	U	50.4	D		
	WB	D			F			D			C		
CSAH 103 / 92nd Ave N	NB	A			E E			A			A		
	EB	E A	А	8.6	F A	F	> 200	A	Α	1.1	A	Α	1.1
	<u>58</u> W/B	R			F			Δ			Δ		
		A			F			A			B		
CSAH 103 / Setzler Pkwy	FB	A			F	_		D		10.0	D	_	10.0
	SB	A	A	1.5	А	F	93.5	В	В	13.8	В	В	18.6
	WB	А			F			С			С		
CSAH 103 / 89th Ave N	NB	Α			В			Α			Α		
	EB	В	А	1.4	F	D	25.7	Α	A A	0.8	Α	А	0.8
	SB	A			A		_0.0	A		0.0	A		
	WB												
CSAH 103 / Maplebrook Pkwy	NB	A			A			A			A		
	EB	ь л	Α	3.6		Α	6.6	A	A	1.2		Α	9.6
	<u>58</u> W/B							Δ					
	NB	Ĉ			D			D			D		
	FB	č	~	27.2	D		10.7	E		50 F	D	D	43.9
CSAH 103 / CSAH 109 (85th Ave N)	SB	D	C	27.3	С	U	40.7	D		53.5	E		
	WB	С			D			D			D		
	NB	Α			С			Α			А		
CSAH 103 / 84th Ave N	EB	С	А	8.8	F	E	56.7	Α	Α	1.4	Α	А	1.3
	SB	В		0.0	В			A		1.4	A		
	WB	C			B			A			A		
	NB	A			A			В			В		
CSAH 103 / College Park Dr	EB		Α	0.5		Α	2.8	В	В	13.7	В	В	12.9
	WB	<u> </u>						D			D		
	NB	Α			Α			A			A		
CCALL 102 / 02 rd Ave	EB	A		0.0	C		1.0	A		0.0	A		0.5
CSAH 103 / 82hd Ave	SB	A	A	0.6	А	A	1.6	А	A	0.8	А	A	0.5
	WB												
	NB	А			Α			Α			Α		
CSAH 103 / Candlewood Dr	EB		А	2.4		А	3.7		А	9.0		А	9.0
··· ···	SB	A			A			A			A		
	WB	E ^			E A			D			D		
		A			A			A			A		
CSAH 103 / 78th Ave N	EB CP		А	0.7	A	A	1.1	A	Α	0.9	A	A	0.9
· · ·	JD W/R				B			A			A		
Source: Kimley/Horn					U			Λ			~		

# Table 16: PM Peak Hour Delay

		20	)14	20	)40	2040					
Scenario		Existing	Condition	No-I	Build	Buil	d-01	Buil	d-02		
	Appr	De	lay	De	lay	De	lay	De	lay		
Intersection		by Appr	by Inters	by Appr	by Inters	by Appr	by Inters	by Appr	by Inters		
	NB	52.3		100.2		37.9		36.0			
CSAH 103 / CSAH 30 (93rd Ave N)	EB	89.0	53.0	> 200	> 200	46.3	38.4	44.8	37.4		
	SB	24.3		> 200		30.9		35.2	-		
	NB NB	47.3		200		41.0		32.0			
	FB	46.5		> 200		7.2		6.8			
CSAH 103 / 92nd Ave N	SB	2.1	8.6	2.8	> 200	0.7	1.1	0.7	1.1		
	WB	14.8		> 200		5.8		6.7			
	NB	0.7		60.3		7.8		18.4			
CSAH 103 / Setzler Pkwy	EB	8.9	1.5	> 200	93.5	43.6	13.8	42.9	18.6		
				2.2		17.5 34.7		10.1 34 Q			
		0.5		14.6		0.2		0.2			
CSAH 102 / 80th Ave N	EB	10.5	1.4	> 200	25.7	6.5	0.0	6.6	0.0		
CSAH 103 / 89th Ave N	SB	1.1	1.4	1.5	25.7	0.6	0.8	0.6	0.8		
	WB										
CSAH 103 / Maplebrook Pkwy	NB	4.7		5.3		1.2		3.8			
	EB	10.5	3.6	24.8	6.6	5.9	1.2	48.2	9.6		
	SB WB	9.2		33.6		0.5 6.3		9.9 48.4			
	NB	23.4		42.6	40.7	47.6		40.4	43.9		
CSAH 103 / CSAH 109 (85th Ave N)	EB	25.1	273	41.7		66.9	535	42.1			
CSAIT 105 / CSAIT 105 (85til AVE IV)	SB	39.8	27.5	34.7		54.4	55.5	55.4	43.5		
	WB	27.4		40.1		38.7		41.7			
	NB FD	3.6		29.3		1.7		1.6	1.3		
CSAH 103 / 84th Ave N	<u>EB</u> SR	50.0 11 1	8.8	19.1	56.7	0.7	1.4	0.4			
	WB	26.6		18.0		8.7		7.9			
	NB	0.3		2.7		10.9		10.6			
CSAH 103 / College Park Dr	EB	6.2	0.5	18.5	28	16.3	13.7	17.2	12.9		
	SB	0.3	0.5	2.1	2.0	13.6	10.7	11.9	12.5		
	WB ND			17		38.4		38.6			
	<u>NB</u> FB	0.0		16.5		6.0		0.5 6.0			
CSAH 103 / 82nd Ave	SB	0.2	0.6	0.8	1.6	0.8	0.8	0.5	0.5		
	WB										
	NB	0.9		1.9		7.4		7.5			
CSAH 103 / Candlewood Dr	EB		2.4		3.7		9.0		9.0		
	SB	0.6		1.5		515		51 2			
	NB	0.4		0.7		0.9		0.9			
CC ALL 102 / 70th Aug N	EB	12.8	0.7	4.4	1.1	6.4	0.0	5.8	0.0		
CSAH 103 / 78th Ave N	SB	0.6	0.7	1.0	1.1	0.5	0.9	0.5	0.9		
	WB	9.6		14.9		8.1		8.2			
Source: Kimley/Horn											

Table 17: PM Peak Hour Maximum Queue Length

			2014			2040				20	40		
Scenario		Exist	ing Con	dition		No-Build	d		Build-01	L		Build-02	2
	Appr	Iv	lax Que	ue	N	lax Que	ue	N	lax Que	ue	Max Queue		
Intersection		LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT
	NB	60	620	620	187	632		90	390	390	80	370	370
CSAH 103 / CSAH 30 (93rd Ave N)	EB	720	290	290	300	1289	000	240	195	200	235	185	185
	SB	120	310	90	485	852	900	120	305	325	120	265	350
		175	210	245	120	962			0	0		203	203
	EB	135	135	135	550	501				65			65
CSAH 103 / 92nd Ave N	SB	45	60	25	49				0	0		0	0
	WB	50	50	50	192					50			50
	NB	5	0	0	56	873	201	125	105	105	45	290	285
CSAH 103 / Setzler Pkwv	EB	55	65	60	368	326		55	30	30	55	30	30
	SB	35	0	0	69	414		210	135	130	200	125	100
		30	25	30	25	414		65	35	35	65	35	35
CSAH 103 / 89th Ave N	FB	65		75	434	440				60			55
	SB		0	0					10	10		10	10
	WB												
CSAH 103 / Maplebrook Pkwy	NB	25	5	5	82	153			10	10	50	70	85
	EB	65	65	65		91				80	100	100	120
	SB	50	35	0		222			10	10	95	145	165
		55 170	210	55 120	244	201	106	215	570	85 575	220	520	520
	FB	190	265	70	354	385	190	345	595	595	220	480	480
CSAH 103 / CSAH 109 (85th Ave N)	SB	115	195	135	104	220		230	345	345	120	310	310
	WB	200	170	0	276	205	91	225	215	215	225	230	230
	NB	20	105	105		451			70	70		15	15
CSAH 103 / 84th Ave N	EB	25	30	30	298					40			40
	SB	130	50	55	143	138	10.1		0	0		0	0
	WB	70	55	55	60	82	124	 125		50			50
		45	25	45	95	109		135	235	235	32	30	200
CSAH 103 / College Park Dr	SB		20	15	55	4		150	150	150	150	75	80
	WB							155	50	55	135	40	40
	NB	40	20			73			30			5	
CSAH 103 / 82nd Ave	EB	45		50	83					50			50
	SB		5	5					65	65		10	15
	WB												
			45	65		17			335	355		340	360
CSAH 103 / Candlewood Dr	<u>ED</u> SB	45	15			74		0	145		70	145	
	WB	120		125	175	<i>,</i> ,		120		45	120		45
	NB	20	0	0	33				20	15		5	5
CSAH 103 / 78th Ave N	EB	35	40	40	29					40			40
CSAIL 1037 / BULAVE N	SB	35	0	0	37				0	0		0	0
	WB	35	45	45	70					45			45
Source: Kimley/Horn													