

Permit Application No.: 16-221

Rules: Erosion Control, Stormwater Management, Waterbody Crossings and Structures, Shoreline and Streambank Stabilization, Floodplain Alteration, Wetland Protection

Applicant: **Metropolitan Council**

Received: **5/03/2016**

Project: **METRO Green Line LRT Extension (SWLRT)**

Complete: **1/13/2017**

Location: **Hopkins, St. Louis Park, and Minneapolis**

Noticed: **1/13/2017**

Recommendation:

Approval of MCWD permit application with the following conditions:

- Submission of documentation of acquisition by the applicant of all necessary property-use rights within a Segment before any work in the Segment begins (providing for issuance of permits on a Segment-by-Segment basis).
- Completion of a draft Public Entity Maintenance Agreement for Stormwater Management BMPs and waterbody crossings for approval by MCWD staff prior and execution.

In addition, staff recommends that the managers' approval include delegation of authority to approve requests for Amendments to permit 16-221, unless a request requires approval of a variance. (The administrator would have the discretion to bring any request to the board if it raises a policy, technical or legal question that, in his view, should be considered by the board.)

Background

The Metropolitan Council (Applicant) has applied for a Minnehaha Creek Watershed District (MCWD or District) permit as part of the METRO Green Line LRT Extension (SWLRT) Project (Project), a proposed 14.5 mile light rail transit line from Eden Prairie to downtown Minneapolis. The Project area within the MCWD traverses the cities of Hopkins, St. Louis Park, and Minneapolis and involves approximately five miles of freight rail, light rail, and paved trail construction along with the construction of six stations and construction of three park-and-ride lots. The Project proposes to cross Minnehaha Creek and the channel between Cedar Lake and Lake of the Isles (the Kenilworth Channel) and triggers six MCWD rules: Erosion Control, Stormwater Management, Waterbody Crossings and Structures, Floodplain Alteration, Shoreline and Streambank Stabilization, and Wetland Protection.

The Project Right of Way (ROW) follows the existing Cedar Lake Regional Trail (CLRT) and Canadian Pacific Freight Rail (CPFR) corridor. Much of the project will consist of the realignment and reconstruction of these existing routes as well as the addition of the Light Rail Transit (LRT) guideway and facilities.

The Project as a whole was analyzed under District rules. For purposes of understanding how the rule is applied, the Applicant divided the Project into seven Segments based on major subwatershed drainage within the Project ROW. A summary of these Segments is provided in Table 1 below. A map of the Project Segments is included as Attachment 1 of this report.

Table 1. Segment Summary			
Segment	Location	Features	Rules Applied
E1-3	Hopkins/St. Louis Park	Linear ROW Reconstruction: CLRT, CPFR, LRT, and Blake Station. Park and Ride: Blake Park and Ride.	Stormwater Management- Linear Transportation and Redevelopment Waterbody Crossings and Structures- Minnehaha Creek
E2-1	St. Louis Park	Linear ROW Reconstruction: CLRT, CPFR, LRT, and Louisiana Station. Park and Ride: Louisiana Park and Ride	Stormwater Management- Linear Transportation and Redevelopment Waterbody Crossings and Structures- Minnehaha Creek
E2-2	St. Louis Park	Linear ROW Reconstruction: CLRT, CPFR, LRT, and Wooddale Station.	Stormwater Management- Linear Transportation
E2-3	St. Louis Park	Linear ROW Reconstruction: CLRT, CPFR, LRT, and Beltline Station. Park and Ride: Beltline Park and Ride.	Stormwater Management-Linear Transportation and Redevelopment
E3-1	St. Louis Park / Minneapolis	Linear ROW Reconstruction: CLRT, CPFR, LRT and West Lake Street Station. Street reconstruction.	Stormwater Management- Linear Transportation
E3-2	Minneapolis	Linear ROW Reconstruction: CLRT, CPFR, and LRT.	Stormwater Management- Linear Transportation Waterbody Crossings and Structures, Floodplain Alteration, and Shoreline and Streambank Stabilization- Kenilworth Lagoon
E3-3	Minneapolis	Linear ROW Reconstruction: CLRT, CPFR, LRT, and 21 st Street Station.	Stormwater Management- Linear Transportation.

Procedural Requirements

Notice:

The Applicant has submitted all exhibits, plans, and materials necessary to analyze compliance with MCWD rules. No variances or exceptions from MCWD rule provisions are needed for approval of the permit. Permit decisions that do not require a variance or exception under District Rules are delegated to the Administrator. However, a member of the Board of Managers (Board), the Administrator, or interested members of the public may request that an application be acted on by the Board. Permit 16-221 does not require a variance or exception, however, due to the regional nature of this public Project, its intersection with several communities and significant water resources within the District, staff scheduled the permit to be considered by the Board of Managers for approval.

Per the District's Procedural Requirements Rule, the Project was publicly noticed via postcard to all residents within 600 feet of the proposed Project area. Residents who received the public notice post card were directed to a designated Project webpage on the District's website for further information about the Project as well as an opportunity to provide comment. A voicemail line was also made available for residents to call-in and leave a comment by phone. The Project description and available comment fields were made available by Project Segment and geography. The Project's webpage was posted to the District Website via the Public Notice portal on January 13th, 2017 and postcards were mailed to residents on January 18th, 2017. The comment period closed at 4:30 PM on February 3rd, 2017. Seven residents provided comments on the website, and two residents provided comment via email transmission. No comments were received through the established voicemail line. The comments and applicable responses are provided as Attachments 2A and 2B) of this report. All comments that were received during the notice period are listed as they were received through the website or email transmission.

Property Rights:

MCWD's procedural rule requires that an application bearing the original signature of the property owner(s) must be submitted to the District to obtain a permit. An application with the necessary signature has been submitted on behalf of the Metropolitan Council, however the Metropolitan Council does not own or have all of the property rights necessary to construct the entirety of the Project. The Metropolitan Council provided a memo dated March

24, 2016 which outlines the proposed property acquisition process for the Project (Attachment 3). The proposed process involves ongoing acquisition of the necessary property and property-use rights for construction (in some cases in partnership with municipal entities along the route) as the Project progresses rather than obtaining all property prior to the start of construction.

Under these circumstances (and the generally unique nature of this extensive public infrastructure Project), staff determines in consultation with legal counsel that the procedural requirement can be met without a procedural variance by board approval of permits for the work, conditioned on demonstration that all necessary property rights have been acquired for work in a particular subwatershed Segment before work in that Segment proceeds.

Consistent with the subwatershed Segments referenced above, no work can take place within a major Project Segment until the necessary property rights have been obtained. This recommendation is facilitated by the 'common scheme of development' provision of the District stormwater rule (Section 2), which provides for compliance of work on multiple properties under common ownership with the District stormwater criteria through use of a stormwater management facility or facilities as long as the criteria in Section 3 of the rule are met for each contributing drainage area under the common or related ownership.

Permit Amendment and Staff Delegation:

Staff also recommends (in consultation with legal counsel) that the managers delegate authority to the Administrator to approve requests for permit modifications that prove necessary for the Project to proceed unless the request requires approval of a variance. The administrator would have the discretion to bring any request to the board if it raises a policy, technical or legal question that, in his view, should be considered by the board. As property rights are acquired, approval of Project Segment would be administered by staff in accordance with this recommendation.

Valid Period:

MCWD Permits are valid for 1 year upon approval and can be renewed upon request by the applicant. Given the extensive nature of the Project, the Applicant has requested that should the permit be approved, the approval be valid through December of 2021. Staff recommends this extended approval for this permit.

Project Analysis

The Project has been analyzed against the District rules by Segment as referenced above, except that the estimated 37 acres of land disturbing activity for the Project as a whole triggers the District's Erosion Control rule for all Segments and the Erosion Control analysis for the Project as a whole is provided here. The District's Wetland Protection Rule is implicated in a limited way by the Project and also is analyzed here for the entire stretch of the Project through the MCWD's jurisdiction. Analysis of the Waterbody Crossings and Structures, Floodplain Alteration and Shoreline and Streambank Stabilization rules are described further as they are triggered by individual Segment.

Erosion and Sediment Control Rule

The applicant has submitted the Project's Stormwater Pollution Prevention Plan (SWPPP). The SWPPP and Project plans include appropriate erosion control and stabilization measures required for this work including silt fence, sediment control logs, floating silt curtain in areas where waterbody crossings are constructed or reconstructed, construction entrance Best Management Practices (BMPs), inlet protection, erosion control blanket, temporary winter cover, and sod and seed mix for stabilization which complies with the requirements of Section 5 of the Erosion Control rule.

The City of St. Louis Park exercises sole regulatory authority for erosion control within its City limits, therefore these findings do not include the Project within the City of St. Louis Park and MCWD permit 16-221, if granted, does not extend to approval of the proposed erosion control measures in the city. The Erosion Control rule for the Project is met for work within the District in the Cities of Hopkins and Minneapolis.

Wetland Protection Rule

The District approved a wetland Boundary and Type delineation for the Project under Notice of Decision W13-40 (Attachment 4). Sixteen wetlands were identified within the Project Study Area. No draining or filling of wetlands is proposed for purposes of the Project. Five wetlands were identified in the vicinity of the Project and evaluated for Wetland Buffer requirements. Of those five wetlands, four are located outside of the Project site. Within Segment E2-3, a partial area of one wetland extends into Project temporary ROW for the Beltline Park

and Ride redevelopment, however, wetland buffer is not applied as the temporary ROW is proposed for a temporary easement and the applicant does not have the necessary property rights to impose a permanent buffer. As an interpretive policy, the District does not require applicants to provide buffer on project property that is adjacent to a wetland but does not include any portion of the wetland.

The Wetland Protection rule is met.

Stormwater Management Rule

In addition to the changes to contours of land affecting direction, peak rate, volume and quality of runoff throughout the Project, the Project will result in a total increase of 17.6 acres of impervious surface within the District's jurisdiction and therefore triggers the Stormwater Management Rule for the Project as a whole. The trail, freight rail, LRT and station construction of the Project – all of which will take place within Linear ROW – are analyzed below for purposes of the District's Stormwater Management rule under the requirements for Linear Transportation Project in Section 6 of the Stormwater Management rule. The three proposed Park and Rides are analyzed under the Redevelopment Requirements in Sections 4 and 5 of the District's Stormwater Management rule.

Section 6 of the Stormwater Management rule requires that linear transportation projects that increase the area of impervious surface by an acre or more must treat for phosphorus, rate, and volume control as required under Section 3 of the rule for the new impervious surface. The Project proposes to increase the Linear ROW impervious area of each Segment by one acre or more. The phosphorus, rate, and volume control requirements for the new impervious area within the Linear ROW of each Segment are provided below.

Section 3(e) of the Stormwater Management Rule requires that two vertical feet of separation be provided between the low openings of structures and the 100-Year High Water Elevation (HWL) of stormwater BMPs and waterbodies. The Project does not include the construction of enclosed structures within the Project. Analysis of this section of the Stormwater Management rule does not apply to the Project.

In accordance with Section 11 of the Stormwater Management Rule, the Applicant must provide MCWD with a draft of an enforceable commitment to permanently maintain all stormwater management facilities.

Segment E1-3 Hopkins and St. Louis Park

Rules Analyzed: Stormwater Management and Waterbody Crossings and Structures.

Segment E1-3 is located within the Cities of Hopkins and St. Louis Park. This Segment begins at the Project intersection with Excelsior Boulevard at the Nine Mile Creek Watershed Boundary in the City of Hopkins. The Segment continues northeast for 5,207 linear feet and terminates at the west bank of Minnehaha Creek in the City of St. Louis Park. The Project proposes to convert the existing CLRT and CPR to a combined pedestrian trail, freight rail, and LRT guideway section. This Segment also includes the Blake Station and Blake Station Park-and-Ride. While this Segment terminates at the west bank of Minnehaha Creek, the Project proposes to cross the creek by removing the existing CLRT and CPR bridge spans and replacing them with a new span for each pedestrian trail, freight rail, and LRT crossing.

The downstream drainage boundary for the Project is ultimately Minnehaha Creek north and south of the proposed crossing of Minnehaha Creek, however, rates will also be maintained at the downstream site boundaries where the Project proposes to connect to existing storm sewer. The drainage areas of this Segment extend from the intersection of Jackson Avenue North and Excelsior Boulevard in Hopkins to the LRT crossing of Minnehaha Creek in St. Louis Park. The drainage area consists of both ROW and adjacent property boundaries and road crossings, including the new Blake Station Park and Ride. The proposed drainage patterns generally follow the existing patterns utilizing existing storm sewers adjacent to the ROW. The Project proposes BMPs to maintain rates at all of the existing storm sewer outfalls and the downstream waterbody (Minnehaha Creek). The drainage boundaries and their existing and proposed rates are listed in Table 2 in the Stormwater Management section, while Table 3 shows abstraction performance of the BMPs provided within Segment E1-3 to meet volume and phosphorus control.

Stormwater Management

Linear Transportation Project Requirements

The linear portion of the Project within this Segment proposes to increase impervious surface by 4.7 acres, therefore, the Project must provide treatment for that new impervious area. The Project proposes to achieve the required rate, volume and phosphorus control through the use of 4 infiltration basins, 2 underground infiltration chambers, one dry detention basin, and 6 infiltration check dams.

Table 2. Peak discharge rates at downstream hydrologic boundaries

Downstream Boundary	1-year (cfs)		10-year (cfs)		100-year (cfs)	
	Exist.	Prop.	Exist.	Prop.	Exist.	Prop.
To Jackson St. N.	1.3	0.0	5.3	0.6	13.8	4.2
To Excelsior Blvd.	0.6	0.1	1.9	0.3	4.4	0.8
To Pierce Ave.	25.6	22.2	47.2	39.8	84.6	69.6
To 2nd St. NE	1.9	0.0	6.8	0.0	16.3	0.0
To Blake Ave. North (N)	2.5	2.4	4.3	4.2	7.5	7.3
To Blake Ave. North (S)	5.8	5.7	10.6	10.5	18.6	18.4
To 325 Blake Road	0.9	0.0	3.8	0.0	10.0	0.0
To 103 Blake Road N.	0.9	0.1	2.8	0.5	6.7	1.8
Direct to Creek	0.9	0.6	3.7	2.7	9.8	7.6
To Minnehaha Creek (North of Crossing)	7.5	7.0	23.9	22.2	57.4	57.3
To Minnehaha Creek (South of Crossing)	33.8	28.2	66.9	52.1	126.5	93.8
Total to Minnehaha Creek	41.3	35.2	90.8	74.3	183.9	151.1

Table 3. Volume abstraction provided by proposed Stormwater BMPs

BMP ID	Type	Abstraction (cf)
BMP 409	Infiltration	5,980
BMP 410	Infiltration	6,446
BMP 411	Filtration	5,708
BMP 417	Infiltration	6,828
BMP 501	Infiltration	4,692
BMP 502	Infiltration	5,284
BMP 503	Infiltration	1,659
Total Provided (required)		36,597 (15,972)

Section 3(b) of the rule requires an Applicant's stormwater management plan to ensure no increase in rate of stormwater discharge at the site boundary/ies for the one-, 10- and 100-year storms. As shown in Table 2, the Project design achieves decrease in rate at each of the nine points from which stormwater discharges from the linear Project area in Segment 1-3, meeting the 3(b) requirement.

Sections 3(a)(2) and 3(c) of the Stormwater Management Rule require that an Applicant provide abstraction of the first 1 inch of rainfall to meet the District volume-control and water-quality requirements. Application of the standard to the 4.7 acres of additional impervious in Segment E1-3 produces a required abstraction of 15,972 cubic feet of rainfall. As illustrated in Table 3, the seven facilities proposed by the Applicant will provide 36,597 cubic feet of volume management, exceeding the abstraction and phosphorus-reduction requirements of the rule.

Redevelopment Requirements

The Project proposes to redevelop a 0.87- acre commercial site located at 150 Blake Road N. into the Blake Station Park-and-Ride. The area proposed for redevelopment is currently 0.87-acre of impervious surface, the Blake Station Park-and-Ride will result in 0.69-acre of impervious area, decreasing the impervious area by 18%.

Under Table 3 of the Stormwater Management rule, redevelopment sites less than 5 acres that result in greater than 10% decrease in impervious surface are not required to provide phosphorus, rate, or volume control treatment.

Section 8 regulates impacts to downstream waterbodies and requires that any new point source to a waterbody must provide pretreatment for sediment and nutrient removal. The section requires that the Project not result in an increase in the bounce in water level for any downstream lake or wetland. The Project proposes a new storm sewer outlet to Minnehaha Creek north of the LRT crossing. There are no bounce or inundation standards for watercourses. To fulfil the pretreatment requirement under this section of the rule, the stormwater runoff directed to the new outfall is treated by a series of infiltration basins before reaching Minnehaha Creek. Under existing conditions most of the stormwater proposed to be directed to the new outfall, is either directed to adjacent properties, untreated, or to an existing dry pond near 2nd Avenue.

Waterbody Crossings and Structures

The District's Waterbody Crossings and Structures rule regulates any activity that proposes to place a bridge in contact with the bed or bank of a waterbody. In order to cross Minnehaha Creek, the Project proposes the removal and replacement of the existing CLRT and CPR bridges and the addition of the new LRT bridge over Minnehaha Creek. The Project proposes to leave the existing bridge abutments in place, reduce the height of the abutments, and place new abutments outside of the existing ones. The waterbody crossing rule is triggered by the construction of the new crossing contacting the bank of Minnehaha Creek. The project will come in contact with the bed or bank of Minnehaha Creek through the removal and backfilling of the landward portions of the abutment. As the backfill and side slopes are removed and replaced with riprap the project will come in contact with the bank of Minnehaha Creek. The project will not affect the cross section of the creek as it will replace the existing structure and footprint.

Minnehaha Creek is a public water. Section 3 (a) requires that Projects involving crossings of a public water meet a demonstrated public benefit. This crossing serves as the route along a multi-city public transportation system, thereby providing a demonstrated public benefit.

Section 3(b), (c), and (d) require that the crossing not result in upstream or downstream increases in flood stage, the crossing shall retain navigational capacity, and shall retain wildlife upland passage. The Applicant has submitted a hydrological analysis demonstrating that leaving the existing abutments in place maintains the crossings existing navigational and hydraulic capacity. Additionally, leaving the abutments in place maintains existing bank access and preserves upland wildlife passage at this crossing.

Section 3(e) requires that the crossing not adversely affect water quality. The Applicant proposes to protect the water quality of the stream by preventing erosion and sedimentation into the creek through stabilizing the slopes between the existing and new abutments with geotextile filter and Class V riprap, this stabilization will be implemented behind the existing abutments which serve as the streambank and above the 100-YR HWL therefore this work does not trigger review and permitting under the Shoreline and Streambank Stabilization rule.

Section 3(f) requires that the crossing represent the minimal impact solution, which can be shown through comparative analysis of the water resources and related impacts of the proposed crossing against those of at least two alternatives to the proposed work, including not building the crossing. The applicant explored two other design alternatives to crossing the creek. One proposed alternative was to remove the bridge crossing and install a box-culvert, the other design proposed to cross the creek via bridge, however use a shorter span. These alternative designs would have resulted in removing the existing abutments completely and impacting the hydrologic and navigational capacity of the creek.

In accordance with section 6 of the MCWD Waterbody Crossings and Structures Rule, the applicant must provide MCWD with a draft of an enforceable commitment to permanently maintain the hydraulic and navigational capacity of the crossing. This requirement can be fulfilled by a single maintenance agreement pertaining to stormwater management BMPs and waterbody crossings.

The Waterbody Crossings and Structures rule is met for Segment E1-3.

Segment E2-1 –St. Louis Park**Rules Analyzed: Stormwater Management, Waterbody Crossings and Structures, and Shoreline and Streambank Stabilization.**

Segment E2-1 is located within the City of St. Louis Park. This Segment begins at the East bank of Minnehaha Creek and the Segment continues northeast for 6,193 linear feet and terminates 300 feet west of the rail line intersection with Wooddale Avenue. The existing Project area contains the CLRT and CPR. The CLRT 12-foot wide and is lined on both sides with shallow vegetated ditches, which also receive run-off from adjacent properties. The Project proposes to convert the existing CLRT and CPR to a combined pedestrian trail, freight rail, and LRT guideway section. This Segment also includes the Louisiana Station and Louisiana Station Park-and-Ride and realignment of the existing CPR. The CPR realignment will involve adding a third bridge span over Minnehaha Creek, two new freight bridges over the proposed LRT and Oxford Street, and three bridges over Louisiana Avenue for the CLRT, LRT and freight rail lines. The CPR alignment will shift 40 and 50 feet north of the current alignment for portions of the Segment with a new southerly connector freight line being constructed 1,000 feet east of Louisiana Avenue.

The downstream drainage boundary for the Project is ultimately Minnehaha Creek, however, rates will also be maintained at the downstream property boundaries where the Project proposes to connect to existing storm sewer. The drainage areas of this Segment extend from the northeast bank of Minnehaha Creek to Edgewood Avenue. The drainage area consists of both ROW and adjacent property boundaries and road crossings, including the Louisiana Station Park and Ride redevelopment. The proposed drainage patterns generally follow the existing patterns utilizing existing storm sewers adjacent to the ROW. The Project proposes BMPs to maintain rates at all of the existing storm sewer outfalls and the downstream waterbody (Minnehaha Creek). The drainage boundaries and the existing and proposed rates of runoff flow to them are provided in Table 4 in the Stormwater Management section, while Table 5 shows abstraction performance of the BMPs provided within segment E2-1 for phosphorus and volume control.

Stormwater Management**Linear Transportation Project Requirements**

The linear Project ROW proposes to increase impervious surface by 3 acres, therefore, the Project must treat for that new impervious area. The Project proposes to achieve the required rate, volume and phosphorus control through the use of 8 infiltration check dams, one underground infiltration chambers, 2 dry detention basin, 3 subsurface storage chambers, and one subsurface infiltration chamber.

Table 4. Peak discharge rates at downstream hydraulic boundaries

Discharge Rates to Downstream Hydraulic Boundaries						
Downstream Boundary	1-year (cfs)		10-year (cfs)		100-year (cfs)	
	Existing	Proposed	Existing	Proposed	Existing	Proposed
To Minnehaha Creek, direct	0.9	0.6	4.1	4.0	19.3	18.7
To South Oak Pond	9.9	6.0	30.5	17.7	74.3	45.4
To Louisiana Ave from West	1.9	1.7	8.5	7.3	19.0	19.2
To Louisiana Ave from East	8.3	5.2	19.4	11.6	40.0	28.4
To Edgewood Avenue.	8.7	6.6	20.5	14.4	41.7	33.2
Total to Minnehaha Creek	29.7	20.1	83.0	55.0	194.3	144.9

Table 5. Volume abstraction provided by proposed Stormwater BMPs

Basin	Type	Abstraction (cf)
BMP 504	Infiltration	550
BMP 505	Infiltration	6,250
BMP 506	Infiltration	3,589
BMP 507	Infiltration	453

BMP 521	Infiltration	350
BMP 522	Infiltration	6,440
BMP 518	Infiltration	4,404
BMP 519	Infiltration	5,410
Total Provided (required)		27,446 (10,782)

Section 3(b) of the rule requires an Applicant’s stormwater management plan to ensure no increase in rate of stormwater discharge at the site boundary/ies for the one-, 10- and 100-year storms. As shown in Table 4, the Project design achieves decrease in rate at each of the five points from which stormwater discharges from the linear Project area in Segment 2-1, meeting the 3(b) requirement. Table 4 shows that there is an increase of 0.2 cfs during the 100-yr storm event to Louisiana Avenue from the west. The 0.2 cfs increase would be realized over 1,458 lineal feet of a drainage boundary that the LRT will share with 9 adjacent property boundaries resulting in an increase to each property of less than 0.03 cfs which is both within the modeling tolerance of the hydrologic and hydraulic model (HydroCAD).

Sections 3(a)(2) and 3(c) of the Stormwater Management Rule require that an Applicant provide abstraction of the first 1 inch of rainfall to meet the District volume-control and water-quality requirements. Application of the standard to the 3 acres of additional impervious in Segment E2-1 produces a required abstraction of 10,782 cubic feet of rainfall. As illustrated in Table 5, the eight facilities proposed by the Applicant will provide 27,466 cubic feet of volume management, exceeding the abstraction and phosphorus-reduction requirements of the rule.

Redevelopment Requirements

The Project proposes to redevelop three commercial sites into the Louisiana Station Park-and Ride and Auxiliary Lots. The Main Lot is 3.7 acres with an existing impervious area of 3.7 acres. As a result of the redevelopment, the impervious area will be reduced by 22 percent to 2.39 acres. Auxiliary Lot 1 is 0.86 acres with an existing impervious area of 0.84-acre. As a result of the redevelopment, the impervious area will be reduced by 15 percent to 0.71-acre. Auxiliary Lot 2 is 0.43-acre with an impervious area of 0.42-acre. As a result of the redevelopment, the impervious area will be reduced by 21 percent to 0.33-acre.

Under Table 3 of the Stormwater Management rule, redevelopment sites equal to or less than 5 acres that result in greater than 10% decrease in impervious surface are not required to provide phosphorus, rate, or volume control treatment. Each lot is considered separately and less than 5 acres. The redevelopment in this Segment therefore does not require phosphorus, rate, or volume control treatment.

Section 8 regulates impacts to downstream waterbodies and requires that any new point source to a waterbody must provide pretreatment for sediment and nutrient removal. The section requires that the Project not result in an increase in the bounce in water level for any downstream lake or wetland. The downstream waterbody of this segment is Minnehaha Creek and bounce/inundation requirements do not apply to watercourses. The Project does not propose a new point source. This section of the rule does not apply to this Segment.

The Stormwater Management rule for Section E2-1 is met.

Waterbody Crossings and Structures

The District’s Waterbody Crossings and Structures rule regulates any activity that proposes to place a bridge in contact with the bed or bank of a waterbody. In order to cross Minnehaha Creek, the Project proposes the removal and replacement of the existing CLRT and CPR bridges and the addition of the new LRT bridge over Minnehaha Creek. The Project proposes to leave the existing bridge abutments in place, reduce the height of the abutments, and place new abutments outside of the existing ones. The waterbody crossing rule is triggered by the construction of the new crossing contacting the bank of Minnehaha Creek. The project will come in contact with the bed or bank of Minnehaha Creek through the removal and backfilling of the landward portions of the abutment. As the backfill and side slopes are removed and replaced with riprap the project will come in contact with the bank of Minnehaha Creek. The project will not affect the cross section of the creek as it will replace the existing structure and footprint.

Minnehaha Creek is a public water. Section 3 (a) requires that Projects involving crossings of a public water meet a demonstrated public benefit. This crossing serves as the route along a multi-city public transportation system, thereby providing a demonstrated public benefit.

Section 3(b), (c), and (d) require that the crossing not result in upstream or downstream increases in flood stage, the crossing shall retain navigational capacity, and shall retain wildlife upland passage. The Applicant has submitted a hydrological analysis demonstrating that leaving the existing abutments in place maintains the crossings existing navigational and hydraulic capacity. Additionally, leaving the abutments in place maintains existing bank access and preserves upland wildlife passage at this crossing.

Section 3(e) requires that the crossing not adversely affect water quality. The Applicant proposes to protect the water quality of the stream by preventing erosion and sedimentation into the creek through stabilizing the slopes between the existing and new abutments with geotextile filter and Class V riprap, this stabilization will be implemented behind the existing abutments which serve as the streambank and above the 100-YR HWL therefore this work does not trigger review and permitting under the Shoreline and Streambank Stabilization rule.

Section 3(f) requires that the crossing represent the minimal impact solution, which can be shown through comparative analysis of the water resources and related impacts of the proposed crossing against those of at least two alternatives to the proposed work, including not building the crossing. The applicant explored two other design alternatives to crossing the creek. One proposed alternative was to remove the bridge crossing and install a box-culvert, the other design proposed to cross the creek via bridge, however use a shorter span. These alternative designs would have resulted in removing the existing abutments completely and impacting the hydrologic and navigational capacity of the creek.

In accordance with section 6 of the MCWD Waterbody Crossings and Structures Rule, the applicant must provide MCWD with a draft of an enforceable commitment to permanently maintain the hydraulic and navigational capacity of the crossing. This requirement can be fulfilled by a single maintenance agreement pertaining to stormwater management BMPs and waterbody crossings.

The Waterbody Crossings and Structures rule is met for Segment E2-1.

Segments E2-2– St. Louis Park

Rule Analyzed: Stormwater Management

Segment E2-2 is located within the City of St. Louis Park. This Segment begins 300 feet west of the rail line intersection with Wooddale Avenue and continues 2,450 feet northeast and terminates at the Project intersection with Highway 100. The existing Project area contains the multi-use paved trails, between 8 and 12 feet in width that run parallel to the north of the freight rail. The Project proposes to convert the existing trail and rail corridor to a combined parallel trail and LRT guideway section, and construction of a trail underpass and the Wooddale Station.

The downstream drainage boundary for the Project is ultimately Bass Lake, however, rates will also be maintained at the downstream property boundaries where the Project proposes to connect to existing stormsewer or stormwater ponds. The drainage area for this Segment extends from about 500 feet west of the intersection of LRT and Wooddale Avenue to the intersection of the LRT where it crosses HWY 100. The runoff from the southern portion of the Project area, west of Wooddale Avenue will be collected in new stormsewer and catch basins before connecting with existing stormsewer. The runoff from the northern portion of the Project area, west of Wooddale Avenue will continue to flow north to existing stormsewer. The Project proposes BMPs to maintain rates at all of the existing storm sewer outfalls and the downstream waterbody (MnDOT Pond). The drainage boundaries and the existing and proposed rates of runoff flow to them are provided in Table 6 in the Stormwater Management rule reviewed below, along with how the BMPs provided the required abstraction for volume and phosphorus control are listed in Table 7.

Stormwater Management

Linear Transportation Project Requirements

The linear Project ROW proposes to increase impervious surface by 1.5 acres, therefore, the Project must treat for that new impervious area. The Project proposes to achieve the required rate, volume and phosphorus control through the use of 3 series of infiltration check dams, for a total of 16 infiltration check dams.

Table 6. Peak discharge rates at downstream hydraulic boundaries

Discharge Rates to Downstream Hydraulic Boundaries						
Downstream Boundary	1-year (cfs)		10-year (cfs)		100-year (cfs)	
	Existing	Proposed	Existing	Proposed	Existing	Proposed
To Wooddale Avenue South	4.7	4.5	10.3	8.8	20.0	16.1
To Wooddale Avenue North	4.0	2.5	9.1	5.3	21.0	9.9
To MnDOT Pond	2.4	1.5	6.2	3.4	13.1	9.8
Total to Bass Lake	11.1	8.5	25.6	17.5	54.1	35.8

Table 7. Volume abstraction provided by proposed Stormwater BMPs

Basin	Type	Abstraction (cf)
BMP 523	Infiltration	2,376
BMP 524	Infiltration	26,745
BMP 525	Infiltration	4,392
Total Provided (required)		33,513 (5,300)

Section 3(b) of the rule requires an Applicant’s stormwater management plan to ensure no increase in rate of stormwater discharge at the site boundary/ies for the one-, 10- and 100-year storms. As shown in Table 6, the Project design achieves decrease in rate at each of the four points from which stormwater discharges from the linear Project area in Segment 2-2, meeting the 3(b) requirement.

Sections 3(a)(2) and 3(c) of the Stormwater Management Rule require that an Applicant provide abstraction of the first 1 inch of rainfall to meet the District volume-control and water-quality requirements. Application of the standard to the 1.5 acres of additional impervious in Segment E2-2 produces a required abstraction of 5,300 cubic feet of rainfall. As illustrated in Table 7, the three facilities proposed by the Applicant will provide 33,513 cubic feet of volume management, exceeding the abstraction and phosphorus-reduction requirements of the rule.

Section 8 regulates impacts to downstream waterbodies and requires that any new point source to a waterbody must provide pretreatment for sediment and nutrient removal. The downstream waterbody of this segment is Bass Lake. According to the District’s Functional Assessment of Wetlands, Bass Lake is classified as a Manage 1 wetland. The Project does not direct additional water to Bass Lake, reduces rates to Bass Lake and does not restrict outflow from Bass Lake, resulting in no increase in the bounce or inundation period for this downstream water resource. This Segment does not propose a new point source.

The Stormwater Management rule for Segment E2-2 is met.

Segment E2-3—St. Louis Park

Rule Analyzed: Stormwater Management

Segment E2-3 is located within the City of St. Louis Park. This Segment begins at the Project intersection with Highway 100 and continues northeast for 3,900 feet. This Segment terminates 1,500 feet east of the Project intersection with Beltline Boulevard. The existing Project area contains the CLRT, CP, and CP-Bass Lake Spur. The freight rails and trail are lined with shallow vegetated ditches which also receive run-off from adjacent commercial and residential developments. The Project proposes to convert the existing trail and rail corridor to a combined parallel trail and LRT guideway section, realign the existing freight rails, and construct the Beltline

Station and Beltline Station Park-and-Ride redevelopment. The existing freight bridge over Highway 100 will be replaced with two bridges for freight and LRT.

The downstream drainage boundary for the Project is ultimately Bass Lake, however, rates will also be maintained at the downstream property boundaries where the Project proposes to connect to existing stormsewer. The drainage area for this Segment extends from about the intersection of the LRT where it crosses HWY 100 to 1,500 east of where the LRT crosses Beltline Boulevard. This Segment also includes a re-development portion that will be the Beltline Park-and-Ride. This Segment of the Project ties into existing stormsewer at Beltline Boulevard and Highway 100. The drainage boundaries and the existing and proposed rates to them are provided in Table 8 in the Stormwater Management section, while Table 9 shows the abstraction performance of the BMPs provided within the linear portion of Segment E2-3.

Stormwater Management

Linear Transportation Project Requirements

The linear portion of the Project within this segment proposes to increase impervious surface by 3.7 acres, therefore, the Project must treat for that new impervious area. The Project proposes to achieve the required rate, volume and phosphorus control through the use of a filtration basin and 3 series of infiltration check dams, providing a total of 29 infiltration check dams.

Table 8. Peak discharge rates at downstream hydraulic boundaries

Downstream Boundary	1-year (cfs)		10-year (cfs)		100-year (cfs)	
	Exist.	Prop.	Exist.	Prop.	Exist.	Prop.
To TH 100 storm sewer	2.3	1.7	5.8	4.1	12.3	8.7
To Beltline Boulevard	43.8	41.0	55.0	50.0	200.0	172.6
Total to Bass Lake	46.1	42.7	58.0	52.2	212.4	181.4

Table 9. Volume abstraction provided by proposed Stormwater BMPs

BMP ID	Type	Abstraction (cf)
BMP 526	Filtration	9,496
BMP 527	Filtration	10,541
BMP 528	Filtration	13,678
BMP 531	Filtration	12,965
Total Provided (required)		46,680 (45,043)

Section 3(b) of the rule requires an Applicant’s stormwater management plan to ensure no increase in rate of stormwater discharge at the site boundary/ies for the one-, 10- and 100-year storms. As shown in Table 8, the Project design achieves decrease in rate at each of the three points from which stormwater discharges from the linear Project area in Segment 2-3, meeting the 3(b) requirement.

Sections 3(a)(2) and 3(c) of the Stormwater Management Rule require that an Applicant provide abstraction of the first 1 inch of rainfall to meet the District volume-control and water-quality requirements. Application of the standard to the 3.7 acres of additional impervious in Segment E2-3 produces a required abstraction of 45,043 cubic feet of rainfall. As illustrated in Table 9, the four facilities proposed by the Applicant will provide 46,680 cubic feet of volume management, exceeding the abstraction and phosphorus-reduction requirements of the rule.

Redevelopment Requirements

The Project proposes to redevelop a commercial site located at 4725 Highway 7 into the Beltline Station Park-and-Ride. The 2.9-acre area proposed for redevelopment is currently 1.24 acres of impervious surface, the Beltline Station Park-and-Ride will result in greater than 40% site disturbance and 1.17-acre of additional impervious area.

Under Table 4 of the Stormwater Management rule, redevelopment sites greater than one acre, that propose greater than 40% site disturbance and increase of impervious surface must provide phosphorus, rate, and volume

control for the entire area of impervious surface as required by Section 3 of the Stormwater Management rule. The Applicant proposes to provide rate control for the 2.3 acre surface lot by directing stormwater to a subsurface storage chamber.

Due to contaminated soils and the level of ground-water in the area, infiltration was not feasible at the Beltline Park and Ride site. The Applicant has proposed to over-treat for water quality within the rail line ROW in order to achieve the abstraction volume required by the Beltline Park-and-Ride. The stormwater in this area is directed to a 72" trunk-line that drains to Bass Lake, therefore, no intermediate water resources are affected and Bass Lake receives the required amount of stormwater treatment. The Applicant meets the abstraction requirement for the Beltline Park and Ride under Section 3(c)(2) through this over-treatment in the Linear ROW because the Beltline Park and Ride and Linear ROW parcels are adjacent, are or will be owned by the project proponent and are directed to the same receiving waterbody.

Pursuant to section 3(c)(2) of the Stormwater Management rule, the Applicant submitted data showing contaminated soils and high ground water levels at the Beltline Station Park and Ride site that staff and the MCWD engineer concluded sufficiently demonstrated the infeasibility of providing the one inch of abstraction for the site to meet the MCWD volume and water quality treatment requirement. Since no abstraction was feasible at the Beltline Park-and-Ride, the Project provided the necessary phosphorus removal within the LRT ROW. To show that the proposed BMPs and stormwater plan would provide adequate phosphorus removal before stormwater reached Bass Lake, the Applicant provided MIDS calculations showing conformance with section 3(c)(2) of the Stormwater Management Rule. The abstraction requirement under complete conformance with the rule was calculated for the Beltline Park and Ride (2.3-acres). This abstraction requirement was added to the calculated abstraction requirement for the Linear ROW (new impervious surface). This baseline abstraction requirement would have resulted in 4.92 lbs. of phosphorus removal per year. The Project proposes to account for the 2.3-acres of Beltline Park and Ride abstraction and ALL Linear ROW impervious surface abstraction to provide 8.61 lbs. of phosphorus removal per year. This phosphorus removal accounts for what would be required at Beltline Park and Ride and provides an additional 3.69 lbs. of phosphorus removal. The MIDS analysis showed that the proposed BMPs provide a removal of 8.61 lbs. of phosphorus per year while the Project, with strict and minimal adherence to the stormwater rules, would provide 4.92 lbs. of phosphorus removal per year.

Section 8 regulates impacts to downstream waterbodies and requires that any new point source to a waterbody must provide pretreatment for sediment and nutrient removal. The downstream waterbody of this segment is Bass Lake. According to the District's Functional Assessment of Wetlands, Bass Lake is classified as a Manage 1 wetland. The Project does not direct additional water to Bass Lake, reduces rates to Bass Lake and does not restrict outflow from Bass Lake, resulting in no increase in the bounce or inundation period for this downstream water resource. This Segment does not propose a new point source.

Segment E2-3 meets the Stormwater Management rule.

Segment E3-1 – St. Louis Park and Minneapolis
Rule Analyzed: Stormwater Management

Segment E3-1 is located within the City of Minneapolis. This Segment begins 1,500 feet east of the Project intersection with Beltline Boulevard and continues north east for 5,400 feet. The Segment terminates at 500 feet northeast of the Lake Street bridge. The existing Project area contains the CLRT and CPR lined on all sides with shallow vegetated ditches that receive also run-off from adjacent commercial and residential developments. The Project also proposes street reconstruction which includes replacing 860 feet of Abbott and Chowen Avenues with 720 feet of new roadway to be known as 31st Street, sidewalk and greenspace additions along Chowen Avenue, Abbott Avenue, and 32nd Street and a passenger drop-off lane along 31st Street.

The Project proposes to construct a 950 feet of the 2,590-ft long shallow tunnel below the trail and freight rail lines for the new light rail track within this Segment. The proposed tunnels associated with Project consist of a 2,500-foot long north segment which begins roughly 600 feet north of Lake of the Isles-Cedar Lake channel (Kenilworth Lagoon) and ends approximately 1,000 feet north of West 21st Street. The southern segment is a 2,200-foot segment south tunnel segment begins roughly 500 feet north of West Lake Street Bridge and ends approximately 400 feet south of the Channel.

Construction of the tunnel will consist of first isolating any excavation from adjacent groundwater by driving sheet piling around its perimeter. Soil will then be excavated to the planned depth indicated on the plans. In areas above and below the groundwater a concrete slab will be poured to seal the base of the tunnel from the underlying groundwater. After the bottom is sealed the remaining structural portions of the tunnel will be formed and poured. The top of the tunnel will be covered with soil and restored.

The downstream drainage boundary for this Segment of the Project are two wetlands and Abbott Street where the Project will tie into existing storm sewer. The drainage area for this Segment extends from 1,500 east of where the LRT crosses Beltline Boulevard to approximately 500 feet northeast of the intersection of the LRT ROW and West 31st Street/Lake Street. The Project proposes to meet rates at each of the outfalls and wetlands. The drainage boundaries and the existing and proposed rates of runoff to them, along with how the BMPs within the linear portion of segment E3-1 provide the required abstraction are shown in Tables 10 and 11 in the Stormwater Management section.

Stormwater Management

Linear Transportation Project Requirements

The linear elements of the Project propose to increase impervious surface by 1.8 acres, therefore, the Project must treat for that new impervious area. The Project proposes to achieve the required rate, volume and phosphorus control through the use of two series of filtration check dams for a total of 7, a series of 8 lined filtration check dams, a filtration chamber, a tiled storage basin, and a subsurface infiltration chamber. Stormwater that collects within the rail area of the tunnel and comes into contact with rail line infrastructure will be directed to the sanitary sewer system. Groundwater that seeps into the outer-layer of the tunnel will be pumped to the Project’s stormwater management system. BMPs that are located within known areas of contamination will be lined and used for filtration in order to prevent stormwater contamination.

Table 10. Peak discharge rates at downstream hydraulic boundaries

Downstream Boundary	1-year (cfs)		10-year (cfs)		100-year (cfs)	
	Exist.	Prop.	Exist.	Prop.	Exist.	Prop.
To Wetland MC-MPL-10	0.7	0.7	3.2	3.2	8.8	8.8
To Wetland MC-MPL-11	0.3	0.3	1.4	1.4	3.7	3.7
To Abbot Street/Lake Calhoun	13.3	11.7	59.0	54.3	166.3	152.8

Table 11. Volume abstraction provided by proposed Stormwater BMPs

BMP ID	Type	Abstraction (cf)
BMP 605	Infiltration	4,005
BMP 600	Filtration	153
BMP 601	Filtration	707
BMP 602	Filtration	656
BMP 604	Filtration	1,891
Total Provided (required)		7,412 (6,534)

Section 3(b) of the rule requires an Applicant’s stormwater management plan to ensure no increase in rate of stormwater discharge at the site boundary/ies for the one-, 10- and 100-year storms. As shown in Table 10, the Project design achieves decrease in rate at each of the three points from which stormwater discharges from the linear Project area in Segment 3-1, meeting the 3(b) requirement.

Sections 3(a)(2) and 3(c) of the Stormwater Management Rule require that an Applicant provide abstraction of the first 1 inch of rainfall to meet the District volume-control and water-quality requirements. Application of the standard to the 1.8 acres of additional impervious in Segment E3-1 produces a required abstraction of 6,534 cubic feet of rainfall. As illustrated in Table 11, the seven facilities proposed by the Applicant will provide 7,412 cubic feet of volume management, exceeding the abstraction and phosphorus-reduction requirements of the rule.

Section 8 regulates impacts to downstream waterbodies and requires that any new point source to a waterbody must provide pretreatment for sediment and nutrient removal. The downstream waterbodies of this Segment are Lake Calhoun, Wetland-MC-MPL-10, and MC-MPL-11. There is no permitted bounce to Lakes according to the section of the rule. According to the District’s Functional Assessment of Wetlands, Wetlands MC-MPL-10 and 11 are classified as Manage 3. The Project does not direct additional water to these resources, retains or reduces the rates to these resources and, do not limit the outflow of these resources, resulting in no increase in the bounce or inundation period for these downstream water resources. This Segment does not propose a new point source.

The Stormwater Management rule for Segment E3-1 is met.

Segment E3-2—Minneapolis

Rules Analyzed: Stormwater Management, Waterbody Crossings and Structures, Shoreline and Streambank Stabilization, and Floodplain Alteration.

Segment E3-2 is located within the City of Minneapolis. This Segment begins 500 feet northeast of the Lake Street bridge and continues north for 2,200 feet. The Segment terminates at 100 feet northeast of the Kenilworth Lagoon. The LRT tunnel is proposed to be 1,640 feet long within this Segment and will be built below the existing trail and freight lines. The Project proposes to reconstruct the CLRT, adjust the CPR alignment, add curb and gutter to Burnham Road, and replace the existing timber bridge over Kenilworth Lagoon with a new bridge span.

The downstream drainage boundary for this Segment of the Project are the Kenilworth Lagoon and existing storm sewer that discharges to Cedar Lake. The drainage area for this Segment extends from approximately 500 feet northeast of the intersection of the LRT ROW and West 31st Street/Lake Street to Kenilworth Lagoon. The Project proposes to meet rates at each of the outfalls. The drainage boundaries and their existing and proposed rates, along with how the upstream BMPs in the linear portion of Segment E3-2 provide the required abstraction are listed in Tables 12 and 13 in the Stormwater Management section.

Stormwater Management

Linear Transportation Project Requirements

The linear Project work in this segment proposes to increase impervious surface by 1 acre. The Project proposes to achieve the required rate, volume and phosphorus control through the use of two infiltration basins and a subsurface infiltration chamber.

Table 12. Peak discharge rates at downstream hydraulic boundaries

Discharge Rates to Downstream Hydraulic Boundaries						
Downstream Boundary	1-year (cfs)		10-year (cfs)		100-year (cfs)	
	Existing	Proposed	Existing	Proposed	Existing	Proposed
To Cedar Lake	3.0	2.4	8.0	5.4	17.5	14.6
To Kenilworth Lagoon	1.8	1.7	6.0	4.1	14.9	14.7

Table 13. Volume abstraction provided by proposed Stormwater BMPs

Basin	Type	Abstraction (cf)
BMP 606	Infiltration	2,572
BMP 607	Infiltration	913
BMP 608	Infiltration	9,506
Total Provided (required)		12,991 (3,630)

Section 3(b) of the rule requires an Applicant’s stormwater management plan to ensure no increase in rate of stormwater discharge at the site boundary/ies for the one-, 10- and 100-year storms. As shown in Table 12, the Project design achieves decrease in rate at each of the two points from which stormwater discharges from the linear Project area in Segment 3-2, meeting the 3(b) requirement.

Sections 3(a)(2) and 3(c) of the Stormwater Management Rule require that an Applicant provide abstraction of the first 1 inch of rainfall to meet the District volume-control and water-quality requirements. Application of the standard to the 1 acre of additional impervious in Segment E3-1 produces a required abstraction of 3,630 cubic feet of rainfall. As illustrated in Table 13, the three facilities proposed by the Applicant will provide 12,991 cubic feet of volume management, exceeding the abstraction and phosphorus-reduction requirements of the rule.

Section 8 regulates impacts to downstream waterbodies and requires that any new point source to a waterbody must provide pretreatment for sediment and nutrient removal. The downstream waterbodies of this Segment are Cedar Lake and the Kenilworth Lagoon. There is no permitted bounce to Lakes according to the section of the rule. The Project does not direct additional water to these resources, retains or reduces the rates to these resources and, do not limit the outflow of these resources, resulting in no increase in the bounce or inundation period for these downstream water resources. This Segment does not propose a new point source.

Segment E3-2 meets the Stormwater Management rule.

Waterbody Crossings and Structures

The District's Waterbody Crossings and Structures rule regulates placement of a bridge the bed or bank of a waterbody. In order to cross the Kenilworth Lagoon, the Project proposes the removal and replacement of the existing CLRT and CPR bridge and the addition of the new LRT bridge over the Lagoon, resulting in three new bridge spans. The Project proposes to place new abutments outside of the 100-YR HWL, place new piers within the channel for the new crossing, remove the timber piers of the existing crossing, and clear-span the channel for the trail and freight rail crossings. This work within the channel triggers the Waterbody Crossings and Structures rule.

The Lagoon has been identified as a DNR Public Water. Section 3 (a) requires that Projects involving crossings of a public water meet a demonstrated public benefit. This crossing serves as the route along a multi-city public transportation system, thereby providing a demonstrated public benefit.

Section 3(b), (c), and (d) require that the crossing not result in upstream or downstream increases in flood stage, the crossing shall retain navigational capacity, and shall retain wildlife upland passage. The Applicant has submitted a hydraulic analysis demonstrating that by removing the existing timber piers, replacing the existing crossing with a clear span, and placing new piers in the channel for the new crossing, the flood storage of the channel has been increased by 1-cy. Cedar Lake, the Lagoon, and the Lake of the Isles are considered a level pool that all maintain the same elevation. The hydraulic capacity of this channel will not be inhibited by the placement of the new piers. Additionally, navigational capacity is maintained though the placement of fewer piers. The proposed crossing preserves the existing wildlife crossing through minimal encroachment on the bank.

Section 3(e) requires that the crossing not adversely affect water quality. The Applicant proposes to protect the water quality of the channel by preventing erosion and sedimentation into the creek through stabilizing the slopes between the new proposed abutments and existing Works Progress Administration (WPA) walls. This stabilization will be implemented behind the bank of the channel and above the 100-YR HWL and therefore this work does not trigger review and permitting under the Shoreline and Streambank Stabilization rule.

Section 3(f) requires that the crossing represent the minimal impact solution through analyzing two alternatives. The Applicant has provided two alternatives to this crossing in addition to exploring a no-cross alternative. The first alternative involved an arched pier design, the second alternative involved a thin-deck design. These alternatives were rejected because they proposed a greater pier footprint within the lagoon than the proposed design. This crossing represents the minimal impact solution because it has the least amount of pier footprint within the channel.

In accordance with section 6 of the MCWD Waterbody Crossings and Structures Rule, the applicant must provide MCWD with a draft of an enforceable commitment to permanently maintain the hydraulic and navigational capacity of the crossing. This requirement can be fulfilled by a single maintenance agreement pertaining to stormwater management BMPs and waterbody crossings.

The Project meets the Waterbody Crossings and Structures rule for Segment E3-2 is met.

Floodplain Alteration

The District's Floodplain Alteration rule applies to Project's proposing to alter land below the Projected 100-yr high water elevation of a waterbody and requires floodplain storage compensation if the storage capacity is reduced. The Project involves land alteration below the 100-yr high water elevation of the Kenilworth lagoon through the removal of existing bridge piers and the placement of new ones. The 100-yr high water elevation for Kenilworth Channel was identified to be 854.81. The volume of the existing piers within the floodplain is currently 7.6 cy. The volume of the proposed piers within the floodplain is 6.5cy. The Applicant proposes a net increase of flood storage by 1.1 cy.

Section 3(c) of the Floodplain Alteration rule also limits the creation of impervious surface within the 10-YR floodplain or within 25-feet of the centerline of a watercourse. This section of the rule provides an exception for impervious surface created as an integral component of a liner public roadway or trail.

The Project does not require floodplain compensation. The Floodplain Alteration rule for Segment E3-2 is met.

Shoreline and Streambank Stabilization

The District's Shoreline and Streambank Stabilization rule applies to Project's proposing to install an improvement or alteration to the shoreline or streambank of a waterbody. Section 2(c) of the Shoreline and Streambank Stabilization rule does not require a permit for maintenance of an existing shoreline or streambank improvement that involves in-kind replacement or restoration of the improvement in compliance with the criteria in this rule. The Kenilworth Channel is currently stabilized with Works Progress Administration (WPA) walls. In order to construct one of the crossings, the wall must be dismantled. Per agreement with the State Historic Preservation Office, the Applicant will replace the wall in-like and in-kind. The Project does not propose to increase the floodplain encroachment beyond the existing extent.

The Shoreline and Streambank Stabilization rule for Segment E3-2 is met.

Segment E3-3—Minneapolis**Rule Analyzed: Stormwater Management**

Segment E3-3 is located within the City of Minneapolis. This Segment begins 100 feet north of the Kenilworth Channel, continues 2,500 feet and ends approximately 500 feet north of the Project's intersection with 21st Street West at the Watershed District Boundary with Basset Creek watershed. The Project corridor consists of existing freight rail and combined pedestrian and bike trail. The Project proposes to reconstruct the combined bike and pedestrian trail, the LRT tracks, adjustment to the existing freight rail alignment, and constructing the 21st Street Station.

The drainage area for this Segment extends the Kenilworth Lagoon to approximately 500 feet north of the LRT ROW intersection with 21st West at the MCWD boundary. The downstream drainage boundary for this Segment consists of an existing outfall that discharges to Cedar Lake at 21st Street. The Project proposes to meet rates at each of the outfalls. The drainage boundaries and their existing and proposed rates, along with how the BMPs within segment E3-3 provide the required abstraction for volume and phosphorus control are listed in Tables 14 and 15 in the Stormwater Management section.

Stormwater Management***Linear Transportation Project Requirements***

The linear Project work within this segment proposes to increase impervious surface by 2.3 acres. The Project proposes to achieve the required rate, volume and phosphorus control through the use of four infiltration basins and a subsurface infiltration chamber.

Table 14. Peak discharge rates at downstream hydraulic boundaries

Discharge Rates to Downstream Hydraulic Boundaries						
Downstream Boundary	1-year (cfs)		10-year (cfs)		100-year (cfs)	
	Existing	Proposed	Existing	Proposed	Existing	Proposed
To Cedar Lake at 21 st Street	3.3	2.9	11.3	10.5	27.9	25.1
Direct to Cedar Lake	1.1	0.0	4.3	0.0	11.3	0.0
Total to Cedar Lake	4.4	2.9	15.6	10.5	39.2	25.1

Table 15. Volume abstraction provided by proposed Stormwater BMPs

Basin	Type	Abstraction (cf)
BMP 609	Infiltration	9,826
BMP 610	Infiltration	4,677
BMP 611	Infiltration	10,934
BMP 612	Infiltration	3,493
BMP 613	Infiltration	931
Total Provided (required)		29,861 (8,458)

Section 3(b) of the rule requires an Applicant’s stormwater management plan to ensure no increase in rate of stormwater discharge at the site boundary/ies for the one-, 10- and 100-year storms. As shown in Table 14, the Project design achieves decrease in rate at each of the three points from which stormwater discharges from the linear Project area in Segment 3-3, meeting the 3(b) requirement.

Sections 3(a)(2) and 3(c) of the Stormwater Management Rule require that an Applicant provide abstraction of the first 1 inch of rainfall to meet the District volume-control and water-quality requirements. Application of the standard to the 2.3 acres of additional impervious in Segment E3-3 produces a required abstraction of 8,458 cubic feet of rainfall. As illustrated in Table 15, the five facilities proposed by the Applicant will provide 29,861 cubic feet of volume management, exceeding the abstraction and phosphorus-reduction requirements of the rule.

Section 8 regulates impacts to downstream waterbodies and requires that any new point source to a waterbody must provide pretreatment for sediment and nutrient removal. The downstream waterbodies of this Segment is Cedar Lake. There is no permitted bounce to Lakes according to the section of the rule. The Project does not direct additional water to these resources, retains or reduces the rates to these resources and, do not limit the outflow of these resources, resulting in no increase in the bounce or inundation period for these downstream water resources. This Segment does not propose a new point source.

The Stormwater Management rule is met for Segment E3-3.

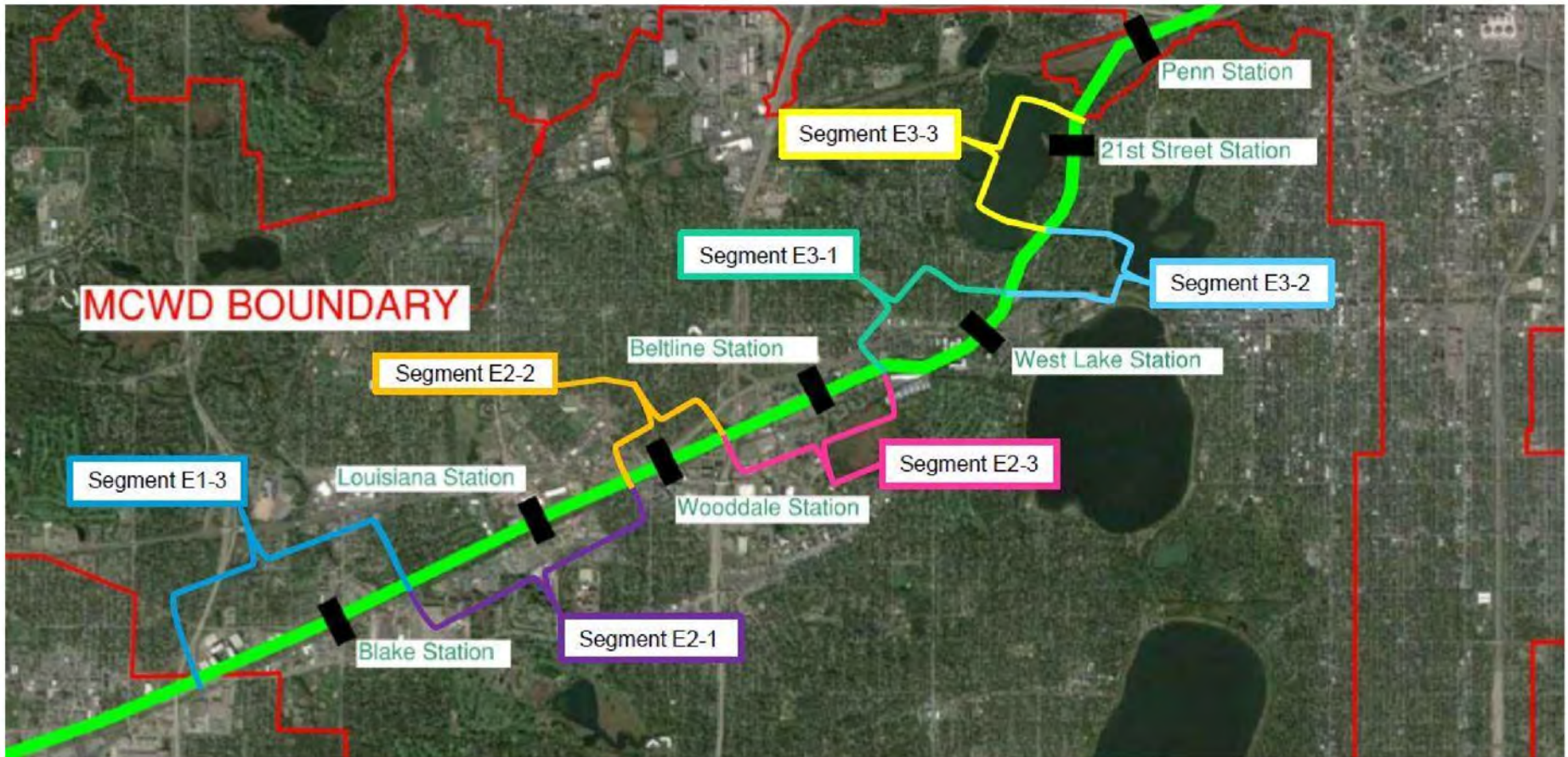
Summary:

The SWLRT proposes to meet all applicable District rule requirements through Permit Application 16-221. Staff recommends approval of this permit with the conditions and recommendations listed in this report.

Attachments:

- Attachment 1: Project Segment Map
- Attachment 2: Permit 16-221 Comments and Responses
- Attachment 3: Permit 16-221 Property Acquisition Process
- Attachment 4: W13-40 NOD

Permit 16-221- Attachment 1
Project Segment Map



Segments E1-3 and E2-1 Hopkins and St. Louis Park

Name: Bob Feely, 1909 Penn Avenue S.

Comment: I look forward to full SWLRT service as soon as possible.

Name: David Wanger, 7807 Edgebrook Drive, St. Louis Park

Comment: 1. Regarding the Design Plan 14 MINNEHAHA CREEK, there is a very high voltage utility distribution pole system on the north side of the property that requires maintenance and access for tree trimming. When the railroad owned the property, drainage ditches, brush clearing and tree trimming maintenance were done thoroughly, sometimes using rail mounted shearing devices. Since Hennepin County purchased the corridor property, zero maintenance has been done to protect the rail bed from destruction by tree roots, and brush overgrowth. Tree trimmers cannot gain access to the ditch with their heavy equipment and trailers because the north side ditch is presently clogged with tree trimming debris and dense overgrowth between Minnehaha Creek and Edgebrook Park. Details on the Design Plan do not require drainage ditch maintenance requirements nor brush clearing for access to the high voltage power lines, so as to provide instructions to the government agency responsible to keep the drainage ditch in a condition that meet the MCWD construction directions. MCWD needs to assure that the Design includes requirements for keeping ditches clear to drain properly and adequate access and brush removal for the high voltage power line maintenance.

2. There is important drainage ditch detail missing from Design Plan 14 Minnehaha Creek, in the area 400 feet east of Minnehaha Creek Bridge on the north side. Most of the housing area on the north side of Edgebrook Park is presently drained out of the south west corner of Edgebrook Park, through a culvert that was added to the railroad ditch as part of the Rhode Island Trail Access. The curve designed into the Cedar Lake Regional Trail that appears to relocate the trail to be closer to Edgebrook Park is shown to be installed over this very important drainage ditch and culvert. At the location of this curve, the ditch elevation is 6 feet below the present trail height! This implementation of the Design appears to fill in the ditch, put the Trail on top of the fill, and not allow for proper slope of drainage toward Minnehaha Creek. As a minimum, implementing it as shown requires a very long and expensive underground culvert system. MCWD needs to evaluate the details of the ditch elevation design, Trail relocation, and water flow to assure adequate drainage to their new requirements described in the article Minnehaha, MN Creek Watershed District Assesses Stormwater Management Climate Vulnerability. Please have a human walk the area to observe the dramatic elevation drainage problem this Design creates, because two dimensional plans do not communicate the 6 foot elevation problem adequately, nor the distance required for the slope from the top of the paved trail to the bottom of the 6 foot deep drainage ditch.

Segment E2-2 and E2-3 St. Louis Park

Name: Bob Feely, 1909 Penn Avenue S.

Comment: I look forward to full SWLRT service as soon as possible.

Segment E3-1 St. Louis Park and Minneapolis

Name: Bob Feely, 1909 Penn Avenue S.

Comment: I look forward to full SWLRT service as soon as possible.

Name: Robert Marzec, 36 Park Lane

Comment: I believe this is a terrible project and serves very little benefit to the community at great risk to the quality of our water. Will damage Cedar Lake, Lake of the Isles and the connecting channel. Ultimately also doing damage to Lake Calhoun.

Segments E3-2 and E3-3 Minneapolis

Name: Bob Feely, 1909 Penn Avenue S.

Comment: I look forward to full SWLRT service as soon as possible.

Name: Robert Marzec, 36 Park Lane

Comment: See above (*Segment E3-1 St. Louis Park and Minneapolis*) -this will do great damage to the channel -the entire project could not stand up to a cost / benefit analysis . It serves very few people -at great risk to the lake system and parks.

Name: Dan Virnig, 5716 Fairfax Avenue, Edina

Comment: I am opposed to the light rail passing through this area. I am extremely concerned about the tunnel in this area. After experiencing the degradation in Lake Calhoun water quality from pumping of ground water at the 1805 W Lake St building a few years ago it seems likely that a similar problem will occur from needed pumping of the tunnel to keep it dry. The biggest difference is that there will not be any way to stop the pumping once the line is built.

Name: Jeanette Colby, 2218 Sheridan Avenue S. Minneapolis, MN 55405

Comment: To what extent have the MCWD-related environmental concerns raised by the Minneapolis Park and Recreation Board in its response to the EIS been addressed? Here is a relevant excerpt from their letter to the SWLRT Project Office, dated July 21, 2015:

The physical location of the Kenilworth Corridor is important to the MPRB not only as a recreation resource, but because of its geographic context among several lakes of the Chain of Lakes Regional Park. Instances of environmental degradation related to the introduction of LRT are of primary concern because of the proximity of the natural features along the corridor. Still, the corridor is an important recreation feature, offering a route for pedestrians and bicyclists totaling more than 550,000 visits per year. The introduction of LRT alongside freight rail poses changes related to safety and connectivity that are a concern for the MPRB.

The MPRB offers the following comments relative to Section 3.4.2 (Environmental Effects) provided in the SDEIS:

1 Section 3.4.2.1 (Geology and Groundwater) notes “there is the potential for long-term pumping of surface water from the tunnel portals (predominantly stormwater) that collects inside and at the lowest point of the tunnel portals and is routed to underground infiltration chambers.” This section notes further “AS described in the Draft EIS, in areas of high groundwater elevations and granular soils, there is an increased potential for groundwater contamination as a result of previous hazardous and contaminated materials spills.” In a description of the effects of the tunnel on lake levels, the SDEIS indicates “Groundwater and lake levels in the area surrounding Cedar Lake, Lake of the Isles, and Lake Calhoun are very similar, with little change in elevation across the system” and “there is little or no groundwater gradient among the lakes; groundwater does not ‘flow’ from one water body to another.” During the MPRB’s study of alternative crossing of the Kenilworth Channel, consultant reports suggest there is a directional movement of groundwater in this area, with a general direction along the alignment of the LRT corridor. The MPRB notes these statements as inconclusive relative to the

potential for contamination and adverse impacts on the lakes. That construction activities could increase the potential for groundwater contamination, that groundwater (now potentially contaminated) would be collected upon entering portion of the tunnel and then infiltrated using underground chambers, and that there is evidence the groundwater system in this area is connected (regardless of flow), suggests a risk for groundwater contamination from the presence of the tunnel that needs to be addressed.

The SDEIS focuses on the potential impacts of groundwater contamination resulting from LRT operations and suggests "The potential to contaminate groundwater from operation of the light rail system would be low, because the trains would be electric and, generally, no activities that generate pollutants would occur in this area." Notwithstanding the MPRB's comments above related to groundwater, the SDEIS does not address the potential for contamination of groundwater from the operations of freight rail in the Kenilworth Corridor. Because co-location is the basis of the SDEIS, it would seem the potential for groundwater contamination from freight rail operations should be addressed.

2 Section 3.4.2.1 (Geology and Groundwater), part C (Mitigation) addresses a groundwater management plan to be prepared as part of the project and that it would address "collection, storage, and disposal of surface water runoff from the light rail track systems, stations, and other infrastructure developed as part of the project." Because the LPA is based on co-location, freight rail is part of the "other infrastructure developed as part of the project" and should be addressed in the groundwater management plan.

3 Section 3.4.2.2 (Water Resources: Wetlands, Floodplains, Public Waters, and Stormwater Management, Part B. Potential Water Resource Impact, Public Waters and Stormwater Management indicates that "runoff from newly poured concrete surfaces can have high alkalinity, often above pH 9, which can result in degraded water quality and can affect fish." This section further states "The concrete used for this project would take several months to cur enough so that the pH of exposed surfaces decreased to acceptable levels. Stormwater runoff would be tested, and if excessive levels of pH or turbidity are found, the runoff would be treated before it is released to storm sewers or receiving water bodies." From the perspective of the MPRB, "acceptable levels" would be at least the same as those levels found prior to the construction of the improvements. In addition, when the receiving water bodies include those under the jurisdiction of the MPRB or are related to its park resources, the MPRB would urge the Metropolitan Council to treat any runoff from those surfaces that might degrade water quality or affect fish, and to not rely upon finding excessive levels of pH or turbidity (at which point, the MPRB assumes, some stormwater runoff would have already entered receiving water bodies.

6 Section 3.4.2.4 (Vibration), C. Mitigation Measures indicates mitigation for vibration impacts will be incorporated in a vibration mitigation plan. For the MPRB, vibration impacts at the Kenilworth Channel bridges remain a concern. Preliminary design directions for the bridges suggest the potential for a trail bridge separated from an LRT bridge. The MPRB believes this is significant in reducing vibration impacts for trail users, even as we understand that vibration for outdoor receptors are not a consideration.

Name: Shawn Smith, 2420 W 24th Street

Comment: I am very troubled by the MCWD permitting of the SWLRT project. I, nor many neighbors, feel confident that the Kenilworth route has been properly vetted (and if so, not made public) for potential damage to groundwater and the Chain of Lakes. You are the guardians of water quality. We implore you to require, prior to construction, the Met Council to prove that disturbing brown fields in

the Kenilworth Corridor will not have a devastating impact on The Chain of Lakes (fish kills, dewatering, disturbing natural underground rivers).

Further, you need to ensure that because MCWD managers are appointed by the Hennepin County Board, which has pushed this project despite continually low-balling costs, that there are no conflicts of interest.

Please be diligent and accountable to the public in your review of MCWD rules regarding construction of this light rail line in this segment. We care a great deal about the Chain of Lakes and other elements of the watershed, and will care about your work related to this very impactful project.

Name: Mary Pattock, 2782 Dean Parkway, Mpls, MN 55416

Comment: I am deeply concerned about the potential Southwest LRT poses for environmental damage to the Minneapolis Chain of Lakes and groundwater. As you know, the Minneapolis Park and Recreation Board also had such concerns, and publicly opposed the project for environmental reasons until its funding was threatened by Governor Dayton.

Some time ago, MCWD bought several acres of land adjacent to the proposed route of Southwest LRT. The land, purchased for \$15 million, was calculated to increase substantially in value if SWLRT were built, thus yielding a substantial profit on this speculative land deal.

Today MCWD is being asked to issue a permit for SWLRT, based on water quality considerations.

Given the obvious conflict of interest posed by its land speculation, and the fact that most of your members are appointed by Hennepin County — the agency that has long been the driving force behind SWLRT — I believe it would be impossible, even with good intentions, for the MCWD to conduct an objective review of the project.

For that reason, I request that you recuse your agency from review of SWLRT, and assign it to another agency that the public can be assured is not conflicted.

Additional Comments:

Name: Bob Feely, 1909 Penn Ave. S

Comment: I look forward to full SWLRT service as soon as possible.

Name: Dan Virnig, 5716 Fairfax Ave, Edina

Comment: While the Met Council may be claiming to use BMP with infiltration basins, the infinitely better solution would be a different route that does not run primarily through park lands and one that will not impact so many delicate and interconnected water bodies.

Name: Jeanette Colby, 2218 Sheridan Ave S, Minneapolis, MN 55405

Comment: Dear Managers,

I am hearing concerns from friends and neighbors about the MCWD's permitting of the SWLRT project. They are very sensitive to potential conflicts of interest that the board may have, including the problems (1) that managers are appointed by the Hennepin County Board, which has pushed this project despite huge cost increases and serious planning errors, and (2) MCWD's ownership of land near the proposed Blake Road station that you hope to sell profitably.

In light of this, I encourage you to be doubly diligent in your review of the MCWD rules relating to SWLRT construction. Community members care a great deal about the Chain of Lakes and other elements of the watershed, and will care about your work related to this very impactful project.

Thank you for your service,

Jeanette Colby

Name: Bob "Again" Carney Jr., Minneapolis

Comment: Dear Ms. Sylvia –

Per our phone conversation today, I'm e-mailing this to you directly, including links to videos, before the 4:30 PM deadline for public comment.

I'm also supplying a part of a 10/19/14 news release sent out by Captain Jack Sparrow during his campaign for Peter McLaughlin's seat on the Hennepin County Board. I believe the Cold Storage Land Deal should be thoroughly investigated from about a month before the time the land was purchased, to the present. Disclosure: I worked for Sparrow's campaign on a paid basis.

I am also providing, for the record, a link to an online video from my youtube channel --This is an audio recording, supplied by staff, of a portion of the Minnehaha Creek Watershed District Board's 9-22-2011 meeting – regarding the purchase by the MCWD of the Cold Storage land.

<https://www.youtube.com/watch?v=G7yBfA0NXPo>

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I am also providing a second video link, to my youtube channel, the first five and a half minutes are both my comments, and Sparrow's comments, to your board. The remainder of the video is an audio recording of the MCWD's 5/8/2014 meeting, at which the Cold Storage Site situation is discussed, including the risk of a "disastrous" loss to the MCWD if SWLRT does not proceed.

<https://www.youtube.com/watch?v=urIqTx1HF8Q>

I will be providing all this, and more, to the Minnesota Legislature, and calling on them to thoroughly investigate this mess.

bobagain

Bob "Again" Carney Jr.

Minneapolis

Following is the excerpt from Sparrow's news release:

Sparrow: McLaughlin's role in watershed board "potential disaster" must be investigated

Sparrow's demand for the investigation of his opponent's role in a "potential disaster" is based primarily on a reader post by "Jumpcut", following a Star Tribune article by Kelly Smith, updated October 14th and titled "Firing of Twin Cities watershed chief leads to backlash, questions".

Smith's article recounts the sudden firing of Eric Evenson-Maarden, the MCWD's top administrator, after 15 years of apparently good service. The vote to terminate Evenson-Maarden immediately was 4-3, with McLaughlin's staffer casting one of the votes to terminate.

According to "Jumpcut", in 2011 or 2012 the MCWD purchased for \$15 million a 17 acre parcel of land near the proposed Blake Road SWLRT station. The land purchase was discussed at a May 8th 2014 meeting, attended by only the four board members who had voted in April to oust Evenson-Maarden.

"Jumpcut" offers a quote from what he says is "the legal audio recording" of the May 8th MCWD meeting:

--Richard Miller "...the worst could be that LRT didn't get approved...we've got to do a quiet plan if LRT doesn't go through and it (the land) doesn't have its commercial value at its highest and best use as a train station site....We've got to build in our budget someplace (for) the losses we're going to absorb on disposing of that site, because we always know [sic] we've got more in it than we'll get from it but the benefits of the (Minnehaha) creek frontage, and the (storm water) storage capacity, etc. you know it had certain value to us and so that could cover the, but you know, if we do have a problem in 2 or 3 years or 4 years you know let's not have it in a situation where we're in a disaster with no plan. And I don't think it would take much of an effort to plan it out, you know, how we're going to pay for the costs.

"Jumpcut", excerpting of the "legal audio recording" continues:

--Richard Miller: "We can't be naked when that \$15-million comes due (in) 2017.... We're planning for the best but we're ready for the worst".

--unidentified male voice: "When we started on this...we had very strong interest in senior housing...there's no question it's going to be more valuable with light rail..."

--Brian Shekleton: "And I will offer that light rail will happen..."

--Jeff Casale: (interrupts) "That's going in the minutes I think."

-- (laugh)

--Brian Shekleton continues: "and by every indication I get that commitment from (Minneapolis) city council members."

--Jeff Casale: "If we're going to have this on the record...disaster is nothing like I would have considered it as. I think the property has been improved significantly from the work that we've done surrounding it...whether or not LRT goes in that property will have significant real estate value and I would not characterize it at all as disaster planning."

--Richard Miller: "Well, you can call it what you want but it will be [a disaster] when the note comes due and we got a third of the value of the note."

Sparrow commented: "Based on 'Jumpcut's' reporting, the MCWD is obviously now worried about a potential disaster: that if Southwest LRT doesn't happen, taxpayers may lose millions of dollars of the \$15 million spent to purchase the parcel at the proposed Blake Station. Because my opponent's principal aide, Brian Shekelton, cast the deciding vote to abruptly terminate MCWD's longtime professional administrator just before the discussion of what Mr. Miller clearly sees as a 'potential disaster', this whole situation cries out for a thorough investigation – including an answer to this question: 'Why was the MCWD apparently gambling millions of taxpayer dollars on what appears to be real estate speculation in anticipation of the construction of the proposed SWLRT?'"

Name: Susu Jeffrey

Comment: Comment on Permit 16-221, Metro Green Line Extension Minnehaha Creek Watershed District Request by the Metropolitan Council- Conflict of Interest: When Developers Dominate Watershed Decisions

Minnehaha Creek Watershed District purchase of Blake Road land on the proposed Southwest LRT route appears to be "insider" activity by an agency regulating permit of the LRT.

When the water permitting agency has invested in development, who is protecting public waters?

The appointment of Brian Shekleton to the Minnehaha Creek Watershed District Board of Managers by his boss, Hennepin County Commissioner Peter McLaughlin, is problematic. McLaughlin is also chair of the Counties Transit Improvement Board.

Minnesota state law 103D.311 subd. 1 (2) states that "A person may not be appointed as a manager who: is a public officer of the county, state, or federal government, except that a soil and water conservation supervisor may be a manager." In place of himself, Commissioner McLaughlin appointed his principal aide.

Southwest LRT: Conflict of Interest

By Susu Jeffrey (Published by Twin Cities Daily Planet 8/15)

The Minnehaha Creek Watershed District (MCWD) purchased 17-acres of land across the street from the proposed Southwest LRT station at Blake Road. The land deal was brokered in 2011 for \$15-million for redevelopment investment, storm water storage and Minnehaha Creek restoration.

Normally the last process hurdle before shovels break the soil is a watershed district permit. Odds are the appointed MCWD Board of Managers would vote to permit SWLRT construction.

When developers take over a watershed the mandate to protect the water commons is compromised. When taxes were collected by appointed officials in colonial America people revolted.

When SWLRT opponent Bob Carney asked about interest payments on the \$15-million tax payer bond managers skirted the question. Approximately \$100,000 per year in interest payments would be expected.

Below are transcribed legal audio minutes of the May 8, 2014 regular meeting of the Minnehaha Creek Watershed District Board of Managers (appointed by Hennepin and Carver County commissioners).

The discussion centers on SWLRT and 17-acres at 325 Blake Road and West Lake Street, south of Knollwood Mall, in Hopkins, across the street from the proposed Blake SWLRT station. The station location is now part of a strip mall, just south of the railroad tracks and Pizza Luce at 210 North Blake Road.

The parcel includes a large frozen food storage warehouse, and borders Minnehaha Creek and the Cedar Lake bike trail which is next to the railroad tracks.

When Developers Take Over the Watershed

The players in this audio transcription of the May 8, 2014 regular MCWD board meeting include:

--Sherry Davis White, president, Orono, term expired 3/15 (wife of former Orono mayor, Jim White who organizes housing developments), reappointed until 3/18

--Brian Shekleton, vice president, St. Louis Park, term expires 3//16 (works for Hennepin County Commissioner Peter McLaughlin)

--Richard Miller, treasurer, Edina, 3/17 (former Wells Fargo employee who arranged bonding, government finance) Wells Fargo is financing the Blake Street bond purchase.

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--Jeff Casale, secretary, Shorewood, 3/15 (realtor); Kurt Rogness of Minneapolis, architect, was appointed for a three-year term replacing Casale. Minor felony charges against Casale for using MCWD staff in his private real estate business were dropped because "the alleged embezzlement occurred outside the statute of limitations."

Three managers were absent:

--Jim Calkins, Minnetonka, 3/16 (PhD, professor Horticultural Science UMN)

--Pamela Blixt, Minneapolis, 3/17 (MA public administration, City of Minneapolis emergency services)

--Bill Olson, Victoria, 3/16 (engineer Rockwell International)

All but one of the seven managers represents Minneapolis suburbs.

Transcript

--Richard Miller "...the worst could be that LRT didn't get approved...we've got to do a quiet plan if LRT doesn't go through and it (the land) doesn't have its commercial value at its highest and best use as a train station site....We've got to build in our budget someplace (for) the losses we're going to absorb on disposing of that site, because we always know [sic] we've got more in it than we'll get from it but the benefits of the (Minnehaha) creek frontage, and the (storm water) storage capacity, etc. you know it had certain value to us and so that could cover the, but you know, if we do have a problem in 2 or 3 years or 4 years you know let's not have it in a situation where we're in a disaster with no plan. And I don't think it would take much of an effort to plan it out, you know, how we're going to pay for the costs."

[The bonding loan to be paid back with tax money comes due in 2017]

--James Wisker, MCWD staff Director of Planning, Projects and Land Conservation: "By the end of July we should have a lot more clarity...worst case scenario planning we should revisit like, July 24th by then all municipal consent should have occurred."

[In a 6/16/14 email Wisker wrote to the author: "Regarding (SWLRT) dewatering. I referenced that there would be no system in place to *perpetually* [author emphasis] dewater following construction completion."

--Richard Miller: "We can't be naked when that \$15-million comes due (in) 2017....We're planning for the best but we're ready for the worst".

--unidentified male voice: "When we started on this...we had very strong interest in senior housing...there's no question it's going to be more valuable with light rail..."

--Brian Shekleton: "And I will offer that light rail will happen..."

--Jeff Casale: (interrupts) "That's going in the minutes I think."

-- (laugh)

--Brian Shekleton continues: "and by every indication I get that commitment from (Minneapolis) city council members."

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Jeff Casale: "If we're going to have this on the record...disaster is nothing like I would have considered it as. I think the property has been improved significantly from the work that we've done surrounding it...whether or not LRT goes in that property will have significant real estate value and I would not characterize it at all as disaster planning."

Richard Miller: "Well, you can call it what you want but it will be (a disaster) when the note comes due and we got a third of the value of the note."

Is This What Corruption Looks Like?

- Who's watching out for the water?
- Is this land purchase a "conflict of interest" for MCWD managers whose agency and political power would profit by voting to permit SWLRT?
- Is this taxation without representation?

It appears that citizens, not officials or paid experts or politicians or white suburban developers, care about the sustainability of keeping Minneapolis waters clean enough for human recreation.

The current SWLRT plan includes a half mile tunnel between Cedar, Lake of the Isles and Calhoun after approximately 44 acres of tree removal/land clearance. Solid steel walls would be sunk 55-feet down for the length of the tunnel to anchor the 35-foot by 30-foot waterproof train tunnel. Otherwise it would float up or down with fluctuating underground water levels.

According to the Burns and McDonnell Engineering Company water study for the Metropolitan Council as much as 24,000 gallons per day from inside and around the tunnel would be pumped out. Less groundwater flow into and out of the lakes would allow more contaminants and particulate matter to fill in and remain in our public waters, our water commons.

Clearly the voting managers of a permitting agency should be leery of the appearance of conflict of interest regarding public money and political power.

The Minnehaha Creek Watershed District deciders have violated public trust with their ambitious financial scheme that supersedes the preservation and protection of the famous Minneapolis Chain of Lakes.

To hear the transcript of the 5/8/2014 MCWD meeting go to <https://www.youtube.com/watch?v=urIqTx1HF8Q>, and forward to minute 13:10 for the discussion transcribed above.)

The 9/22/11 MCWD meeting is a discussion authorizing a \$15-million bond purchase of 17 acres adjacent to the proposed SWLRT Blake station. To hear the 51:25 minute audiotape go to <https://www.youtube.com/watch?v=urIqTx1HF8Q>.

Submitted by Susu Jeffrey, susujeffrey@msn.com, February 3, 2017

Name: Susu Jeffrey

Comment: Comment on Permit 16-221, Metro Green Line Extension Minnehaha Creek Watershed District Request by the Metropolitan Council- Kenilworth Corridor Construction and Tunnel

1. To route the Southwest Light Rail Transit (SWLRT) line, also called the Green Line Extension, through the Kenilworth commuter bike trail and Cedar Lake Park, is the antithesis of public mass transit. People do not live in parks. Parks are not locations of business or industry. The plan avoids the populous Minneapolis African American Northside and white Uptown areas.
2. Sold to the public as an “equity train” for African American Northside residents, the SWLRT circumnavigates black Minneapolis.
3. This 30-year-old plan, now outdated because demographics have changed, originated under the George W. Bush administration for the purpose of providing time saving, direct, no transfer, rides to elites living in suburbs and exurbs into downtown. There is now a documented population transfer of elites moving into the newly developed urban core with lower income residents pushed out into suburbs. Commuting time has lost its glam.
4. Neither urban communities nor environmental impacts were prioritized in federal criteria until after President G. W. Bush left office, meanwhile the SWLRT alignment had already been selected. As a result, SWLRT is suburban-centric and avoids urban density and economically stressed communities in the city.
5. In the generation since SWLRT was conceived a substantial bus service has evolved in the southwest metro area. A comfortable, air-conditioned bus with Wi-Fi can deliver a commuter from Eden Prairie to downtown Minneapolis in one-half the time the proposed SWLRT could. More than 800 buses run citizens to work, to school, to shopping areas on roads already built.
6. SWLRT is a 20th century plan unsuited to 21st century reality.

Response to Comment: N/A- Thank you for your comment.

Brownfields

1. Extensive soil and groundwater contamination remain in the former Kenilworth/Cedar Lake railroad yards active for 100 years beginning in the 1860s.
2. Industrial waste in the 19th century Kenilworth/Cedar yards was isolated to backyard-out-of-site areas around which poor and unhealthy neighborhoods developed.
3. Today that sacrifice zone endures as the blast zone with co-location of the proposed passenger light rail and volatile heavy rail ethanol trains. However, the zone is currently residential and middle class framed by Cedar Lake, Bassett Creek and Bryn Mawr Meadows.
4. The geography of this corridor is an ancient Mississippi River channel, a valley with clay, silt and gravel alluvial deposits, former swamp, marsh, wetland, in other words a low, wet, soft landscape. A Bryn Mawr neighborhood story is told of a World War II rail emergency when workers were ordered to dump a train car load of paint into the swamp because the railroad car was needed.
5. “There is no such thing as a static water level,” Calvin Alexander, professor emeritus Earth Sciences, UMN.
6. Now the Kenilworth corridor is the top of Minneapolis’ namesake Chain of Lakes. Cedar and Brownie Lakes, formerly emptied northward into Bassett Creek, but were diverted with the early 20th century rowboat craze when Brownie’s lake level was lowered and connected to Cedar

Lake. And Cedar was artificially connected to the wetland called Lake of the Isles, in turn linked to Lake Calhoun. With four lakes levelled together, the top of The Chain lacks the stepdown flow that would normally allow particulates to drop down for cleaner, clearer water. The last time I swam across Cedar Lake, in August of 2015, I could not see my fingers at the end of my hands—even wearing swim goggles—because of the dense stew of gunk suspended in the water. Both the top of The Chain, Brownie Lake, and the bottom, Lake Hiawatha, are unfit for human swimming.

7. When citizens formed Cedar Lake Park Association, raised money, bought the land, spearheaded its rebirth into America's premier commuter bike trail and then donated it to the Minneapolis Park and Recreation Board, the land was never decontaminated. The park was layered atop the old rail yards; it was not "disturbed" thus did not expose any dangerous surface and subsurface poisons.
8. According to public information six potentially contaminated sites have been identified in the Kenilworth corridor. SWLRT propaganda stated that cleanup would begin before or during construction. Hazardous and toxic cleanup is described as limited to the immediate corridor. The silty, gravelly former bottomland is not stable. The water table is 15 to 25-feet deep with rain water seeping into the water table and that water sinking into the aquifer below. Subsurface flow is gauged at northeasterly, toward the Mississippi River. To limit contaminated cleanup to the immediate slice through the corridor is analogous to performing a biopsy rather than removing a tumor. The dangerous substances will simply leach back.
9. Water obeys gravity. The old railroad yards cannot be decontaminated unless the entire plume is excavated. That would involve mapping the boundaries, digging out and removing hazardous substances that have spread out in the old riverbed since the 1860s. Rain water for more than 150 years will have spread pollutants far into the water table, maybe into the aquifer below, or along Bassett Creek to the Mississippi.
10. In July of 2015, \$5-million from an environmental county cleanup fund was shifted into general SWLRT project money. Meanwhile other polluted sites will go untreated with the financial stampede to the SWLRT.
11. Fact: The groundwater flow has not been fully characterized. Fact: LRT construction will require major disturbance of soil.
12. The rail yard was active for a century. Creosote soaked railroad ties from 58 sets of tracks blanketed the Kenilworth corridor during its industrial heyday including switching tracks, repair and maintenance shops. There is a plume of railroad pollutants persisting in the groundwater. The practice of cleaning contaminants for construction is limited to the immediate area on top of which new building is to occur, a pro forma, futile exercise. Disregard of the rules of nature has consequences. As the "water protectors" say, *Mni Waconi*, water is life.
13. The Burns and McDonnell water study for the Metropolitan Council assumes up to 24,000 gal/day water pumped out of the proposed tunnel and surrounding area. 15,000 gal/day would be funneled into sanitary sewer facilities off site. Another 9,000 gal/day would be removed from outside, around the tunnel and pumped back through local sand and gravel with the caveat that flooding might occur. This convoluted system would avoid the "dewatering" term normally associated with removal of 24,000 gal/day.

14. According to Kelton Barr of Braun Intertec, sand and gravel groundwater filtering would remove "some" of the pollutants.
15. The proposed "shallow" tunnel just north of Lake Calhoun between Cedar and Lake of the Isles is planned to be nearly ½-mile long, 37-feet wide and 30-feet deep. Adding to the tunnel's bulk impediment of subsurface flow are two parallel steel sheet pilings on the outside of the tunnel, sunk 55-feet below surface to anchor the huge transit box and keep it from popping out of the ground due to water pressure. The pilings would also hinder groundwater circulation for the length of the tunnel and between the 37-foot wide steel walls.
16. The massive and expensive construction would theoretically help waterproof the electric train cars but would not pick up or drop off any passengers despite traveling through the most populous city in Minneapolis.
17. SWLRT is the most expensive public works project ever proposed in Minnesota. The price is nearly \$2-billion. Half the cost is assumed by federal transportation dollars which seems to be its political raison d'être. Expected, extensive cost overruns and maintenance would fall to Hennepin County taxpayers according to the latest announcements.
18. There is current chatter that President Trump would cut funding for such transportation projects.

Submitted by Susu Jeffrey, susujeffrey@msn.com, February 3, 2017

Name: Susu Jeffrey

Comment: Comment on Permit 16-221, Metro Green Line Extension Minnehaha Creek Watershed District Request by the Metropolitan Council- Rain Events and Climate Change

1. On July 23, 1987, Minneapolis experienced a 15-inch rain.
2. The Minneapolis Public Works Department guide describes a 50-year-rain event as more than 5.3-inches in a 24-hour period.
3. The Burns & McDonnell water study for the Metropolitan Council recommends that the proposed tunnel infiltration chambers be redesigned to handle a 100-year storm event rather than the 50-year design.
4. It's getting wetter here. Across Minnesota, precipitation in the 1990's exceeded the climatological benchmark (1961-1990 normal) by a significant amount. The [cumulative departure from normal map](#) for the period January 1, 1991 through August 16, 1999 shows that many regions of the state exceeded the historical average by more than 30 inches. In some areas of northwestern, south central, and southeastern Minnesota, the aggregate departure exceeds 40 inches.
(http://www.dnr.state.mn.us/climate/summaries_and_publications/wet1990s.html)
5. [Trees hold soil in place and](#) absorb huge amounts of water. Trees improve water quality by extracting pollutants through tree roots. Forests capture rain in the canopy and on the forest floor, reducing storm water runoff and flooding. A mature tree can absorb 36 percent of the rainfall it comes in contact with. In one day, a large tree can absorb up to 100 gallons of water and release it into the air, cooling the surrounding area and trapping and removing dust, ash, pollen and smoke. One mature tree absorbs carbon dioxide at a rate of 48 pounds per year. Areas with trees experience lower crime rates. The SWLRT plan would remove a 44-acre urban forest in the Kenilworth corridor.

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6. Recent climate studies of our warming climate warn of increasing extreme downpours. Meteorologists have coined the new term "rain bomb." In the future there is a much higher potential for flash floods, potentially disastrous for electric trains.
7. Drought is the opposite half of extreme rains. Electric trains throw off sparks. In a tight corridor with trains carrying volatile ethanol like the proposed Kenilworth co-location plan, a fire bomb could erupt.

Submitted by Susu Jeffrey, susujeffrey@msn.com, February 3, 2017

Name: Susu Jeffrey

Comment: PROXY APOLOGY: Mayor Hodges Aide "I'm Sorry"

<http://riseuptimes.org/2015/06/29/southwest-lrt-mayor-hodges-aide-im-sorry/>

By Susu Jeffrey

Peter Wagenius, Senior Policy Aide to Minneapolis Mayor Betsy Hodges, apologized at the final Southwest LRT public hearing on June 18 (2015)—final for this round. The SWLRT budget is approaching \$2-billion. It is the largest public works project ever proposed in Minnesota.

In an effort save the project proponents are slicing stations, suburban parking, landscaping and public art. The "equity" argument, providing transportation for predominantly black American Northsiders to suburban jobs, was abandoned months ago to bussing riders to a downtown LRT stop.

Wagenius focused on renege promises by the Metropolitan Council and Hennepin County Commission to remove freight rail co-location with the proposed LRT trains. The heavy freight rail currently transports ethanol which puts the LRT, and businesses and residences along the route, in the blast zone.

Wagenius asserted that the LRT plan as it now stands is not the same project that Minneapolis City Council members approved in August 2014. Council President Barb Johnson along with members Lisa Goodman and Cam Gordon voted 10-to-3 against municipal consent, then priced at \$1.65-billion.

SWLRT is splitting the Democratic Farmer Labor Party into constant growth vs. quality of life.

Wagenius testified: "Thank you Mr. Chair [Adam Duinick, Metropolitan Council chair] and thank you Met Council members for your willingness to hold this [legally required public] hearing.

"I work for Mayor Hodges and she would like to extend her thanks to everybody here—the citizens present for their remarkable politeness and thoughtful comments in the face of this project's transformation from what it was promised to be, into a totally different project that it is today.

"I will share this experience with Mayor Hodges as a refreshing tonic compared to the collective amnesia which permeates the conversation that takes place at the Corridor Management Committee. At the CMC they were saying it is time, now, for the burdens of this cost cutting to be shared equitably among the five cities along the line, as if the burdens of this project have been shared equitably up to this point.

"At those meetings there was no recognition whatsoever that the burden of freight fell 100-percent on one city.

Permit 16-221- Attachment (2A)
Public Notice Comments

"At those meetings there was no recognition that this project was planned to be and promised to be totally different than it is today with freight relocated from the corridor. This is beyond dispute. Whether or not St. Louis Park acknowledges their promise, the fact that Hennepin County promised to reroute the freight is not disputed.

"Ms. [Jeanette] Colby and Mr. [George] Puzak are absolutely right about the origin, the root causes of all these challenges. Southwest LRT has been a project to avoid accountability. Why did the federal government have to force the project to incorporate [the] freight issue into the project's scope and budget? Did anyone ever think there was going to be a solution to the freight problem which was free?—which did not cost money?

"How much more has it cost the project and the residents of Minneapolis because the freight issue wasn't dealt with five, 10, 15, 17 years ago. If neither of the government agencies [Metropolitan Council and Hennepin County Commission] responsible for this situation are willing to tell the community, let the City of Minneapolis do it.

"You are right to be angry and frustrated. You are right. Your politeness in the face of this is entirely amazing.

"This is the opposite of what you were told this project was going to be. So if no one else can say it—I'm sorry." (applause)

Transcribed by the author from Robert Carney Jr.'s meeting audiotape at <https://www.youtube.com/watch?v=YUMJyXCa3lg&feature=youtu.be>

Permit 16-221- Attachment (2B)
Summary of Responses

Introduction:

The SWLRT Project was publicly noticed to all residents within 600 feet of the proposed Project area. Residents who received the public notice post card were directed to the Project's public notice webpage on the District's website for further information about the project as well as an opportunity to provide comment. The project description and available comment fields were made available by project segment and geography. A voicemail line was also made available for residents to call-in and leave a comment by phone.

The Project received nineteen comments from seven individuals. These comments are provided as Attachment 1A and are listed as they were received either on the website or via e-mail transmission. For the purposes of responding to these comments, Staff has characterized the comments into three categories including, General Concern for Water Resource Impact, Groundwater and Contamination Effects of the Kenilworth Corridor, and Conflict of Interest. One comment received was in relation to how the project design will affect drainage from private property. Staff is currently working with that resident to address this concern and a direct response has been provided for this comment.

The District has reviewed the Project for compliance with its applicable rules, which are in place to protect water resources and prevent flooding. The District does not have land-use authority and so does not regulate what kind of use an applicant puts a property or properties to. Rather the District regulatory review ensures that land-disturbing activities do not degrade water resources or increase flood risk. The permit application review was based on the applicable rules triggered by the project design on the property that the project is proposed. The following responses are based on the District's evaluation of the Project under the applicable rules.

Comments:

General Concern for Water Resource Impact

Commenters provided statements of opposition to the project based on this concern for water resource impact. Several comments received included resident's concerns of how water resources will be affected as a result of the short term construction, and long term operation of the project. These concerns mostly related to the concern for the water quality of the Chain of Lakes. Commenters provided statements of opposition to the project based on this concern for water resource impact.

The SWLRT Project is a major transportation redevelopment project and the District recognizes the concern that impacts to water resources could result from the project. The District has developed and implements rules for water resource protection and flood risk mitigation that are based on sound science and the best available data. Through the permitting process, the District is able to review Project design and evaluate potential impacts to water resources through application of the rule criteria. The Project plans and specification have been diligently reviewed by MCWD staff and engineers, and measures have been integrated into the plan to ensure that the work meets the District's rules for protection against impacts to water resources and flood-risk mitigation. The permit report in the packet for the meeting at which the managers will consider approval summarizes the evaluation against all applicable specific rule standards and requirements.

Groundwater Contamination and the Effects of the Kenilworth Corridor

The Kenilworth Corridor route and design was the main concern for a majority of the commenters. Commenters noted that the Shallow Tunnel design posed the following water resource concerns:

1. Tunnel would impede groundwater flow from Cedar Lake to Lake of the Isles.
2. Construction of the tunnel and work within the Kenilworth Corridor would cause earth disturbance resulting in mobilizing contamination plume within the groundwater system.
3. The Water discharged from the tunnel would introduce polluted water into the stormwater and surface water system.
4. The existence of contaminants within the proposed stormwater management system.

Item 1: During the Project's Design process in September of 2013, upon request of Metropolitan Council Southwest Project Office, the District Engineer reviewed the Project's Draft Basis of Design for the proposed Shallow Tunnel, including affects to groundwater flow. Based on the District's data and knowledge of the area hydrology, the District Engineer provided a conclusion that there was no serious concern about potential shallow groundwater or nearby surface water impacts based on the information in the draft and the intended design. This report was provided to the Board of Managers as a Staff Update during the March 13, 2014 Board Meeting (the packet information is provided as an attachment to this memo).

Following this determination, two engineering firms (Burns and McDonnell and Barr Engineering) produced groundwater impact reports analyzing the effect of a shallow tunnel design. Burns and McDonnell on behalf of the Metropolitan Council, published a Water Resources Evaluation for the Kenilworth Shallow LRT Tunnels. Barr Engineering, provided a groundwater impact analysis to the Minneapolis Park and Recreation Board. These reports, consistent with the District's findings, produced conclusions that there is a minimal risk for impact to groundwater resources as a result of the Project.

Item 2: Except to the extent that infiltration of runoff is precluded at locations of known contamination, the District rules do not approve permit applicants' soil or groundwater management plans. An applicant is obligated to seek review and approval of development and redevelopment plans, along with applicant contamination-management, from the Minnesota Pollution Control Agency (MPCA) for purposes of obtaining liability protection. MPCA has approved applicant's Construction Response Action Plan (RAP) and RAP's procedures for managing contaminated soil and groundwater have been implemented into the Project's plans and documents. MCWD is aware, though, that the Applicant has demonstrated to MPCA that groundwater flow will not mobilize contaminant plumes to move to adjacent water resources.

Item 3 and 4: The District reviewed the temporary tunnel groundwater discharge plan to be implemented during construction of the tunnel as part of the Project's Stormwater Management Plan review. The ground water will be treated on-site prior to being discharged to the storm system. During winter months, the discharged ground water will be conveyed to the MCES sanitary system. The plan shows that water that is collected within the Rail Line tunnel, and potentially polluted through

Permit 16-221- Attachment (2B)

Summary of Responses

interaction with track infrastructure, will be routed to the sanitary sewer system. Storm water that is collected within the tunnel portal areas will be pumped out and routed to the Project's stormwater management system. The Applicant has conducted a Phase II Environmental Site Assessment to determine the existence and location of soil contaminants. In accordance with the District's Stormwater Management rule, the applicant has proposed to use infiltration where there are no known contaminants and filtration where contaminants were identified through the Phase II Environmental Site Assessment. The filtration features will be lined in order to preclude any possibility that stormwater will mobilize subsurface contamination.

Conflict of Interest

1. First, some commenters asserted that the District has an improper interest in approving the Southwest Light Rail Project because the District owns and intends to sell land along the Project corridor within Hopkins.
2. Second, several commenters expressed concern that MCWD has a conflict of interest in reviewing and approving a permit for the Metro Green Line Extension Project (SWLRT). These concerns relate to some managers being appointed by the Hennepin County Board of Commissioners and a perception that the county's interest in the project will influence the managers' decision. A couple of commenters also specifically pointed to the fact that Manager Brian Shekleton is employed as an aide to Hennepin County Commissioner Peter McLaughlin, who has been an advocate for the project.

Response

1. The MCWD Land Conservation and Restoration Program works with willing landowners to acquire easements and property in environmentally sensitive areas that can help the MCWD achieve its water quality goals. In September 2011, MCWD purchased the 16.9 acre property at 325 Blake Road with 1,000 feet of Minnehaha Creek shoreline. This property lies within a local geography that represents the most environmentally-degraded section of the creek and is a significant source of pollutants to impaired waters downstream. This geography was therefore determined to be a high priority area to focus MCWD clean water initiatives, which include collaboration with St. Louis Park and Hopkins and also local business partners. This property will eventually allow the MCWD to treat 250 acres of regional urban stormwater before it enters the creek and create an iconic greenway along Minnehaha Creek that connects communities in St. Louis Park and Hopkins. MCWD will only retain land required for creek restoration and water quality improvement. The balance of the property will be sold for redevelopment consistent MCWD policies and with the City of Hopkins' land-use plan. Proceeds of the sale will recover a portion of the MCWD water quality improvement investments related to the original purchase and additional capital improvements for the creek restoration and stormwater treatment.
2. No individual manager is in a position to directly or materially benefit financially from approval of the project. No manager has a unique or even remotely quantifiable personal interest in the success or failure of the project. To the degree Manager Shekleton may have a unique professional connection to the project, it is an attenuated one and he is not in a position to

Permit 16-221- Attachment (2B)

Summary of Responses

personally benefit from its obtaining an MCWD permit in anything more than an indistinct, indirect way. Conflict of interest concerns are implicated when a governmental body takes action that benefits the personal financial interests of one (or more) officer. (See Minn. Stat. § 471.87; 10A.07.) The MCWD Board of Managers, in its bylaws, has expanded this policy to include nonfinancial personal interests of a manager.

MCWD has statutory authority and is required to adopt rules and operate a permitting program. Minn. Stat. §§ 103D.341, .345. Fulfilling these mandates, MCWD has adopted thresholds, standards and criteria that apply to land-disturbing work in the watershed, and has long operated a permitting program in keeping with these rules. The proof of its diligent and fair application of its regulatory requirements is the record before the managers of the examination of the Southwest Light Rail's proposed land-disturbing activities against the established regulatory framework. In making a determination on the matter, MCWD is fulfilling its statutory purposes. If it declined to do so – either by ceding authority to another entity or declining to exercise its regulatory authority – MCWD would abdicate its responsibility to the potential detriment of water resources. It is worth noting that as a matter of policy, MCWD subjects its own projects to review and approval by its regulatory program. That is, even in cases where MCWD itself is the project proponent and has a direct interest in its success, MCWD conducts a public review of the work against its regulatory criteria and standards, and requires that its own projects obtain an MCWD permit.

September 4, 2013

James Wisker
Director of Planning, Project and Land Conservation Programs
Minnehaha Creek Watershed District
15320 Minnetonka Blvd.
Minnetonka, MN 55345

*File copy
3-13-14*

Re: Kenilworth Shallow LRT Tunnel – Basis of Design - DRAFT

Dear James,

In the last month, the Southwest LRT Project Office (SPO) has met with the Minnehaha Creek Watershed District (MCWD) to share technical information related to a potential Shallow LRT Tunnel design in the Kenilworth Corridor for the Southwest Light Rail Transit (SWLRT) Project in Minneapolis. The area addressed by this potential design option is located between the proposed locations of the West Lake Station and the Penn Station in the general area of the Kenilworth Corridor.

SPO staff met with MCWD staff on the following dates: August 19, August 22, August 27 and most recently September 3, 2013. City of Minneapolis staff and the Minneapolis Park and Recreation Board (MPRB) staff have attended and/or been invited to attend all of these meetings.

On August 27, 2013, a draft Kenilworth Shallow LRT Tunnel Basis of Design Report was transmitted by SPO to MCWD. On September 3, 2013, MCWD, with City of Minneapolis and MPRB staff, verbally shared comments on the Basis of Design Report with the SPO.

The SPO is requesting that MCWD provide technical feedback in a written response to the materials provided regarding the potential Shallow LRT Tunnel option. Specifically the SPO would appreciate technical feedback related to the following:

- Potential impacts to the groundwater elevation in the vicinity of the proposed tunnel.
- Potential impacts to the Chain of Lakes “water budget” due to water that is anticipated to be collected in the proposed tunnel and routed to the sanitary sewer.
- Potential for the proposed tunnel to cause a groundwater flow blockage related to groundwater flow between Cedar Lake and Lake of the Isles. SPO presented materials that indicated that the water elevations of Cedar Lake and Lake of the Isles are uniform and rise and fall together.
- Reasonability of the design criteria provided in the Basis of Design for leakage rates for both permanent sheet piling and waterproofing systems surrounding the proposed concrete tunnel. The leakage rate design criteria provided by the SPO is related to the

quantity and flow rate of water that would be collected by storm or sanitary sewer systems.

- Reasonability of methods presented to address construction dewatering and to minimize the amount of temporary dewatering required. SPO presented information regarding tunnel construction temporary dewatering as well as a step-by-step potential construction methodology that was the basis for determining flow rates and quantities of temporary dewatering.
- Reasonability of the 50-year design recommended by the SPO for storm water infiltration and whether this approach will address concerns related to discharging warmer water back into the storm sewers or lakes during winter months.
- Any other potential impacts to water resources in the area.

MCWD technical feedback on these items will help the SPO respond to concerns raised by other local stakeholders including the City of Minneapolis. The SPO understands that as the project progresses, the MCWD will need additional information from the SPO. This information is anticipated to include the following:

- The current readings from recently installed piezometers in the area to confirm existing groundwater elevations.
- The completion of a Phase I Environmental Site Assessment (ESA) for the area.
- The completion of any Phase II ESA (if required).
- Discharge points for temporary and permanent groundwater dewatering.
- Best Management Practices anticipated to treat storm water to an acceptable level in accordance to MCWD and MPCA requirements.
- A completed drainage report summarizing the details of the storm water management system for the project.

SPO also acknowledges that, in addition to the MCWD, other agencies will need to be engaged in the on-going review of the project. These agencies include, but are not limited to the following:

- Minnesota Department of Natural Resources – for groundwater appropriation.
- City of Minneapolis – for discharge points and infrastructure requirements.
- Minnesota Pollution Control Agency – NPDES and sanitary sewer discharge requirements.
- US Army Corps of Engineers – impacts to water bodies (such as the Kenilworth Channel).

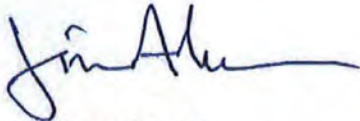
Finally, SPO understands that MCWD will be reviewing other parts of the SWLRT Project in addition to this area of the project in the Kenilworth Corridor. This includes storm water design

and water quality treatment for the remainder of the station areas and LRT alignment (including the Minnehaha Creek crossing area) located within the watershed boundaries.

We are grateful that MCWD has been engaged early in the preliminary engineering design process. We look forward to your technical feedback and to continued coordination and collaboration on this project. We would appreciate a response from MCWD by September 9, 2013, so that this information can be shared with the Southwest LRT Corridor Management Committee on September 11, 2013.

If you should need any additional information, please feel free to contact me at (612) 373-3880 or jim.alexander@metrotransit.org.

Sincerely,



Jim Alexander, P.E.
Director of Design and Engineering
Southwest LRT Project Office

Cc: Mark Fuhrman, SPO
Chris Weyer, SPO



**Southwest Light Rail Transit: Kenilworth Shallow LRT Tunnels
Water Resources Evaluation**

DRAFT

Metropolitan Council

Project No. 76701

**Revision 0
January 30, 2013**

Southwest Light Rail Transit: Kenilworth Shallow LRT Tunnels Water Resources Evaluation

DRAFT

prepared for

Metropolitan Council

St. Paul, Minnesota

Project No. 76701

**Revision 0
January 30, 2013**

prepared by

**Burns & McDonnell Engineering Company, Inc.
Bloomington, MN**



**Southwest Light Rail Transit: Kenilworth Shallow LRT Tunnels
Water Resources Evaluation**

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- *Reasonability of methods presented to address construction dewatering and to minimize the amount of temporary dewatering required SPO presented information regarding tunnel construction temporary dewatering as well as a step-by-step potential construction methodology that was the basis for determining flow rates and quantities of temporary dewatering.*
- *Reasonability of the 50-year design recommended by the SPO for stormwater infiltration and whether this approach will address concerns related to discharging warmer water back into the storm sewers or lakes during winter months*
- *Any other potential impacts to water resources in the area*

Burns & McDonnell's evaluation was accomplished by gathering information at project meetings, and reviewing the project documents mentioned above. The project meetings consisted of two technical project meetings on December 10 and 19, 2013 and town hall/community meetings that were held in Minneapolis and St. Louis Park on January 7, 2014 and January 9, 2014, respectively. Project documents were systematically reviewed in a charrette setting by an interdisciplinary team of water resources professionals using the following steps

- 1 Identify specific statements and conclusions made in relation to water resources and the issues identified in the SPO September 4, 2013 letter to MCWD.
- 2 List the specific data and assumptions these in which statements are based.
- 3 Review the data and assumptions for potential sources of uncertainty, seasonal fluctuations, safety factors, sensitivity to change, etc.
- 4 As appropriate, suggest alternative lines of evidence (data, methodology, etc.) that may provide additional clarification or support of the statements/conclusions

A summary of conclusions and recommendations, incorporating topics provided by project stakeholder and town hall/community meeting participants are provided below.

1.1 Potential Impacts to Groundwater Elevation in the Vicinity of the Proposed Tunnels

1.1.1 Kenilworth Corridor Hydrogeology

The near-surface geology in the Kenilworth Corridor primarily consists of fluvial deposits of sands and gravels with some silty sand to silt layers and underlain by a coarse sand aquifer extending to a depth of greater than 120 feet, a buried swamp deposit and areas with man-placed fill have also been identified. The water table generally ranges in depth from 15 to 25 feet below grade along the proposed route. Perched groundwater may be encountered above the water table in areas with silty layers and swamp deposits.

Cedar Lake and Lake of the Isles are within the Minnehaha Creek watershed and generally drain sequentially through the chain of lakes to the south toward Minnehaha Creek. Cedar Lake and Lake of the Isles are connected by an open channel that equalizes the lake levels in Cedar Lake, the channel and Lake of the Isles. The piezometer data indicate that the lake level elevation in the channel is higher than most of the groundwater elevations. This suggests that groundwater in the corridor does not discharge to the channel and lakes in the corridor and that the lakes may be

EXECUTIVE SUMMARY

The Metropolitan Council (Council) has developed preliminary plans and designs for the Southwest Light Rail Transit (SWLRT) Green Line Extension project. The planned Green Line Extension project is approximately 16 miles long and runs southwest from downtown Minneapolis through the cities of St. Louis Park, Hopkins, Minnetonka, and Eden Prairie. Within the Green Line Extension project, the Council is exploring the option of installing two shallow tunnel segments (north and south) between the proposed West Lake and Penn Stations, both of which would be located within the city limits of Minneapolis, MN. The area where the shallow tunnels would be located is known as the Kenilworth Corridor.

As part of the design exploration process, the Council has developed a draft Basis of Design report (BODR) and draft Water Resources Monitoring Program (WMP), which together present an approach to constructing the shallow tunnels, and a means for controlling seepage groundwater into the tunnels and mitigating impacts to water resources in the area during construction and operation of the light rail transit (LRT) system.

Burns & McDonnell Engineering Company (Burns & McDonnell) was retained by the Council to conduct an independent engineering evaluation and technical review (evaluation) of these six documents:

1. Kenilworth Shallow LRT Tunnel BODR (Metropolitan Council, 2013)
2. SWLRT Project Office (SPO) letter to Minnehaha Creek Watershed District (MCWD) dated September 4, 2013 (Alexander, 2013)
3. MCWD response letter to SPO dated September 10, 2013 (Wisker, 2013)
4. Wenck Associates (Wenck), Inc., letter to MCWD dated September 9, 2013 (Panzer, 2013)
5. Kenilworth Shallow LRT Tunnel draft Water Resources Monitoring Program (Metropolitan Council, 2013)
6. Modified Phase I Environmental Site Assessment (SEH, Inc., 2013)

The evaluation focused on addressing the following issues identified in the September 4, 2013 SPO letter to MCWD:

- *Potential impacts to the groundwater elevation in the vicinity of the proposed tunnel.*
- *Potential impacts to the Chain of Lakes "water budget" due to water that is anticipated to be collected in the proposed tunnel and routed to the sanitary sewer.*
- *Potential for the proposed tunnel to cause a groundwater flow blockage related to groundwater flow between Cedar Lake and Lake of the Isles. SPO presented materials that indicated that the water elevations of Cedar Lake and Lake of the Isles are uniform and rise and fall together.*
- *Reasonability of the design criteria provided in the BODR for leakage rates for both permanent sheet piling and waterproofing systems surrounding the proposed concrete tunnel. The leakage rate design criteria provided by the SPO is related to the quantity and flow rate of water that would be collected by storm or sanitary sewer systems.*

recharging the aquifer. This is counter to a more typical groundwater-surface water relationship in this climate where groundwater flows toward and discharges to surface water

Since piezometers are installed only along the proposed route in the Kenilworth Corridor, they only provide a one dimensional view of the groundwater elevations and it is difficult to conclusively determine the groundwater flow pattern. Additional piezometers lateral to the proposed route are needed to better characterize the groundwater flow system in two dimensions, and a few nested piezometers completed at a greater depth would help to evaluate potential downward flow. Also, the water levels presented are only from October and November 2013. Seasonal water level data are needed to better understand ground water elevations during wet periods and in response to rain events.

1.1.2 Potential Impacts to Groundwater Elevation due to Pumping or Leakage into Tunnel

The BODR presents a construction method that intends to isolate the tunnels from the groundwater system with minimal leakage. As a result, there should be little impact on groundwater levels because traditional dewatering methods will not be used provided the construction can achieve the stated leakage rates. The proposed north and south tunnels system is not analogous to the dewatering occurring at 1800 Lake Street. We recommend removing the term “dewatering” from the BODR because it may imply pumping to lower the water table during construction and/or operation of the shallow tunnels option.

1.1.3 Potential Impacts to Groundwater Elevation due to Blockage of Groundwater Flow

The considerable thickness and overall transmissivity of the alluvial aquifer should be able to easily transmit groundwater under the sheet piling without a significant increase in water levels. The only foreseeable situation where a significant rise in water levels could occur would be if there were some areas where a confining silt layer separated a portion of the upper aquifer from the lower aquifer and the sheet piling extended all the way or nearly all the way through the upper aquifer and the tunnel was somewhat perpendicular to horizontal groundwater flow. This appears to be unlikely to occur, however, as stated above, more characterization of groundwater flow is needed to be certain that this would not be an issue.

1.2 Potential Impacts to the Chain of Lakes ‘Water Budget’

According to the information in the BODR, only about 34 acre-feet (11 million gallons) would be redirected to the sanitary sewer system annually. This volume of water represents a relatively small portion of the overall water budget of the chain of lakes system. However, sanitary sewer systems are designed to convey sanitary waste and are typically sized for much smaller flows. A comprehensive capacity analysis and range of scenarios to adequately understand the implications of routing water to these systems and city approval is required.

1.3 Potential for the proposed tunnel to cause a groundwater flow blockage related to groundwater flow between Cedar Lake and Lake of the Isles

Cedar Lake and Lake of the Isles are connected by an open channel that equalizes the water level elevation both lakes and the channel. Therefore, there is not a hydraulic driver for groundwater flow from one lake to another across the Kenilworth Corridor. However, the groundwater flow system has not been adequately characterized to conclusively describe groundwater flow in the Kenilworth Corridor.

1.4 Reasonability of methods presented to address construction dewatering and to minimize the amount of temporary dewatering required

In summary, it appears that some of the pumping rates presented in the BODR for the construction and operation of the tunnel system are in error. It does not appear that these are serious issues that would represent major flaws in the basis of design.

It is recommended that these rates be thoroughly re-evaluated with clearly stated assumptions, input values, and ranges of calculated values. Additionally, the anticipated long-term performance of the waterproofing system should be evaluated considering its durability and other projects where this system has been used in similar settings.

1.5 Reasonability of the 50-year design recommended by the SPO for stormwater infiltration and whether this approach will address concerns related to discharging warmer water back into the storm sewers or lakes during winter months.

During winter, contributions from stormwater and snow melt are assumed to be minimal because of below freezing air temperatures. As a result, the water removed is expected to be mostly groundwater with a temperature of about 55 °F. This water will not be discharged directly into surface water bodies. But will be discharged to underground infiltration chambers that will return this water to the groundwater system. As such, no impacts on the ice cover of the water bodies are expected assuming the chambers are located below the frost line and are sufficiently large enough to infiltrate the maximum volume of water. The chambers should be designed for the 100-year design storm and a comprehensive capacity analysis and range of scenarios to adequately understand the implications of routing water to these systems and city approval is obtained.

1.6 Other Potential Impacts to Water Resources in the Area

Surface water runoff that enters the portals (entrance/ exits of the tunnels) and tunnels has the potential to contain sediment, oil and grease and chlorides from ice melting chemicals. Stormwater pre-treatment devices, such as grit chambers, should be included in the design to remove sediment, oil and grease which could clog chamber pore space and degrade the functionality of the system. This potential for groundwater contamination, however, could be largely prevented by investigating snow and ice control best management practices, such as blowing or shoveling snow. In the Phase I report, several areas were noted as “high risk” for environmental impacts, many of these are former railroad operations areas. A Phase II investigation is needed in the Kenilworth Corridor to determine if contaminated soil or groundwater may be encountered during the construction.

1.7 Water Resources Monitoring Program Assessment

1.7.1 Groundwater

The groundwater monitoring plan is preliminary and does not go into sufficient detail on key locations to monitor groundwater levels or specific threshold criteria that could indicate an issue with groundwater levels or flow. We recommend revising this document after additional characterization of the groundwater flow system has been completed, as recommended. The revision should include sufficient and specific monitoring locations, parameters, threshold criteria, as well as a monitoring schedule and a course of action should a threshold criteria be exceeded.

1.7.2 Water Quality

Groundwater should be sampled and analyzed for hydrocarbons, chlorides, and other potential contaminants attributable to the project. Beginning before construction, samples should be collected in late spring and fall from sites near underground infiltration chambers (chambers) and from sites in the track corridor away from the chambers.

2 RECOMMENDATIONS

In conclusion, recommended actions are as follows:

- Additional piezometers lateral to the planned route both north and the south of the channel are needed to better characterize the groundwater flow system in two dimensions. Also, some sets of nested piezometers should be installed to evaluate vertical groundwater flow in the Kenilworth Corridor. This will help to better characterize and understand the direction and gradient of groundwater flow and the interaction between groundwater and surface water.
- Revise the BODR, removing the term “dewatering” and providing a comprehensive section on water resources.
- A comprehensive capacity analysis and range of scenarios to adequately understand the implications of routing water to sanitary and storm sewer systems is needed for final design.
- Design the underground infiltration chambers for the 100-year design storm event.
- Incorporate stormwater pre-treatment devices in the design.
- A Phase II investigation is needed in the Kenilworth Corridor to determine if contaminated soil or groundwater may be encountered during the construction or operation of the shallow tunnel system.
- Revise the WMP document after additional characterization of the groundwater flow system has been completed sufficiently and specific monitoring locations, parameters, threshold criteria, as well as a monitoring schedule and course of action should a threshold criteria be exceeded.
- Sample and analyze groundwater for hydrocarbons, chlorides, other potential contaminants attributable to the project near the infiltration chambers.

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1 BACKGROUND

The Metropolitan Council (Council) has developed preliminary plans and designs for the Southwest Light Rail Transit (SWLRT) Green Line Extension project. The planned Green Line Extension project is approximately 16 miles long and runs southwest from downtown Minneapolis through the cities of St. Louis Park, Hopkins, Minnetonka, and Eden Prairie. Within the Green Line Extension project, the Council is exploring the option of installing two shallow tunnel segments (north and south) between the proposed West Lake and Penn Stations, both of which would be located within the city limits of Minneapolis, MN. The section of the overall project route where the shallow tunnels would be located is known as the Kenilworth Corridor. The proposed 2,500-foot long north tunnel segment begins roughly 600 feet north of Lake of the Isles-Cedar Lake channel (Channel) and ends approximately 1,000 feet north of West 21st Street (Metropolitan Council, 2013). The proposed 2,200-foot south tunnel segment begins roughly 500 feet north of West Lake Street Bridge and ends approximately 400 feet south of the Channel (Metropolitan Council, 2013). As part of the exploration process, the Council has developed a draft Basis of Design report (BODR) and draft Water Resources Monitoring Program (WMP), which together present an approach to constructing the shallow tunnels, and a means for controlling groundwater and mitigating impacts to water resources in the area during construction and operation of the light rail transit (LRT) system.

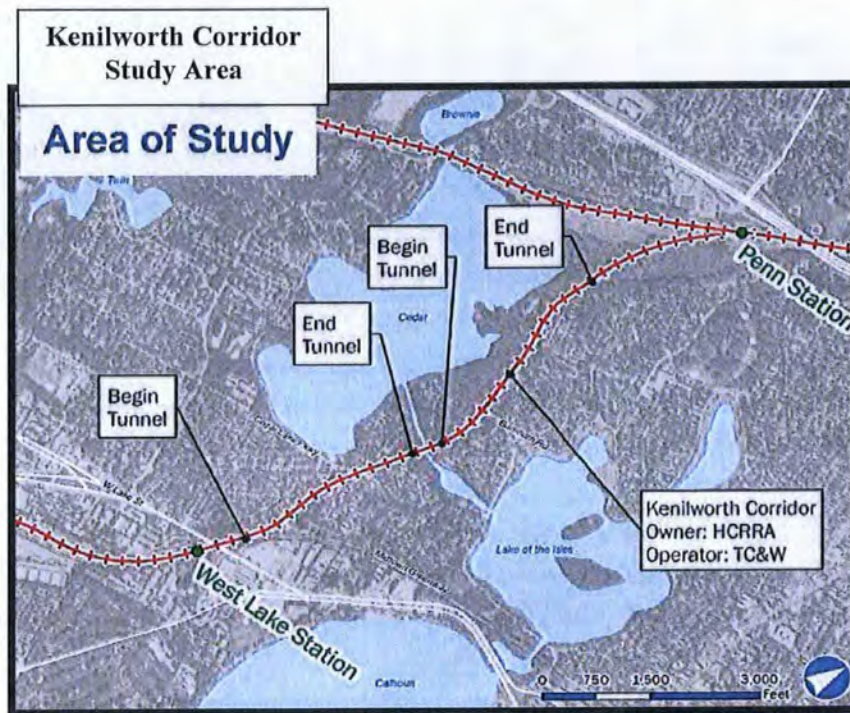


Figure 1: Kenilworth Corridor Study Area (SPO Map)

Burns & McDonnell Engineering Company (Burns & McDonnell) was retained by the Council to conduct an independent engineering evaluation and technical review (evaluation) of the materials provided in BODR. This evaluation was to specifically address the seven issues identified in the SWLRT Project Office's (SPO) letter to Minnehaha Creek Watershed District (MCWD) dated September 4, 2013, and to review and evaluate the WMP.

1.1 Scope

Burns & McDonnell was provided copies of six documents that were to form the basis for its evaluation of potential impacts to water resources in the Kenilworth Corridor due to the proposed construction and operation of the shallow tunnel option. The six documents reviewed were:

1. Kenilworth Shallow LRT Tunnel BODR (Metropolitan Council, 2013)
2. September 4, 2013 SPO letter to Minnehaha Creek Watershed District (MCWD) (Alexander, 2013)
3. September 10, 2013 MCWD response letter to SPO (Wisker, 2013)
4. September 9, 2013 Wenck Associates(Wenck), Inc., letter to MCWD (Panzer, 2013)
5. Kenilworth Shallow LRT Tunnel draft Water Resources Monitoring Program (Metropolitan Council, 2013)
6. Modified Phase I Environmental Site Assessment (SEH, Inc., 2013)

The evaluation focused on addressing the following issues identified in the September 4, 2013 SPO letter to MCWD (Alexander, 2013):

- *Potential impacts to the groundwater elevation in the vicinity of the proposed tunnel.*
- *Potential impacts to the Chain of Lakes "water budget" due to water that is anticipated to be collected in the proposed tunnel and routed to the sanitary sewer.*
- *Potential for the proposed tunnel to cause a groundwater flow blockage related to groundwater flow between Cedar Lake and Lake of the Isles. SPO presented materials that indicated that the water elevations of Cedar Lake and Lake of the Isles are uniform and rise and fall together.*
- *Reasonability of the design criteria provided in the BODR for leakage rates for both permanent sheet piling and waterproofing systems surrounding the proposed concrete tunnel. The leakage rate design criteria provided by the SPO is related to the quantity and flow rate of water that would be collected by storm or sanitary sewer systems.*
- *Reasonability of methods presented to address construction dewatering and to minimize the amount of temporary dewatering required. SPO presented information regarding tunnel construction temporary dewatering as well as a step-by-step potential construction methodology that was the basis for determining flow rates and quantities of temporary dewatering.*
- *Reasonability of the 50-year design recommended by the SPO for stormwater infiltration and whether this approach will address concerns related to discharging warmer water back into the storm sewers or lakes during winter months.*
- *Any other potential impacts to water resources in the area.*

In addition to reviewing the provided documents to address the specific issues cited above, Burns & McDonnell participated in meetings with the SPO project stakeholders City of Minneapolis, Hennepin County and Minneapolis Park and Recreation Board (MPRB); a project technical meeting with the City of Minneapolis, MPRB and Barr Engineering Company (Barr); and the Minneapolis and St. Louis Park town hall meetings.

No data collection or analytical modeling were included as part of the Burns & McDonnell's evaluation.

1.2 Project Understanding

As part of assessing the shallow tunnels option for the Kenilworth Corridor, the Council developed the BODR, which presents an approach to constructing the shallow tunnels, and a means for mitigating potential impacts to water resources in the area during construction and operations of the LRT system. Our understanding of the proposed tunnel construction and operation process and how water resources will be handled during construction and operation phases is presented below.

1.2.1 Water Management during Construction

The tunnel construction method presented in the BODR is intended to eliminate the need for active dewatering by isolating the tunnels from groundwater. Beginning at each end of the north and south tunnels the construction will be segmented into roughly 150-foot long by 37-foot wide cells.

Prior to any excavation, each section will be isolated from any adjacent groundwater by driving sheet piling around its perimeter. Next, the soil within each section will be excavated to the proposed depth. In areas where the proposed depth is below the water table, a clam shell bucket will be used to wet-excavate the soils without any pumping of groundwater. After, the soil is excavated to the proposed depth; a concrete slab will be poured to seal the base of the tunnel from the underlying groundwater. In areas where the base of the excavation is below the water table, the concrete will be tremmed into place below the water level to create a seal. After the concrete has cured and the seal has been established, any water remaining in the now-sealed excavation will be pumped out (Figure 2). For the segments beneath the water table, there will likely be some leakage through the sheet piling and concrete slab as stated in the BODR and discussed in Section 2.4.

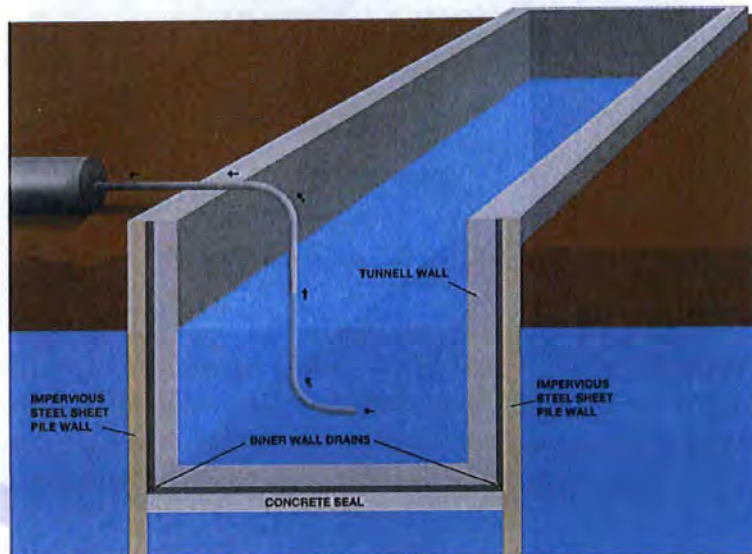


Figure 2: Construction Sheet Pile Cell

With this approach, the water removed during construction would be limited to the amount of precipitation that falls into the cell, the volume of groundwater in the cell when the sheet piling is installed, and leakage through the sheet piling and basal concrete slab. During warm weather months, the water pumped from the cells would be discharged to temporary onsite treatment facilities to remove sediment (filtration basins, portable baffle tanks, etc.) then discharged to the storm sewer system which would then discharge to the chain of lakes. To address temperature differences between water in the cells and in the lake during winter months, water from the cells would be discharged to constructed underground infiltration chambers (chambers), the sanitary sewer, or storage tanks that would be hauled offsite.

1.2.2 Water Management during Operation

When the tunnel system is operating, water would be collected and managed from three different areas: the portals, inner walls and the tunnel. The portals, or entrances/exits of the tunnel, are uncovered and open to rain and snow. Stormwater and snowmelt from the portals would be collected in drains at the base of the portals that are designed to capture a 100-year design storm event. Water captured would be pumped into chambers and infiltrated to groundwater (Figure 3:

Portal Water Control System). Runoff volumes in excess of the chambers' 50-year design storm event volume will overflow from the chambers and discharge into the storm sewer system before the chain of lakes. All design storm events are based on National Oceanic and Atmospheric Administration (NOAA) Atlas 14 rainfalls (Metropolitan Council, 2013).

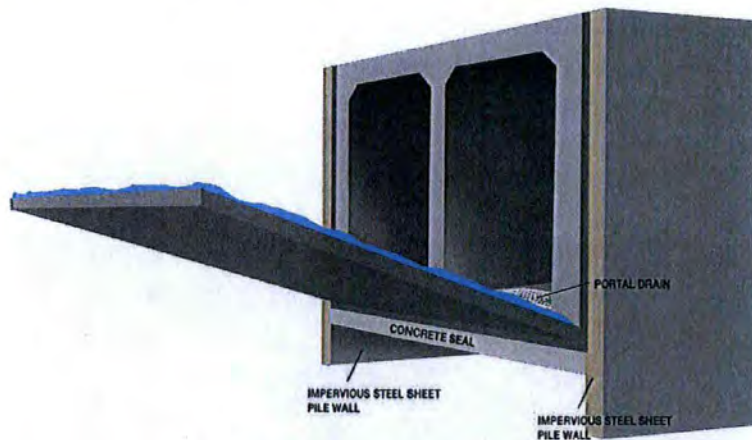


Figure 3: Portal Water Control System

The inner wall (external shallow LRT Tunnel Water Control System) drainage collection area is located between the outside of the tunnel walls and floor of the tunnel and the initial sheet piling and concrete seal (Figure 4). This area would collect any groundwater that seeps through the sheet piling and concrete seal. That water would be routed to a chamber and returned to the groundwater system.

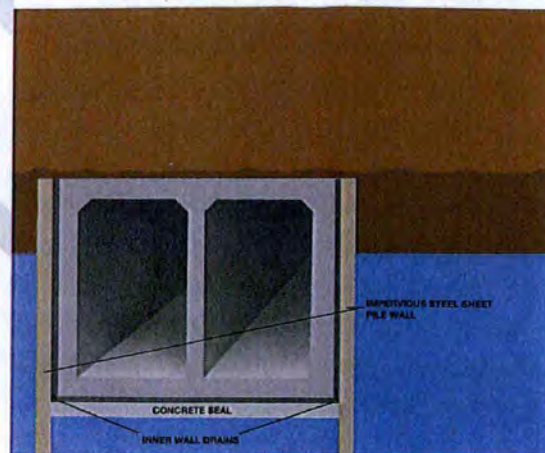


Figure 4: Inner Wall Water Control System

And finally, any water collected inside the tunnel from stormwater, snowmelt and groundwater seepage would be collected in storm drains. That water, which may come in contact with potential

contaminants, would be pumped to the City of Minneapolis or Metropolitan Council Environmental Service (MCES) sanitary sewer system (Figure 5).

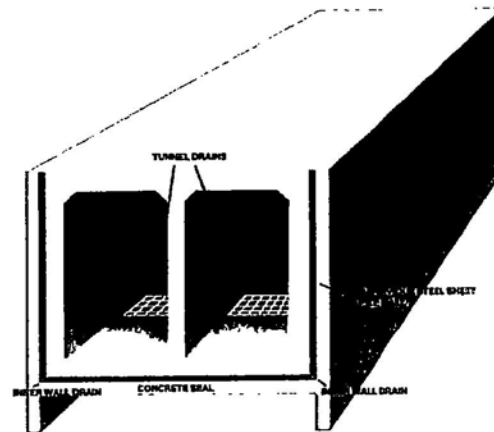


Figure 5: Tunnel Water Control System

1.2.3 Water Resource Monitoring Program

As presented in the draft WMP, the purpose of the document is to satisfy applicable regulatory requirements of the Minnesota Department of Natural Resources (DNR), Minnesota Pollution Control Agency (MPCA) and MCWD and present a means to monitor surface water and groundwater before and during construction, and during operation. The procedures documented in the draft WMP report present a means for establishing baseline conditions, detecting changes and setting criteria that would trigger the development of appropriate corrective actions, if necessary.

2 APPROACH

Burns & McDonnell's evaluation was accomplished by gathering information at project meetings, and review of project documents identified in the Scope (Section 1.1). The project meetings consisted of a kick-off meeting, one stakeholder meeting and two town hall meetings (Minneapolis and St. Louis Park). The meetings provided supplementary background information about the project, identified areas of public concern and allowed for the scope of the evaluation to be amended by comments received from project stakeholders and the public-at-large.

The kick-off meeting, which was held December 10, 2013, provided an opportunity for Burns & McDonnell team and project stakeholder introductions; provided an overview of the shallow tunnels option; and allowed the project stakeholders to share data. The project stakeholders also voiced concerns about potential groundwater contamination and the capacity of sanitary and stormwater sewer systems to handle proposed flows.

The City of Minneapolis, MPRB, Hennepin County, Barr, the SPO and Burns & McDonnell held a project technical meeting on December 19, 2013. The meeting provided a platform for the City of Minneapolis, MPRB and their consultant Barr to present questions for consideration during the evaluation and in the future, should the option progress. Specific to this evaluation were the following topics: groundwater and surface water monitoring, risk analysis of safety factors considering the range of lake and groundwater elevations, and lake water quality and temperature issues.

Town hall/community meetings were held in Minneapolis and St. Louis Park on January 7, 2014 and January 9, 2014, respectively. The professionally facilitated meetings gave participants the opportunity to refine the scope of the evaluation and to specify concerns to be addressed as part of this evaluation. Below are topics generated specific to this evaluation at those meetings:

- Dewatering impact: thermal, biological and groundwater
- Contamination from disrupted soils
- Climate change and design storms
- Decision criteria: water quality and groundwater and surface water levels
- 1800 West Lake Street apartment complex dewatering impacts and challenges

Project documents listed in the scope were systematically reviewed in a charrette setting by an interdisciplinary team of water resources professional using the following steps:

- 1 Identify specific statements and conclusions made in relation to water resources and the issues identified in the SPO September 4, 2013 letter to MCWD.
- 2 List the specific data and assumptions these statements are based on.
- 3 Review the data and assumptions for potential sources of uncertainty, seasonal fluctuations, safety factors, sensitivity to change, etc.
- 4 As appropriate, suggest alternative lines of evidence (data, methodology, etc.) that may provide additional clarification or support of the statements/conclusions.

A summary of conclusions and recommendations, incorporating topics provided by project stakeholder and town hall/community meeting participants are provided in the following sections.

3 EVALUATION

3.1 Potential Impacts to Groundwater Elevation in the Vicinity of the Proposed Tunnels

3.1.1 Kenilworth Corridor Hydrogeology

The near-surface geology in the Kenilworth Corridor primarily consists of fluvial deposits of sands and gravels with some silty sand to silt layers and a coarse sand aquifer extending to a depth of greater than 120 feet, based on the information presented in the American Engineering Testing (AET) memorandum dated August 26, 2013, that was included as Appendix C of the BODR and a revised AET memorandum dated December 13, 2013. AET also identified a buried swamp deposit near West 21st street and areas with man-placed fill near the surface. The water table generally ranges in depth from 15 to 25 feet below grade along the proposed route based on the piezometers installed by AET (2013). Perched groundwater may be encountered in areas of silty layers and the buried swamp deposits above the water table, but these would be expected to be limited in extent and seasonal duration.

Water level data provided by MPRB for a nested set of monitoring wells installed at depths of 30 and 100 feet located near the Kenilworth Corridor at the north end of Lake of the Isles indicate that there has been a downward gradient (MPRB email with attached files, dated January 2, 2014). The period of record for MPRB's water level data is 1982 through the end of 2013, so these data provide some historical context to the variation of water levels both seasonally and year to year. The water level in the 30-foot monitoring well has ranged over approximately six feet during the monitoring period with seasonal fluctuations of up to three feet. The water levels also show a slight upward trend indicating that water levels have risen approximately 1.5 feet during the monitoring period.

Cedar Lake and Lake of the Isles are within the Minnehaha Creek watershed and generally drain sequentially through the chain of lakes to the south toward Minnehaha Creek. Cedar Lake and Lake of the Isles are connected by an open channel that equalizes the lake levels in Cedar Lake, the channel and Lake of the Isles. The AET piezometer data indicate that the lake level elevation in the channel is higher than most of the groundwater elevations (Figure 6). This suggests that groundwater in the corridor does not discharge to the channel and lakes and that the lakes may be recharging the aquifer. This is counter to a more typical groundwater-surface water relationship in this climate where groundwater flows toward and discharges to surface water.

The AET memo states that the overall groundwater gradient is to the northeast, toward discharge in the Bassett Creek watershed. This would be another anomaly from a "typical" groundwater-surface water relationship where shallow groundwater flow would generally be in the same direction as surface water and flow would not leave the watershed. There is a low topographic divide 500 to 1000 feet northeast of Cedar Lake that separates the Minnehaha Creek and Bassett Creek watersheds. In addition, there is a buried bedrock valley filled with coarse sands beneath this area that could provide a connection for groundwater flow to the northeast. The MPRB wells near Lake

of the Isles indicate a downward gradient, so that the primary flow direction may be downward to a more transmissive aquifer at depth

Since the AFT piezometers are installed only along the proposed route in the Kenilworth Corridor, they only provide a one dimensional view of the groundwater elevations and it is difficult to conclusively determine the groundwater flow pattern. Additional piezometers lateral to the proposed route are needed to better characterize the groundwater flow system in two dimensions, and a few nested piezometers completed at a greater depth would help to evaluate potential downward flow. Also, the water levels presented are only from October and November 2014. Seasonal water level data are needed to better understand ground water elevations during wet periods and in response to rain events.

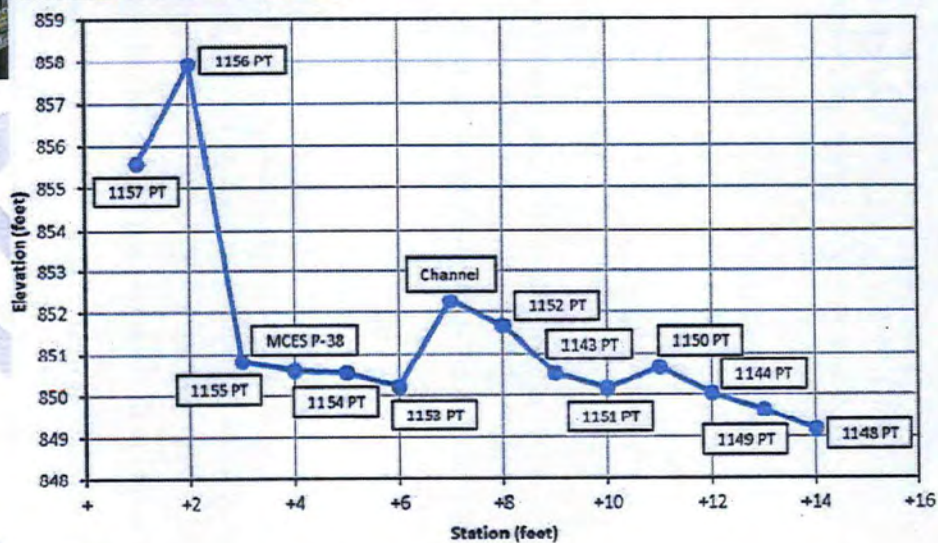
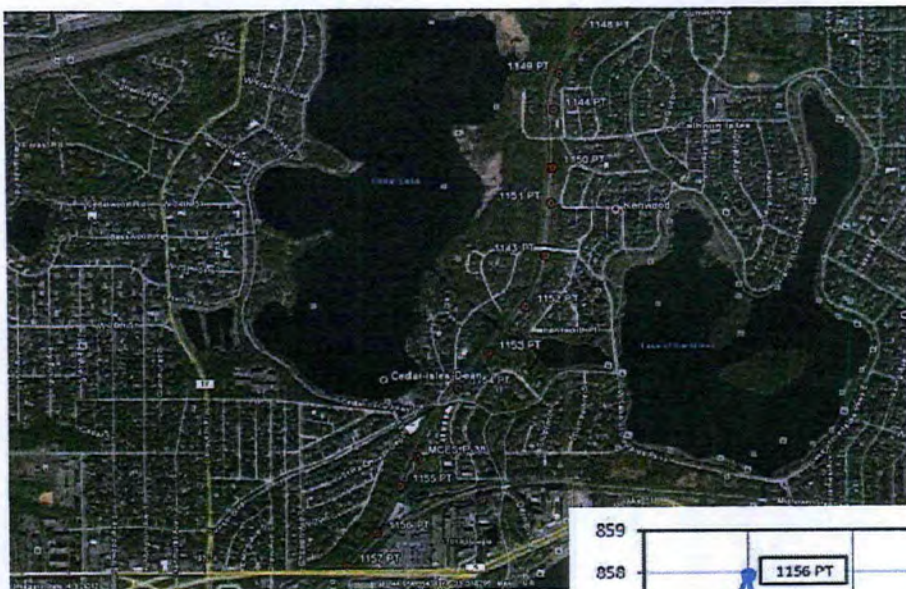


Figure 6: Groundwater Piezometer Data (Vayen, 2013)

3.1.2 Potential Impacts to Groundwater Elevation due to Pumping or Leakage into Tunnel

The proposed method of the tunnel construction, as described in the BODR and summarized in Section 1.2 1 should have little impact on groundwater levels because traditional dewatering methods will not be used during construction or during operation of the tunnel. Rather, the BODR presents a construction method in which the tunnel will be isolated from the groundwater system with minimal leakage into the tunnel. If the leakage rates presented in the BODR are met, there should be little to no drawdown of the adjacent water table due to leakage into the tunnel.

As heard at several meetings, there is public concern about “dewatering” from the tunnel resulting in lowered groundwater levels as has recently been reported with the 1800 Lake Street building near the southeast shore of Lake of the Isles. It is understood, based on the Barr Report (2013), that traditional dewatering at the 1800 Lake Street building is occurring to lower the water table to stop groundwater leakage into the basement of the building (Barr Engineering, 2013).

The use of the term “dewatering” in the BODR may imply that groundwater extraction (pumping) will occur to lower the water table outside of the 150-foot by 37-foot cell to keep the bottom of the excavation dry during construction and operation of the tunnel system. However, as discussed above, the proposed construction method described in the BODR does not include any traditional dewatering because the construction method relies on isolating the cell with sheet piling and concrete seals from the adjacent groundwater with minimal groundwater leakage into the excavations or the finished tunnel system. For these reasons, the proposed north and south tunnels system is not analogous to the dewatering occurring at 1800 Lake Street. We recommend removing the term “dewatering” from the BODR because it may imply pumping to lower the water table during construction and/or operation of the tunnel system.

3.1.3 Potential Impacts to Groundwater Elevation due to Blockage of Groundwater Flow

The depth of the sheet piling is not specified in the BODR, however, it appears that it will extend ten or more feet beneath the water table in some areas and, therefore, has the potential to block horizontal groundwater flow and potentially result in an increase in water levels on the up-gradient side of the sheet piling/tunnel. However, the considerable thickness and overall transmissivity of the alluvial aquifer should be able to easily transmit groundwater under the sheet piling without a significant increase in water levels. AET developed a two dimensional hypothetical groundwater model to illustrate that the permeability of the aquifer is great enough that even if it were much thinner, the rise in water level would not be significant (Vayen, 2013). The only foreseeable situation where a significant rise in water levels could occur would be if there were some areas where a confining silt layer separated a portion of the upper aquifer from the lower aquifer and the sheet piling extended all the way or nearly all the way through the upper aquifer and the tunnel was somewhat perpendicular to horizontal groundwater flow. This appears to be unlikely to occur, however, as stated above; more characterization of groundwater flow is needed to be certain that this would not be an issue.

3.2 Potential Impacts to the Chain of Lakes 'Water Budget' due to water that is anticipated to be collected in the proposed tunnel and routed to the sanitary sewer

Along the Kenilworth Corridor, rain and snow have the potential to saturate the soil, recharge the underlying groundwater system or concentrate on the surface, runoff into the storm sewer system and recharge the surrounding lake system. The proposed water collection, treatment, and management system described in section 1.2 and the BODR would re-direct water from the chain of lakes and groundwater systems to the sanitary sewer.

According to the information in the BODR, only about 34 acre-feet (11 million gallons) would be redirected to the sanitary sewer system (Metropolitan Council, 2013). This volume of water represents a relatively small portion of the overall water budget of the chain of lakes system. In reviewing the information, a calculation error was identified. Once corrected, the water volume estimate in the tunnel directed to the sanitary sewer system is **expected** to be even smaller. Section 3.4 has additional seepage discussion.

Although the amount of water that would be re-directed is relatively small for a lake water budget perspective, sanitary sewer systems are designed to convey sanitary waste and are typically sized for much smaller flows and, therefore, may not be able to convey the added groundwater and stormwater. Overtaxing the sanitary sewer system could cause problems for residential and businesses users, as well as maintenance issues. A comprehensive capacity analysis and range of scenarios is required to adequately understand the implications of routing water to these systems. City approval should be obtained prior to the moving forward with discharging to the sanitary sewer system.

3.3 Potential for the proposed tunnel to cause a groundwater flow blockage related to groundwater flow between Cedar Lake and Lake of the Isles

Cedar Lake and Lake of the Isles are connected by an open channel that equalizes the water level elevation both lakes and the channel. Therefore, there is not a hydraulic driver for groundwater flow from one lake to another across the Kenilworth Corridor. However, that does not mean that there is not groundwater flow in the Kenilworth Corridor. As discussed in section 3.1, the groundwater flow system has not been adequately characterized to conclusively describe groundwater flow in the Kenilworth Corridor.

3.4 Reasonability of the design criteria provided in the BODR for leakage rates for both permanent sheet piling and waterproofing systems surrounding the proposed concrete tunnel.

The BODR describes two permanent systems to limit and collect groundwater seepage. These systems consist of a sheet piling system outside the tunnel walls and a waterproof coating on the tunnel walls. The sheet piling would consist of interlocking pieces with sealed joints (either a bituminous or water-swelling product), and would be set in a concrete seal at the base. A drainage layer would be installed between the sheet piling system and the tunnel walls to collect any seepage through the sheet piling system. The tunnel walls would be sealed with unspecified waterproofing materials.

According to the BODR, the seepage rates through the sheet piles were derived from *The Impervious Steel Sheet Pile Wall (ArcelorMittal, 2009)*. Seepage rates through the coated tunnel walls were derived from Federal Highway Administration Publication No. FHWA-NHI-10-034 *Technical Manual for Design and Construction of Road Tunnels – Civil Elements (2009)* as the source for the seepage calculation through the coated tunnel walls.

The water removal rates stated in the BODR are as follows:

Temporary Water Control Rates.

Cell 1 Pumping Rate (15 DAYS) 10.0 GPM (Excavation)
Cell 2 Pumping Rate (45 DAYS) 2.4 GPM (Construction)

Permanent Water Control Rates

External Concrete Tunnel (Storm Sewer) – Estimated Discharge Rates & Volumes

South Portal South Tunnel Pumping Rate 0.4 GPM
North Portal South Tunnel Pumping Rate 2.3 GPM
South Portal North Tunnel Pumping Rate 7.4 GPM
North Portal North Tunnel Pumping Rate: 2.3 GPM
Total Pumping Rate: 12.4 GPM

Internal Concrete Tunnel (Sanitary Sewer) – Estimated Discharge Rates & Volumes

South Portal South Tunnel Pumping Rate 2.7 GPM
North Portal South Tunnel Pumping Rate 7.3 GPM
South Portal North Tunnel Pumping Rate 6.4 GPM
North Portal North Tunnel Pumping Rate 4.7 GPM
Total Pumping Rate: 21.1 GPM

The amount of groundwater seepage anticipated through these systems is presented in the BODR, and a spreadsheet containing these calculations was provided for Burns & McDonnell's review.

Groundwater Seepage Calculations

The spreadsheet provided for review contained calculations (in separate sections, or tabs) for permanent and water control and temporary water control. The section for permanent water control consisted of tables containing calculations for seepage or drainage into various components of the tunnel. Table 1 presented the calculation for Internal Tunnel Drainage, representing groundwater that seeps through the tunnel walls to be collected from the internal drainage system and discharged to the sanitary sewer. Table 2 presented the calculations for External Tunnel Drainage, representing groundwater that seeps through the sheet piling into the external drainage system and ultimately discharged to the storm sewer. Table 3 relates to surface drainage into the portal area and is not addressed in this section.

Temporary Water Control

The section for temporary water control consisted of two tables addressing water control in excavation cells and in construction cells. Based on our review of the spreadsheet, the methodology

used for calculating the estimated groundwater seepage rates to the external tunnel appears to be reasonable. However, some errors were apparent with the actual calculations, as discussed below.

- Based on our understanding of the proposed construction method, the Cell 1 (Excavation) dewatering calculation would not apply because no pumping of groundwater would occur until after the excavation is complete and the concrete seal is in place. At that point the Cell 2 (Construction) scenario would apply.
- Although sealed sheet piling joints are proposed in the BODR, the analysis for groundwater control during construction of the excavation cells appears to assume open joints as stated in the BODR construction sequence.
- The calculation for groundwater removal in the excavation cell factors in the seepage rate for each sheet piling joint, the total number of joints, and the maximum precipitation anticipated to occur during the 15-day construction period. Additionally, this calculation factors in the volume of the cell that is below lake level during the 15-day period. However, when this volume is factored into the calculated pumping rate for the excavation cell a 45-day period is assumed. Groundwater removal from the excavation cell will occur in 15 days as that is the length of time the cell will be under construction. If the 15-day excavation cell period is substituted in place of the 45-day period, the resultant pumping rate is 24.6 gpm, rather than the 10 gpm reported in the BODR.
- For the Cell 2 (Construction) calculation (in which the sheet pile joints will be sealed) a joint resistance of 1.0×10^{-7} m/s is used. A joint resistance of 3×10^{-10} m/s should be used (according to the referenced sheet pile manual). When this factor is applied in the spreadsheet calculation, a pumping rate of 0.6 gpm is the result, rather than 2.4 gpm presented in the BODR.
- The source of the presumed rainfall amounts (6 inches for the excavation scenario and 12 inches for the construction scenario) was not stated. This would be a significant amount of rainfall and, therefore, would likely represent a near-worst case scenario for precipitation. It is recommended that the source of the precipitation amounts used in the calculations be stated.

Permanent Water Control

External Concrete Tunnel

Based on review of the submitted calculation spreadsheet, the methodology used for the seepage rates to the external tunnel appears to be reasonable. However, some errors were apparent with the actual calculations, as discussed below.

The joint resistance used in the calculation is appropriate for open (unsealed) sheet pile joints (per the referenced sheet pile manual), yet the installation process described in the BODR states that the joints will be sealed. The sheet pile manual suggests using a minimum joint resistance of 3×10^{-10} m/s for sealed joints. If this value is substituted into the spreadsheet equation the infiltration rate is much less than 1 gpm for each tunnel section.

Internal tunnel drainage

The shallow LRT tunnels will have a second waterproofing system, applied to the outside faces of the concrete tunnels inside the sheet piling. The material to be applied was not specified and may include “external and/or internal membranes and coatings, specialized concrete designs, and water stop joint treatments”

The calculation for seepage into the tunnels through the tunnel walls assumes an infiltration rate of 0.002 gallons/square foot/day. This is the allowable infiltration rate permitted as stated on page 1-14 of the *Technical Manual for Design and Construction of Road Tunnels – Civil Elements (2009)*

Based on review of the calculations in the spreadsheet, the methodology used for calculating the estimated groundwater seepage rates to the external tunnel **appears** to be reasonable. However, an error is apparent with the actual calculations, as discussed below.

- The calculation for the tunnel surface area **appears** to be in error. The surface area of each tunnel side and the surface area of the floor slab should be summed to arrive at the total area available for infiltration. This results in a total area of 50,820 square feet. The area calculation in the spreadsheet appears to have multiplied the surface areas of the tunnel sides by the surface area of the floor slab, resulting in total volume of the tunnel segment. Using the permitted infiltration rate of 0.002 gal/sq ft/day, inflows to the tunnel through the tunnel walls and bottom slab are **expected to be much lower** than presented in the report. For example, the revised calculation indicates an inflow to the south tunnel’s south portal to be more on the order of 0.07 gpm and 37,099 gallons annually, not 2.7 gpm and 1.4 million gallons annually as stated in the BODR. Similarly reduced inflows are indicated for the other portals.

In summary, it **appears** that the some of the pumping rates presented in the BODR for the construction and operation of the tunnel system are in error. It does not appear that these are serious issues that would represent major flaws in the basis of design.

It is recommended that these rates be thoroughly re-evaluated with clearly stated assumptions, input values, and ranges of calculated values. Additionally, the anticipated long-term performance of the waterproofing system should be evaluated considering its durability and other projects where this system has been used in similar settings.

3.5 Reasonability of methods presented to address construction dewatering and to minimize the amount of temporary dewatering required

Projects of this type frequently utilize active dewatering methods for groundwater control throughout construction that utilize one or more wells or a well point system. Pumping of the wells or well point system lowers the groundwater table in the vicinity of the excavation and maintains it at a certain level so that construction activities can proceed in a relatively dry excavation. Once

construction is complete, dewatering pumps are turned off and groundwater returns to its normal elevation

The BODR proposes a unique method for groundwater control. Once initial excavation and clamshell excavation is complete the initial dewatering commences, with water and remaining sediment pumped out to leave a relatively dry cell into which groundwater seeps. Once the initial volume of water is removed the sheet piling in place will severely limit the amount of infiltration into the work area. This approach seems reasonable.

3.6 Reasonability of the 50-year design recommended by the SPO for stormwater infiltration and whether this approach will address concerns related to discharging warmer water back into the storm sewers or lakes during winter months.

Water from the following sources will be removed and sent to chambers:

- sheet pile cells during construction
- stormwater and snow melt from the tunnel portals
- groundwater that seeps into the drainage system between the sheet pile, the concrete seal, and the concrete tunnel walls and floors

During the winter, contributions from stormwater and snow melt are assumed to be minimal because of below freezing air temperatures. The water removed in winter, therefore, is expected to be mostly groundwater (from construction dewatering or seepage) with a temperature of about 55 °F. Concerns exist that discharge of this relatively warm water into one of the nearby surface water bodies in winter could lead to thinning or loss of ice cover resulting in hazardous conditions and a loss of recreational opportunities. Such an occurrence has occurred nearby where the winter discharge of groundwater from the foundation of a large building into a storm sewer that leads directly to a pond has adversely impacted the thickness of ice on the receiving water body (Barr Engineering, 2013)

The water removed in winter, however, will not be discharged directly into surface water bodies. This water instead will be discharged to chambers that will return this water to its source. Because the water in winter is expected to be mostly groundwater, returning this water to the aquifer will result in little net change in the volume of water in the aquifer. Although local groundwater gradients may be affected in areas immediately around the tunnels and chambers, the current exchange of water between the lakes and the aquifer is expected to remain the same. As such, no impacts on the ice cover of the water bodies around the proposed shallow LRT tunnels are expected assuming

- The chambers are located below the frost line so that ice will not form in the pore spaces around the chambers and prevent infiltration
- The chambers are sufficiently large to infiltrate the maximum volume of water expected to be removed from the tunnels in winter so that no overflow from the chambers will occur to storm sewers that discharge into surface water bodies.

Stormwater volumes provided in the BODR for the 50-year and 100-year design storm events were 0.26 acre-feet and 0.30 acre-feet, respectively for the South Portal. Using appropriate significant figures for this level of design and the relatively insignificant change from one design storm event to the other, the chambers should be designed for the 100-year design storm with an overflow for greater storm events. Also, stormwater runoff from storms greater than the 50-year design storm event for the portal areas would be directed to the City of Minneapolis or MCES storm sewer system. Storm sewer infrastructure is typically designed for storm events much less than the 50-year event. As recommended for sanitary sewer connections, city of Minneapolis approval and a comprehensive capacity analysis and range of scenarios should also be completed for storm sewer connections to adequately understand potential implications.

Climate variability was a topic of concern expressed during the town hall meetings. As noted in the BODR, portal water control systems were designed NOAA Atlas 14. NOAA Atlas provides engineers precipitation frequency at average recurrence intervals of 1-year through 1,000-year for the Minnesota and 10 Midwestern states (USDC & NOAA, 2013). Importantly, it includes information on temporal distributions for heavy precipitation amounts for selected durations and seasonal information for annual maxima data used in the frequency analysis and examines the potential effects of climate change as trends in historic annual maximum series (USDC & NOAA, 2013). Using NOAA Atlas 14 rainfall, incorporates climate variability into the proposed design.

3.7 Other Potential Impacts to Water Resources in the Area

Surface water runoff that enters the portals and tunnels has the potential to contain sediment, oil and grease and chlorides from ice melting chemicals. Stormwater pre-treatment devices, such as grit chambers, should be included in the design to remove sediment, oil and grease which could clog chamber pore space and degrade the functionality of the system. Chlorides in the runoff pumped out of the portals and tunnels would not be removed by the stormwater pre-treatment systems designed to remove oil, grease, and solids, and would pass through the chambers into the groundwater. This potential for groundwater contamination, however, could be largely prevented by implementing snow and ice control best management practices, such as blowing or shoveling snow.

A Phase I Environmental Assessment was completed for properties along the entire proposed shallow tunnels option (SEH, Inc., 2013). In the Kenilworth Corridor, several areas were noted as “high risk” for environmental impacts, many of these are former railroad operations areas. A phase II investigation is needed in the Kenilworth Corridor to determine if contaminated soil or groundwater may be encountered during the construction. In addition, the potential for contaminated groundwater leaking into the tunnel system and potential vapor intrusion into the tunnel by any volatile organic compounds that are found to be present should be evaluated.

3.8 Water Resources Monitoring Program Assessment

3.8.1 Groundwater Levels

The groundwater monitoring program proposed in the draft WMP report is a preliminary outline of monitoring water levels. It is divided into three phases: Pre-Construction, Construction, and In-

Service Operations Pre-construction monitoring would consist of measuring monthly water levels in the existing piezometers and at the Channel Construction monitoring would consist of weekly monitoring of the existing piezometers (and additional or replacement piezometers due to construction activities) with a to-be-determined threshold criteria that would lead to more frequent monitoring and/or corrective action The In-Service monitoring phase consists of measuring baseline water levels in the piezometers and subsequent monthly measurements with to-be-determined threshold criteria that would lead to more frequent monitoring and/or corrective action similar to the construction monitoring

The groundwater monitoring plan is preliminary and does not go into much detail on key locations to monitor groundwater levels or specific threshold criteria that could indicate an issue with groundwater levels or flow. This is likely because it is a preliminary plan, and the groundwater flow system has not been fully characterized to determine key locations or criteria that would indicate that the tunnel system is not performing as designed with regard to groundwater resources We recommend revising this document after additional characterization of the groundwater flow system has been completed The revision should include sufficient and specific monitoring locations, parameters, threshold criteria, as well as the monitoring schedule and course of action should a threshold criteria be exceeded

3.8.2 Water Quality

Groundwater should be sampled and analyzed for hydrocarbons, chlorides, other potential contaminants attributable to the project. Samples should be collected from sites near chambers and from sites in the track corridor but away from the chambers. Sampling should occur in late spring to assess the impact of snowmelt and in fall to assess the impacts of warm season runoff Sampling should begin pre-construction to establish a baseline and continue through construction and operation

4 RECOMMENDATIONS

In conclusion, recommended actions are as follows.

- Additional piezometers lateral to the planned route both north and the south of the channel are needed to better characterize the groundwater flow system in two dimensions. Also some sets of nested piezometers should be installed to evaluate vertical groundwater flow in the Kenilworth Corridor. This will help to better characterize and understand the direction and gradient of groundwater flow and the interaction between groundwater and surface water. Also, seasonal water level data are needed to better understand ground water elevations during wet periods and in response to rainfall events
- Revise the BODR, removing the term “dewatering” and providing a comprehensive section on water resources
- A comprehensive capacity analysis and range of scenarios to adequately understand the implications of routing water to sanitary and storm sewer systems is needed for final design
- Design the underground infiltration chambers for the 100-year design storm event.
- Incorporate stormwater pre-treatment devices in the design
- A Phase II investigation is needed in the Kenilworth Corridor to determine if contaminated soil or groundwater may be encountered during the construction or operation of the shallow tunnel system
- Revise the WMP document after additional characterization of the groundwater flow system has been completed sufficiently and specific monitoring locations, parameters, threshold criteria, as well as a monitoring schedule and course of action should a threshold criteria be exceeded
- Sample and analyze groundwater for hydrocarbons, chlorides, other potential contaminants attributable to the project near the infiltration chambers

5 BIBLIOGRAPHY

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- Metropolitan Council (2013, November) Water Resources Monitoring Kenilworth Shallow LRT
Tunnels DRAFT REV 0 *Southwest LRT Project Technical Report*
- Panzer, M A (2013, September 9) Kenilworth Shallow LRT Tunnel - Basis of Design - DRAFT;
Metropolitan Council - Southwest LRT Project Technical Report dated August 27, 2013
Letter to James Wisker, MCWD.
- SEH, Inc. (2013, August) Modified Phase I Environmental Site Assessment. Southwest Light Rail
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- USDC & NOAA (2013) *NOAA Atlas 14: Precipitation-Frequency Atlas of the United States*. Silver
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- Wisker, J. (2013, September 10). Kenilworth Shallow LRT Tunnel - Basis of Design - DRAFT. *Letter
to Jim Alexander.*



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Burns & McDonnell: Making our clients successful for more than 100 years



September 10, 2013

Mr. Jim Alexander, P.E.
Director of Design and Engineering
Southwest LRT Project Office
Park Place West Building, Suite 500
6465 Wayzata Boulevard
St. Louis Park, MN 55426

Re: Kenilworth Shallow LRT Tunnel – Basis of Design – DRAFT

Dear Mr. Alexander:

I am writing in response to your letter of September 4, 2013 requesting that the Minnehaha Creek Watershed District (MCWD) provide technical comments regarding the potential Shallow LRT Tunnel option.

The MCWD welcomes the opportunity generally to provide informal review early in the project development process in order to promote sound protection of water resources. In addition to the MCWD's regulatory role, our broad policy goals include a commitment to protect and maintain existing groundwater flow, promote groundwater recharge and improve groundwater quality and aquifer protection (Comprehensive Water Resources Management Plan, 5.0 Goals and Policies, adopted 2007). We recognize that this commitment requires coordinated efforts among appropriate agencies. Accordingly, we appreciate the involvement to date with the Southwest LRT Project Office to discuss the Draft Basis of Design report dated August 27, 2013.

Enclosed please find a letter from the MCWD District Engineer, Michael Panzer of Wenck Associates, Inc. that provides responses to the issues identified in your letter of September 4. Please note that our review and comments at this stage of the project development process involve a number of constraints, many of which were also acknowledged in your letter, including the following:

- We have only reviewed the Draft Basis of Design Report, and our assessment could change as new information becomes available;
- The Phase I Environmental Site Assessment results are not available, and hence we are unable to comment on any issues of potential contamination;
- The information provided to date does not involve a completed design and therefore is not adequately detailed to support a permit application; a detailed permit review would include not only this project segment, but the remainder of the project within the MCWD boundaries and would also include storm water management and other issues; we cannot offer any preliminary guidance on MCWD permitting issues at this conceptual stage; ultimately, permit decisions

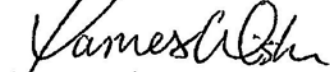
The Minnehaha Creek Watershed District is committed to a leadership role in protecting, improving and managing the surface waters and affiliated groundwater resources within the District, including their relationships to the ecosystems of which they are an integral part. We achieve our mission through regulation, capital projects, education, cooperative endeavors, and other programs based on sound science, innovative thinking, an informed and engaged constituency, and the cost effective use of public funds.

are also subject to public hearing upon request and review and action by the MCWD Board of Managers;

- The area of the North Tunnel segment, while located within the legal boundary of the MCWD, is hydrologically connected to the Bassett Creek watershed; and
- Other agencies also have important roles to play in reviewing the project.

Please do not hesitate to contact me if you need any further information. We appreciate the opportunity to comment at this stage in the project development process.

Sincerely,



James Wisker

Director of Planning, Project and Land Conservation Programs

Cc: MCWD Board of Managers
Eric Evenson, District Administrator



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1800 Pioneer Creek Center
P O Box 249
Maple Plain, MN 55359-0249

(800) 472-2232
(763) 479-4200
Fax (763) 479-4242
wenckmp@wenck.com
www.wenck.com

September 9, 2013

Mr. James Wisker, Director of Planning
Minnehaha Creek Watershed District
15320 Minnetonka Boulevard
Minnetonka, MN 55345

Re: Kenilworth Shallow LRT Tunnel
Basis of Design – Draft
Metropolitan Council
Southwest LRT Project Technical Report
August 27, 2013

Dear Mr. Wisker:

Wenck Associates, Inc. has reviewed the above referenced draft document, as requested by the Southwest LRT Project Office (SPO) staff and authorized by the Minnehaha Creek Watershed District (MCWD). Mr. Jim Alexander, PE, Director of Design and Engineering for SPO later provided a letter to you dated September 4, 2013 requesting MCWD comments and feedback on specific technical aspects related to groundwater and surface water resources in the general vicinity. This letter provides information about the status of our review and comments we have at this stage of the shallow tunnel concept development.

1. The first three bullets in Mr. Alexander's letter (letter) request feedback regarding the potential to affect groundwater levels and lake levels in the vicinity of the shallow tunnel.

Cedar Lake, Lake of the Isles, and Lake Calhoun are all connected by free flowing surface water channels. The three lakes function as a single reservoir with respect to runoff, precipitation and evaporation, and lake levels fluctuate together at or near the same elevation. Near the shorelines, lake levels are a reflection of the shallow groundwater level in the area. Since the near shoreline shallow groundwater level is very much the same in the whole area, there is also little or no groundwater gradient between lakes. Boring information included in the draft Basis of Design supports this condition. With this condition prevailing in the area, there is little potential for significant shallow groundwater flow between lakes.

The shallow tunnel, located between Cedar Lake and Lake of the Isles would be in an area where any groundwater gradient would be expected to be small. Therefore, the tunnel would not be expected to act as a barrier to shallow groundwater flow between the lakes.

Mr. James Wisker, Director of Planning
Minnehaha Creek Watershed District
September 9, 2013

The SPO prepared a groundwater model to illustrate this potential. The model demonstrates that even with very unlikely gradient conditions assumed the groundwater elevation change on the upgradient side of the tunnel is small, on the order of less than 10% of the normal lake level fluctuation caused by seasonal runoff precipitation and evaporation. The SPO draft states the assumed gradient condition in the model is conservative. Based on the geology and hydrology of the lakes, Wenck agrees with the statement that the assumed groundwater gradient condition in the model is conservative.

The Minneapolis Chain of Lakes is underlain by a valley eroded in the bedrock from glacial melting. As the glacial melting occurred, the glaciers receded depositing a mixture of sands, silts and clays referred to as glacial till in the eroded valley to depths of hundreds of feet in places. The boring logs provided by SPO in the August 27, 2013 draft show this to be the case and a predominance of sands and silts at depth. Because of this surficial geology and neutral shallow groundwater gradients in the vicinity of the lakes, the shallow tunnel would not be expected to act as a barrier to groundwater movement.

2. Bullets four through seven of the letter request feedback on the reasonability of design criteria, methods to control groundwater and runoff during construction and the intended design to control seepage, leakage, and internal drainage after construction.

The shallow tunnel concept design and envisioned methods of construction require dewatering, or temporary removal of groundwater (also precipitation and runoff) from the construction zones. The completed tunnels (North and South) will include both external and internal drainage systems to keep the completed tunnel permanently in a dry condition.

All construction phase water collected from the tunnel areas will be first treated by temporary settling basins and possibly other means so that the quality of the water meets applicable state standards. The treated water will then be discharged to existing storm water systems and thus back to the lakes. Provided the water is adequately treated, there would not be a negative impact on lake water quality. And, since all construction related water will be discharged to surface water (lakes), there would be no expected overall impact to the hydrology supporting the lakes (primarily runoff).

After construction, there will be systems in-place to collect any shallow groundwater leakage through the steel sheet-pile and to collect precipitation and runoff from the tunnel portal areas. This water is intended to be treated by infiltration basins. Infiltrated water will recharge the shallow groundwater. Any excess water that might be generated by a storm magnitude that exceeds a 50-year return frequency event (a 50-year event has a probability of occurring of 2% in any given year) will overflow after treatment to the existing storm sewer and discharge to the lakes.

Mr. James Wisker, Director of Planning
Minnehaha Creek Watershed District
September 9, 2013

Therefore, impacts to the lakes hydrology and the shallow groundwater would not be expected. We will want to review any information collected or generated concerning possible contaminated soil or water in the area that could potentially change the intended design.

Also after construction, the interior of the concrete tunnel itself will have a drainage system intended to collect any seepage through the concrete and interior drainage. This water volume is a small amount compared to the overall water budget for the lakes. We believe the assumed seepage rates are reasonable and since it is interior to the tunnel, the intention is to drain the system to sanitary sewer. This water will be the only portion permanently extracted from the shallow groundwater but it is expected to be only a small percentage of the lake hydrologic budget, which is driven primarily by precipitation and runoff and can vary by 20% or more either way in a given year. The trend over the past few decades has been to receive increasing average amounts of annual precipitation.

We have reviewed the assumed rates of infiltration and seepage. An impact to the lake levels is not expected from the drainage system interior to the concrete tunnel based on assumed leakage rates through the concrete. SPO is encouraged to evaluate how the leakage rate could change with time or with vibrations that would be expected in the tunnel environment.

3. Bullet five in the letter requests feedback on the intended phasing of construction.

The draft Basis for Design anticipates a coordinated phasing of the tunnel construction so that a limited portion is under construction at any given time. This is viewed as a reasonable approach that should minimize the impact of unexpected or prolonged wet weather on pumping, treatment and discharges of water.

4. In reference to bullet six in the letter:

The infiltration systems intended to treat leakage through steel sheet-piling and runoff from the portals to the tunnels will accommodate a 50-year return frequency storm, with no overflow to the lakes, and avoid potential issues with open water during winter conditions. This magnitude of storm runoff would certainly be expected to be rare in the spring-summer-fall timeframe and at least greatly slowed down by freezing temperatures or non-existent in the winter months. This is a reasonable way to eliminate potential for a thermal discharge in the winter months.

In conclusion, Wenck does not have serious concerns about potential shallow groundwater or nearby surface water impacts based on the information in the draft and the intended design. We reserve the ability to alter our comments or provide additional feedback as other information becomes available. Of particular interest to us is any monitoring data that may be associated with piezometers in the project area; any information about contaminated soils or groundwater in the vicinity of the project and an assessment of how leakage rates through concrete could change with aging, stresses and vibration. As such, we have voiced specific requests for additional information, as it becomes available, to SPO staff and in this letter.

Mr. James Wisker, Director of Planning
Minnehaha Creek Watershed District
September 9, 2013

We also recommend the SPO staff solicit early regulatory comments from all affected agencies, including MCWD and Bassett Creek WMO, should the shallow tunnel concept advance to a design stage and design details are developed.

Sincerely,



Michael A. Panzer, PE, PG
Vice President
Wenck Associates, Inc.

Memorandum

DATE: March 24, 2016
TO: Bojan Mistic
FROM: Aaron Tag, Manager Right of Way
SUBJECT: Right of Way Process

The Metropolitan Council (Council) will acquire Right of Way (ROW) for track, stations, a maintenance facility and other infrastructure necessary for construction and operation of the Projects. Property rights to be acquired may include fee, permanent and temporary easements, leases for specified uses and duration, air rights, access rights, and underground easements.

To accomplish ROW acquisition for the Projects, the Council has entered into cooperative agreements with the Minnesota Department of Transportation (MnDOT). These agreements describe the basis and extent of assistance MnDOT will provide for the Projects. The agreements specify that MnDOT will provide staff for property acquisitions and will acquire property in the name of the Council as authorized by Minnesota Statutes, section 473.411, unless the Council determines otherwise. In general, the Council's authority relative to ROW acquisitions is outlined in Minnesota Statutes chapter 473.

For private property the Council will follow the steps outlined below to gain title and possession to the necessary right to construct and operate the Green Line Extension. Necessary rights will be obtained prior to the start of construction on that parcel of land. The construction specification will require the contractor to not use any specific property until they receive written notification from the Council that title and possession has been obtained. Because of the timing of the project, it is expected that construction will start on the project prior to having all of the Right of Way.

Private Property Acquisition Steps

Step 1: Property Identification. Anticipated property needs will be identified during project development and refined as necessary during engineering. Once the Council defines the anticipated real property interests it will commence the acquisition process by obtaining a title opinion.

Step 2: Parcel File and Field Title. MnDOT will prepare a parcel file that includes the following for each parcel: a parcel sketch from the base map, a title opinion, and a legal description. Field

title work is then performed. The title opinion and field title report will be used to prepare the Attorney's Condition of Title (ACT).

Step 3: Appraisals. The appraiser will prepare an appraisal report for each parcel and submit these reports to the Council.

Step 4: Appraisal Reviews. The Council will be responsible for procuring a review appraiser in accordance with Council procurement policies and FTA procurement requirements. The Council's concurrence with the value certified by the review appraiser establishes the offer of just compensation.

Step 5: FTA Concurrence on Appraisals. The Council will request FTA concurrence if the recommended offer of just compensation exceeds the applicable threshold.

Step 6: Offer to Purchase. The Council will make an offer to the property owner on the Council's behalf. Offers cannot proceed without Council approval.

Step 7: Owner Accepts or Rejects Offer. If the owner accepts the offer, the Council will assemble an acquisition package – including a purchase agreement, IRS Form W-9, and a deed or easement – and make payment to the owner. The Council will record the conveyance document received from the owner.

If the owner rejects the offer, the negotiation process outlined in Step 9 will commence.

Step 8: Negotiation and FTA Concurrence for Administrative Settlement. Every reasonable effort will be made to acquire property through negotiation. In negotiations, Project staff will make recommendations to the Council for approval of administrative settlement amounts to be offered.

Step 9: Prepare and File Condemnation Petition. If the Council fails to reach an agreed upon settlement to acquire property through direct purchase, it will document that an agreement was not reached and will utilize its condemnation authority found in Minnesota Statutes section 473.405 to condemn the property for the Project. Such authority may also be used to remedy title problems. The project will at least 30 days after making an offer before it files for condemnation.

Step 12: Hearing on Petition. The attorney representing the Council will appear at the hearing on petition and present testimony to justify the public purpose and necessity for the taking. The Council's attorney will arrange for agents to be present as necessary. Upon proper presentation of evidence, the judge will sign an order approving the petition, appointing commissioners and authorizing the transfer of title and possession to the Council. The order is then served by the Council on all property owners named in the petition.

Step 13: Title and Possession. After the 90-day notice of intent to condemn period has expired, the order approving the petition has been signed and the Council has made its quick take payment (its offer of just compensation), title and possession to the land will pass to the Council.

Public property is expected to be obtained for the project through agreement with other local agencies. These agreements will be executed prior to the start of any construction on parcels owned or controlled by those local agencies. The property transfer agreements will cover the areas to be transferred, the rights to be transferred, and the timing of those transfers.

Minnesota Wetland Conservation Act

Notice of Decision

Local Government Unit (LGU) Minnehaha Creek Watershed District	Address 15320 Minnetonka Blvd Minnetonka, MN 55391
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1. PROJECT INFORMATION

Applicant Name Southwest Light Rail Transit (LRT)	Project Name Southwest LRT Project, St. Louis Park and Minneapolis	Date of Application 12/16/2013	Application Number W13-40
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Attach site locator map.

Type of Decision:

<input checked="" type="checkbox"/> Wetland Boundary or Type	<input checked="" type="checkbox"/> No-Loss	<input type="checkbox"/> Exemption	<input type="checkbox"/> Sequencing
<input type="checkbox"/> Replacement Plan	<input type="checkbox"/> Banking Plan		

Technical Evaluation Panel Findings and Recommendation (if any):

Approve
 Approve with conditions
 Deny

Summary (or attach):

BWSR staff recommended the approval of the Application for No Loss and Wetland Boundary and Type.

2. LOCAL GOVERNMENT UNIT DECISION

Date of Decision: **2/12/2014**

Approved
 Approved with conditions (include below)
 Denied

LGU Findings and Conclusions (attach additional sheets as necessary):

Southwest Light Rail Transit has applied for a Wetland Boundary & Type and No-Loss approval for the proposed Southwest LRT Project, a proposed 16-mile light rail line located in southern Hennepin County. Delineation of wetlands located within the MCWD was performed by Anderson Engineering of MN, LLC between August 9 and November 18, 2013.

16 wetlands were identified and delineated within the proposed LRT corridor and study area by Andersen Engineering. The wetlands were classified according to wetland type and are summarized in Appendix A of the delineation report dated December 2013. The boundaries were reviewed and verified in the field by Wes Boll of Wenck Associates on behalf of MCWD on October 3, 2013. Wenck staff was in agreement with the delineated boundaries and types of the wetlands located in the proposed project area.

In addition to the delineated wetland basins described above, four wetland basins were also identified within the MCWD in Minneapolis where on-site access could not be obtained from the property owner to complete the field delineation. These four wetlands were digitally mapped using off-site methods. This Notice of Decision does not approve the wetland boundaries identified through off-site procedures. These wetland boundaries will need to be field delineated and verified at a later time.

Two of these wetlands have been further identified as being incidental wetlands not subject to WCA rules. The Applicant provided aerial photographs that demonstrate that these basins were constructed as stormwater basins. Therefore, these basins are incidental and are not covered under the scope of WCA.

MCWD approves the wetland boundary & type as delineated in the field and documented in the delineation report. MCWD also approves the request for a No-Loss determination for Wetlands MC-SLP-06 and MC-SLP-07 as documentation provided sufficient evidence that these basins are incidental wetlands not regulated by WCA. This decision is valid for five years.

For Replacement Plans using credits from the State Wetland Bank:

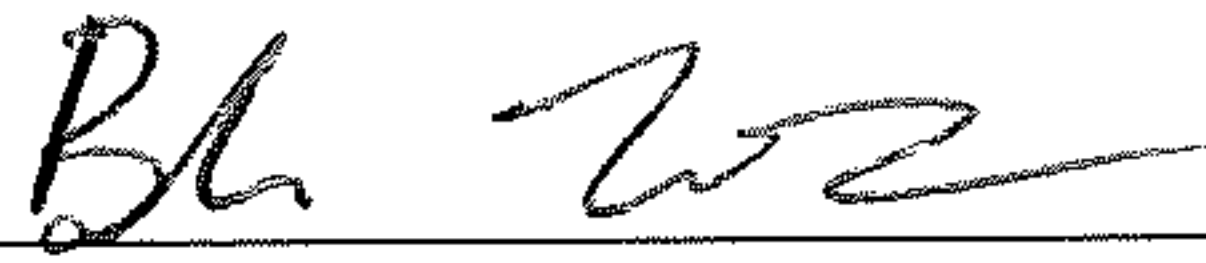
Bank Account #	Bank Service Area	County	Credits Approved for Withdrawal (sq. ft. or nearest .01 acre)

Replacement Plan Approval Conditions. In addition to any conditions specified by the LGU, the approval of a Wetland Replacement Plan is conditional upon the following:

- Financial Assurance:** For project-specific replacement that is not in-advance, a financial assurance specified by the LGU must be submitted to the LGU in accordance with MN Rule 8420.0522, Subp. 9 (List amount and type in LGU Findings).
- Deed Recording:** For project-specific replacement, evidence must be provided to the LGU that the BWSR “Declaration of Restrictions and Covenants” and “Consent to Replacement Wetland” forms have been filed with the county recorder’s office in which the replacement wetland is located.
- Credit Withdrawal:** For replacement consisting of wetland bank credits, confirmation that BWSR has withdrawn the credits from the state wetland bank as specified in the approved replacement plan.

Wetlands may not be impacted until all applicable conditions have been met!

LGU Authorized Signature:

Signing and mailing of this completed form to the appropriate recipients in accordance with 8420.0255, Subp. 5 provides notice that a decision was made by the LGU under the Wetland Conservation Act as specified above. If additional details on the decision exist, they have been provided to the landowner and are available from the LGU upon request.		
Name Brandon Wisner	Title Compliance Officer	
Signature 	Date 2/14/2014	Phone Number and E-mail (952) 641-4505 bwisner@minnehahacreek.org

THIS DECISION ONLY APPLIES TO THE MINNESOTA WETLAND CONSERVATION ACT. Additional approvals or permits from local, state, and federal agencies may be required. Check with all appropriate authorities before commencing work in or near wetlands.

Applicants proceed at their own risk if work authorized by this decision is started before the time period for appeal (30 days) has expired. If this decision is reversed or revised under appeal, the applicant may be responsible for restoring or replacing all wetland impacts.

This decision is valid for three years from the date of decision unless a longer period is advised by the TEP and specified in this notice of decision.

3. APPEAL OF THIS DECISION

Pursuant to MN Rule 8420.0905, any appeal of this decision can only be commenced by mailing a petition for appeal, including applicable fee, within thirty (30) calendar days of the date of the mailing of this Notice to the following as indicated:

Check one:

<input checked="" type="checkbox"/> Appeal of an LGU staff decision. Send petition and \$0 fee (if applicable) to: Minnehaha Creek Watershed District 15320 Minnetonka Blvd Minnetonka, MN 55391	<input type="checkbox"/> Appeal of LGU governing body decision. Send petition and \$500 filing fee to: Executive Director Minnesota Board of Water and Soil Resources 520 Lafayette Road North St. Paul, MN 55155
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4. LIST OF ADDRESSEES

<input checked="" type="checkbox"/> SWCD TEP member: Stacey Lijewski – Stacey.lijewski@co.hennepin.mn.us <input checked="" type="checkbox"/> BWSR TEP member: Lynda Peterson – Lynda.peterson@state.mn.us <input type="checkbox"/> LGU TEP member (if different than LGU Contact): <input type="checkbox"/> DNR TEP member: <input checked="" type="checkbox"/> DNR Regional Office (if different than DNR TEP member): Brooke Haworth – brooke.haworth@state.mn.us <input type="checkbox"/> WD or WMO (if applicable): <input checked="" type="checkbox"/> Applicant (notice only) and Landowner (if different): Southwest Light Rail Transit (Nani Jacobsen) – nani.jacobsen@metrotransit.org <input checked="" type="checkbox"/> Members of the public who requested notice (notice only): Consultant: Anderson Engineering of MN, LLC (Ben Hodapp) – bhodapp@ae-mn.com <input checked="" type="checkbox"/> Corps of Engineers Project Manager (notice only): Melissa Jenny – Melissa.m.jenny@usace.army.mil <input type="checkbox"/> BWSR Wetland Bank Coordinator (wetland bank plan applications only)
--

5. MAILING INFORMATION

➤ For a list of BWSR TEP representatives: www.bwsr.state.mn.us/aboutbwsr/workareas/WCA_areas.pdf

➤ For a list of DNR TEP representatives: www.bwsr.state.mn.us/wetlands/wca/DNR_TEP_contacts.pdf

➤ Department of Natural Resources Regional Offices:

NW Region: Reg. Env. Assess. Ecol. Div. Ecol. Resources 2115 Birchmont Beach Rd. NE Bemidji, MN 56601	NE Region: Reg. Env. Assess. Ecol. Div. Ecol. Resources 1201 E. Hwy. 2 Grand Rapids, MN 55744	Central Region: Reg. Env. Assess. Ecol. Div. Ecol. Resources 1200 Warner Road St. Paul, MN 55106	Southern Region: Reg. Env. Assess. Ecol. Div. Ecol. Resources 261 Hwy. 15 South New Ulm, MN 56073
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For a map of DNR Administrative Regions, see: http://files.dnr.state.mn.us/aboutdnr/dnr_regions.pdf

➤ For a list of Corps of Project Managers: www.mvp.usace.army.mil/regulatory/default.asp?pageid=687
 or send to:

US Army Corps of Engineers
 St. Paul District, ATTN: OP-R
 180 Fifth St. East, Suite 700

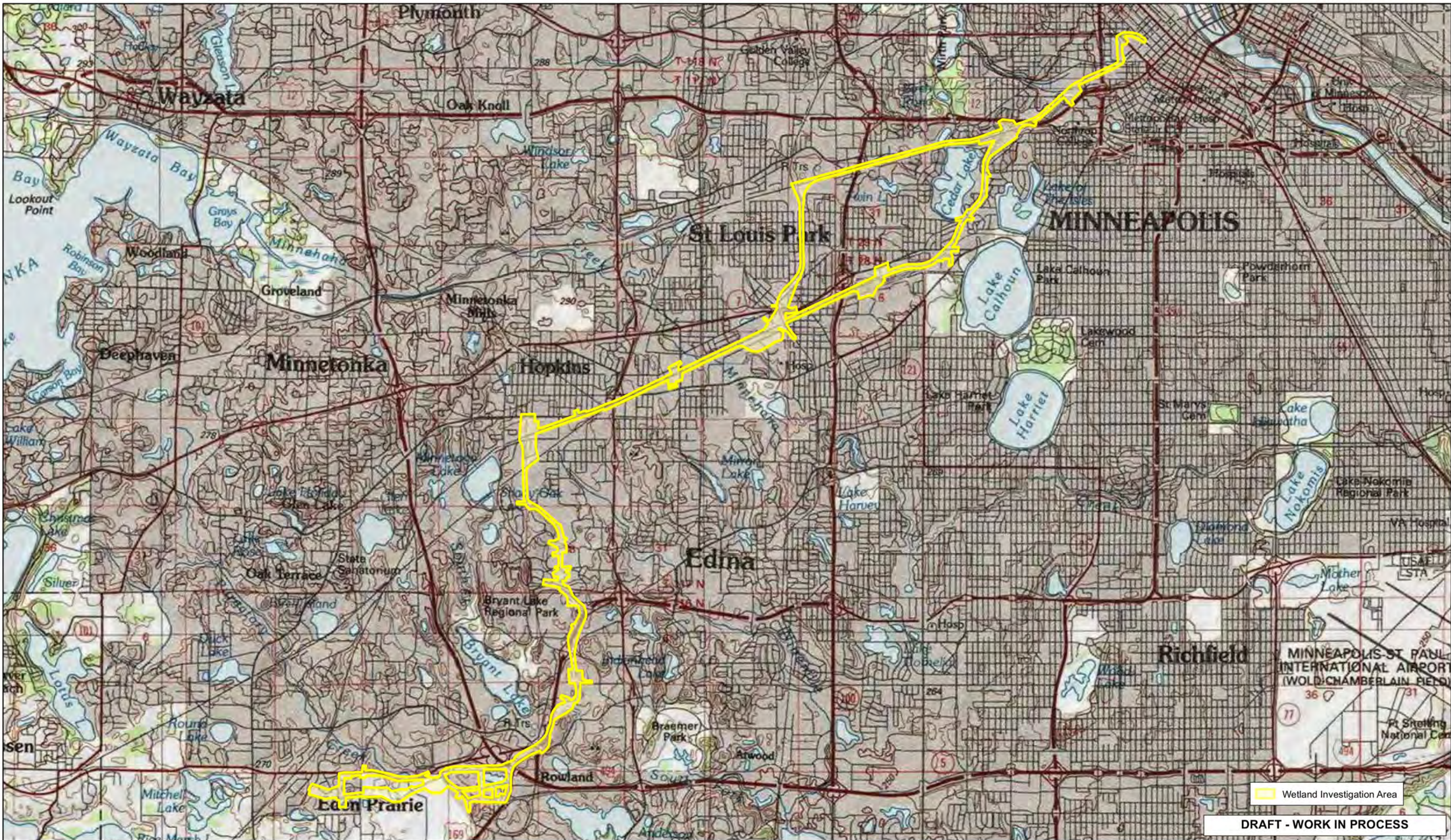
St. Paul, MN 55101-1678

➤ For Wetland Bank Plan applications, also send a copy of the application to:
Minnesota Board of Water and Soil Resources
Wetland Bank Coordinator
520 Lafayette Road North
St. Paul, MN 55155

6. ATTACHMENTS

In addition to the site locator map, list any other attachments:

MCWD Wetlands



Wetland Investigation Area

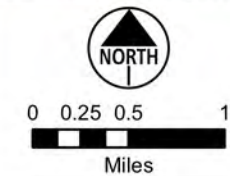
DRAFT - WORK IN PROCESS

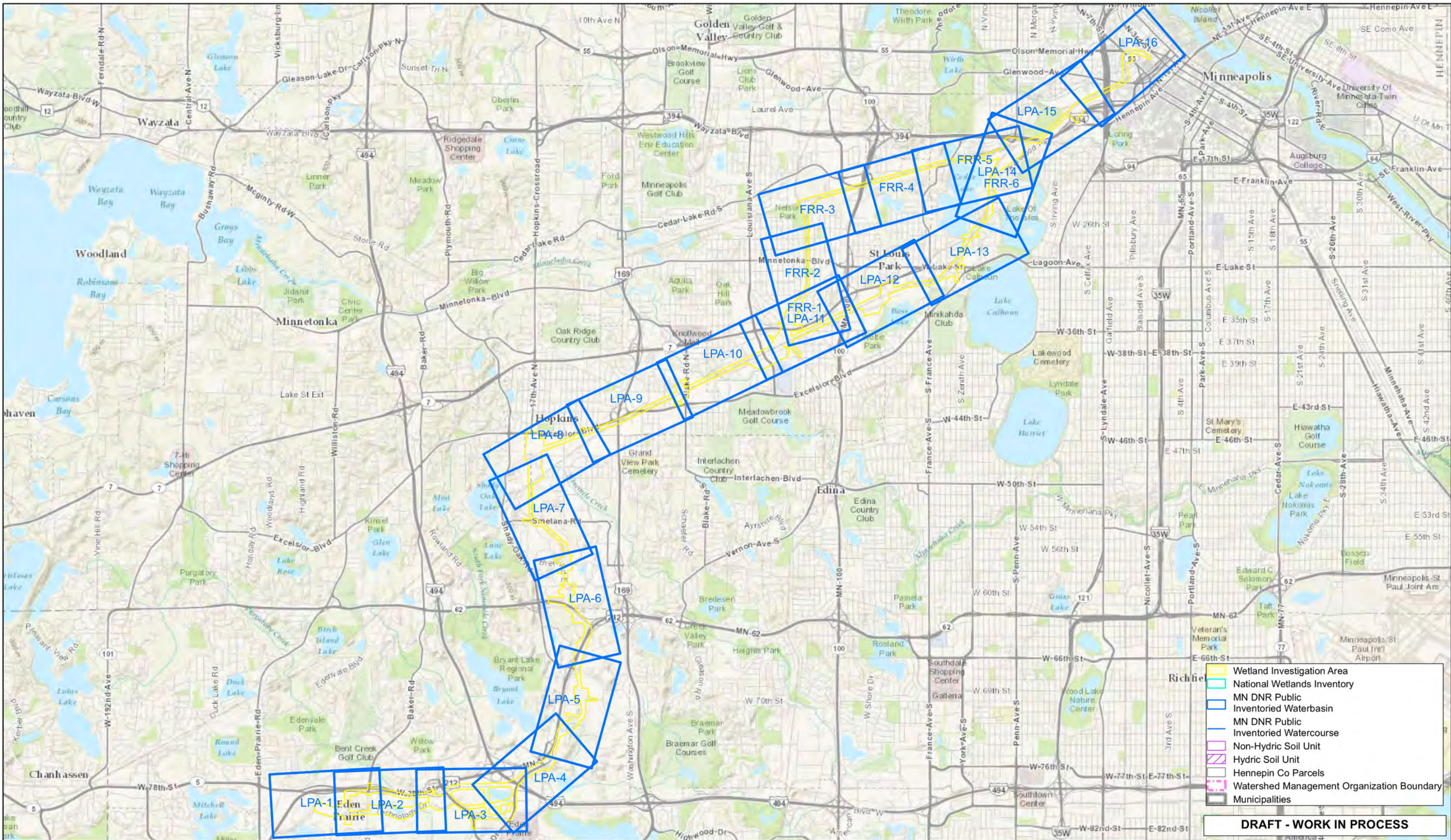
SOUTHWEST LRT

Wetland Investigation Area Location



Rev 00.00
12/4/2013
Sheet 1 of 1

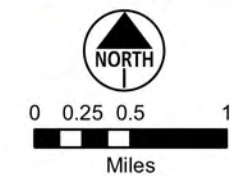


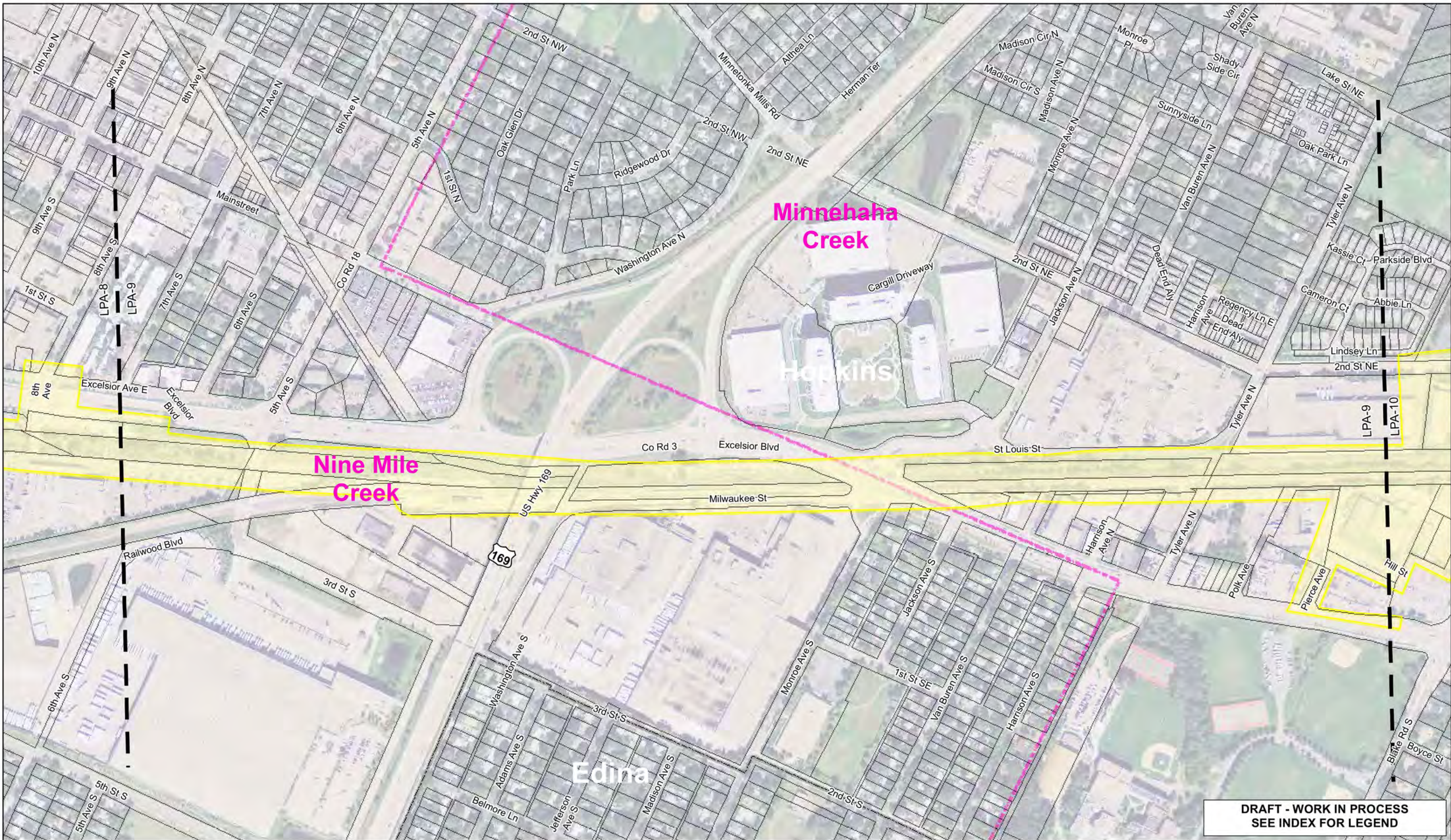


SOUTHWEST LRT

Environmental MapBook Index

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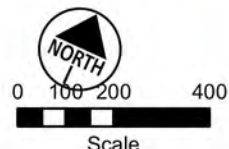


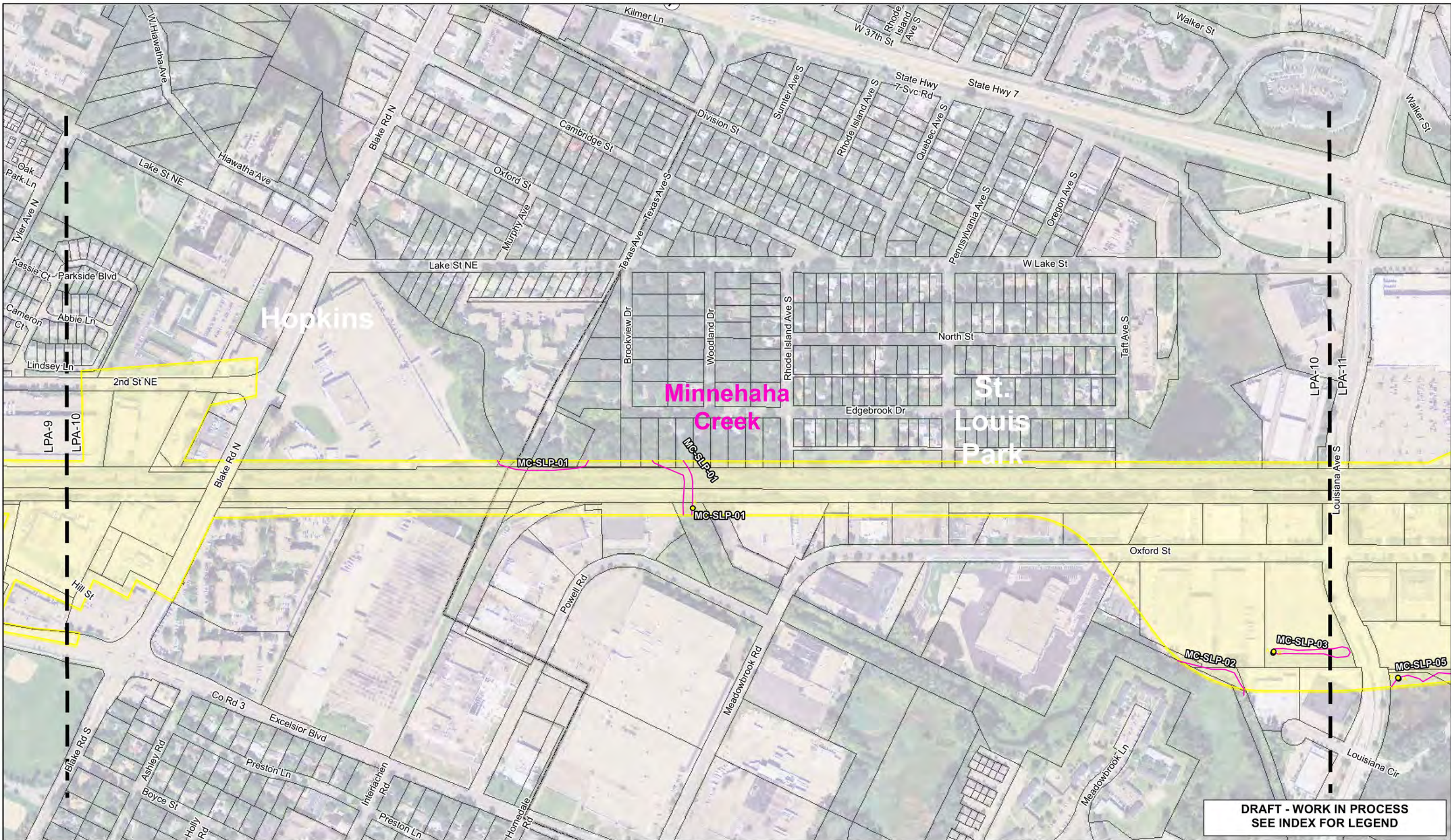
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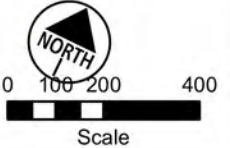


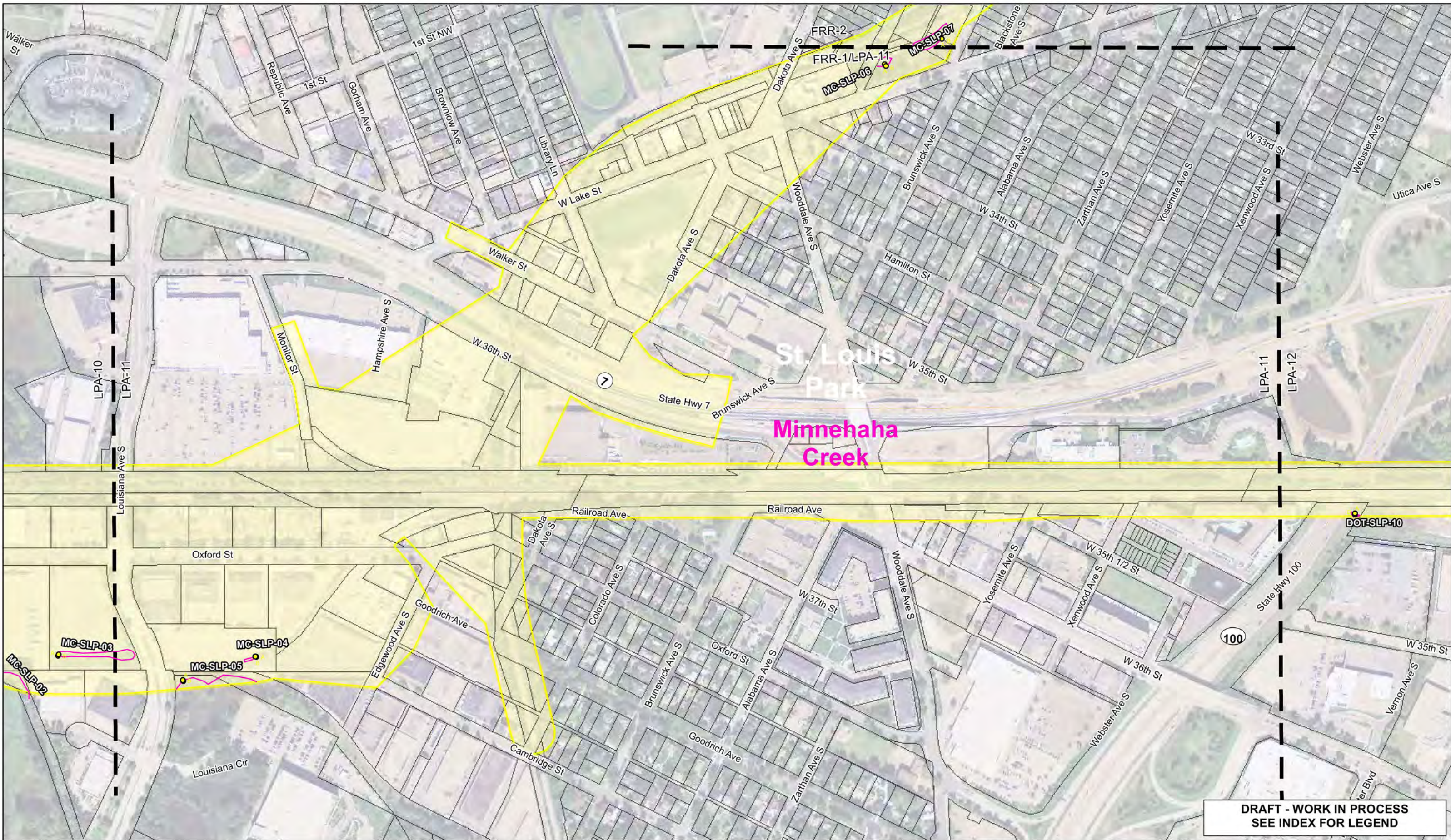
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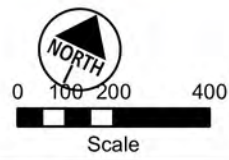


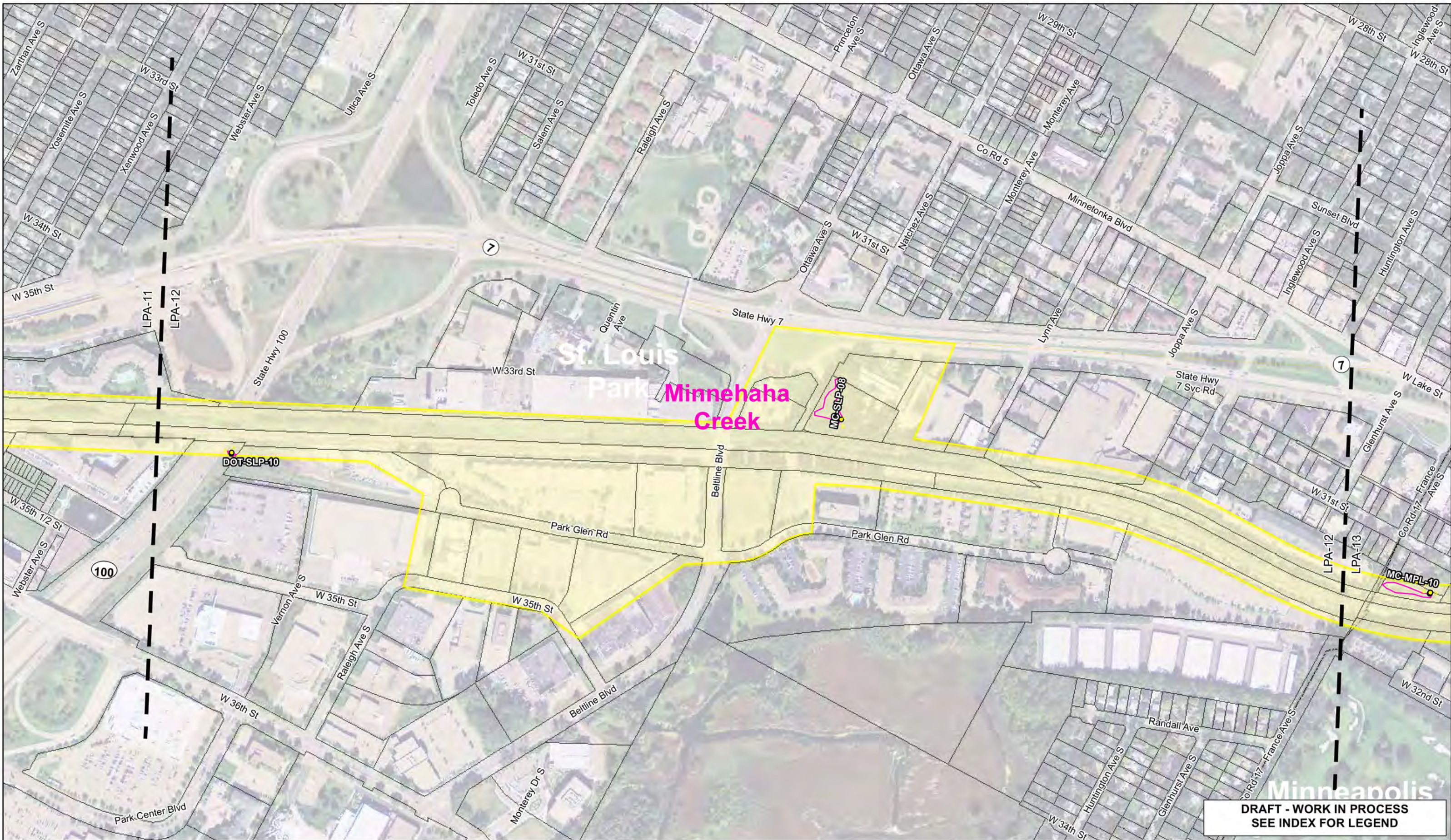
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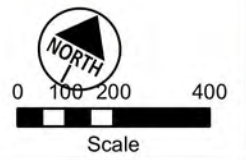


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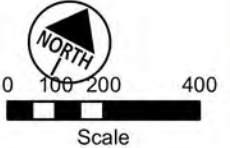
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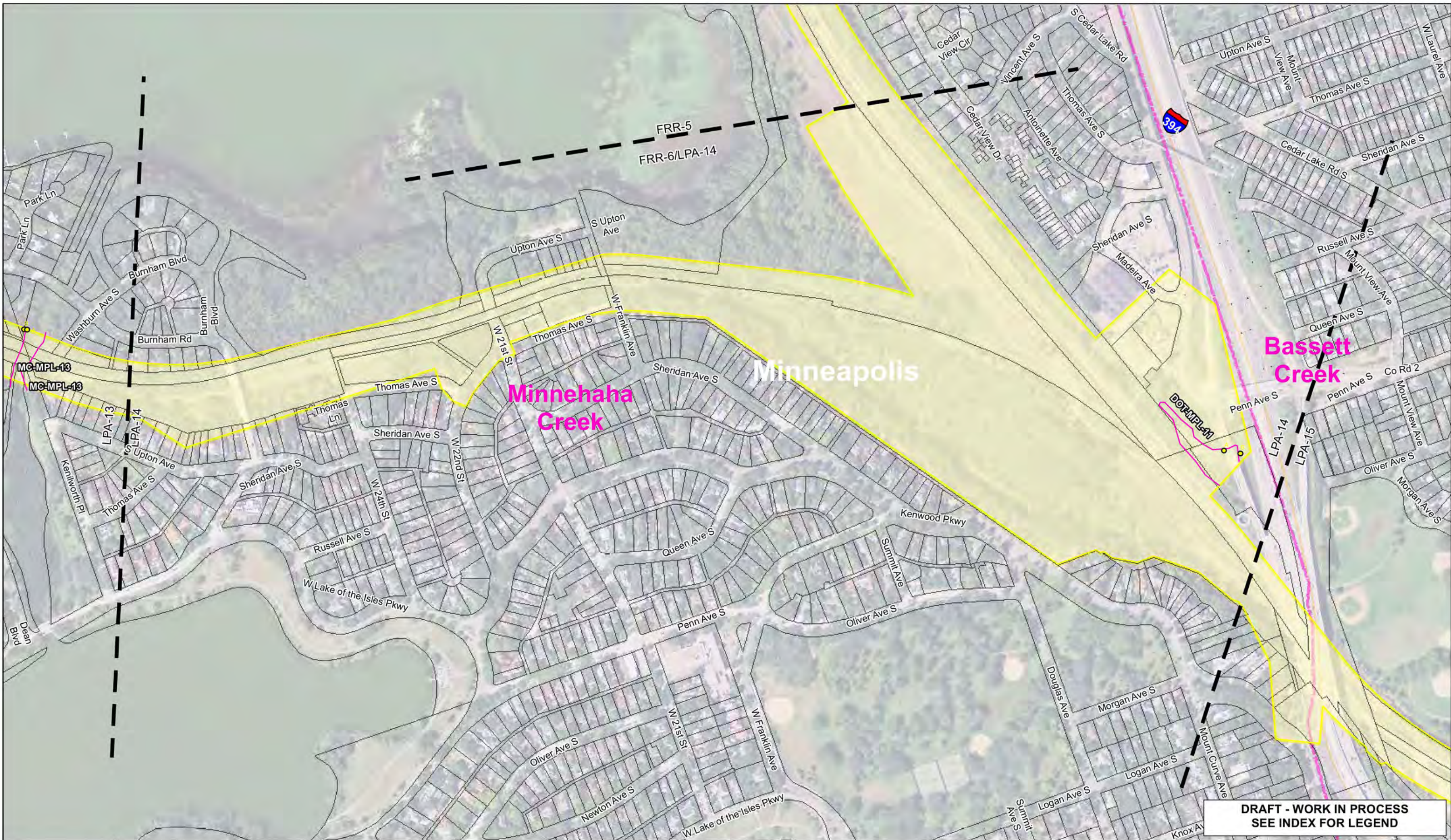


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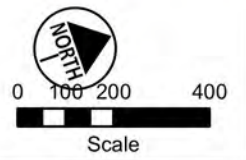


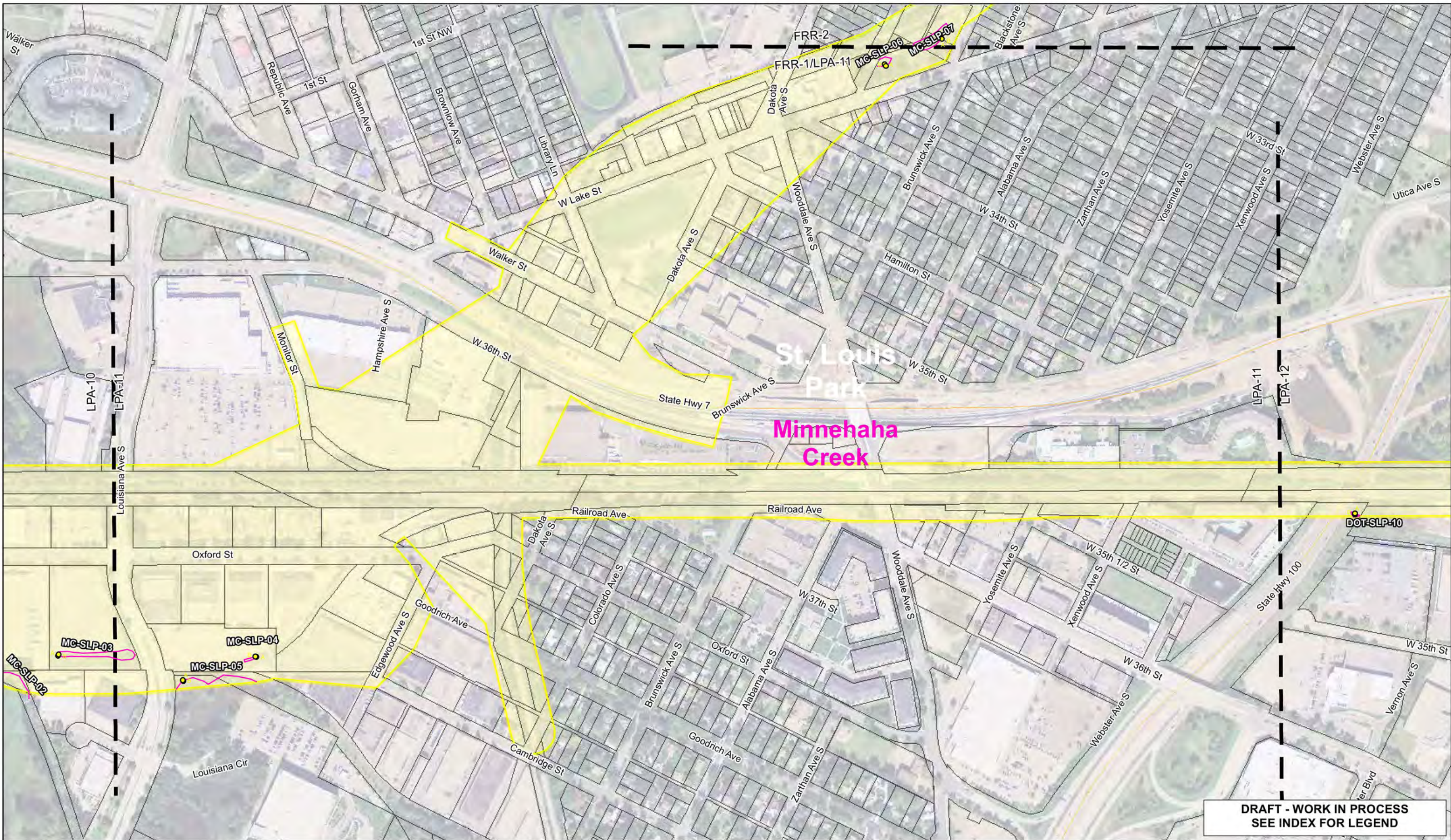
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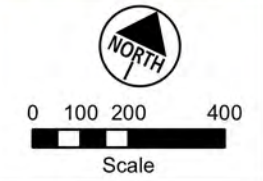


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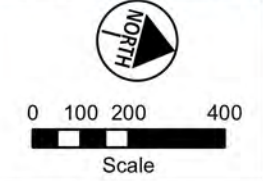


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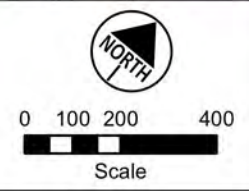
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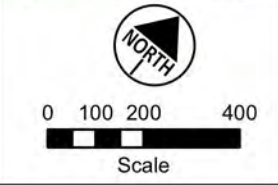
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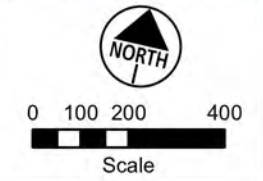


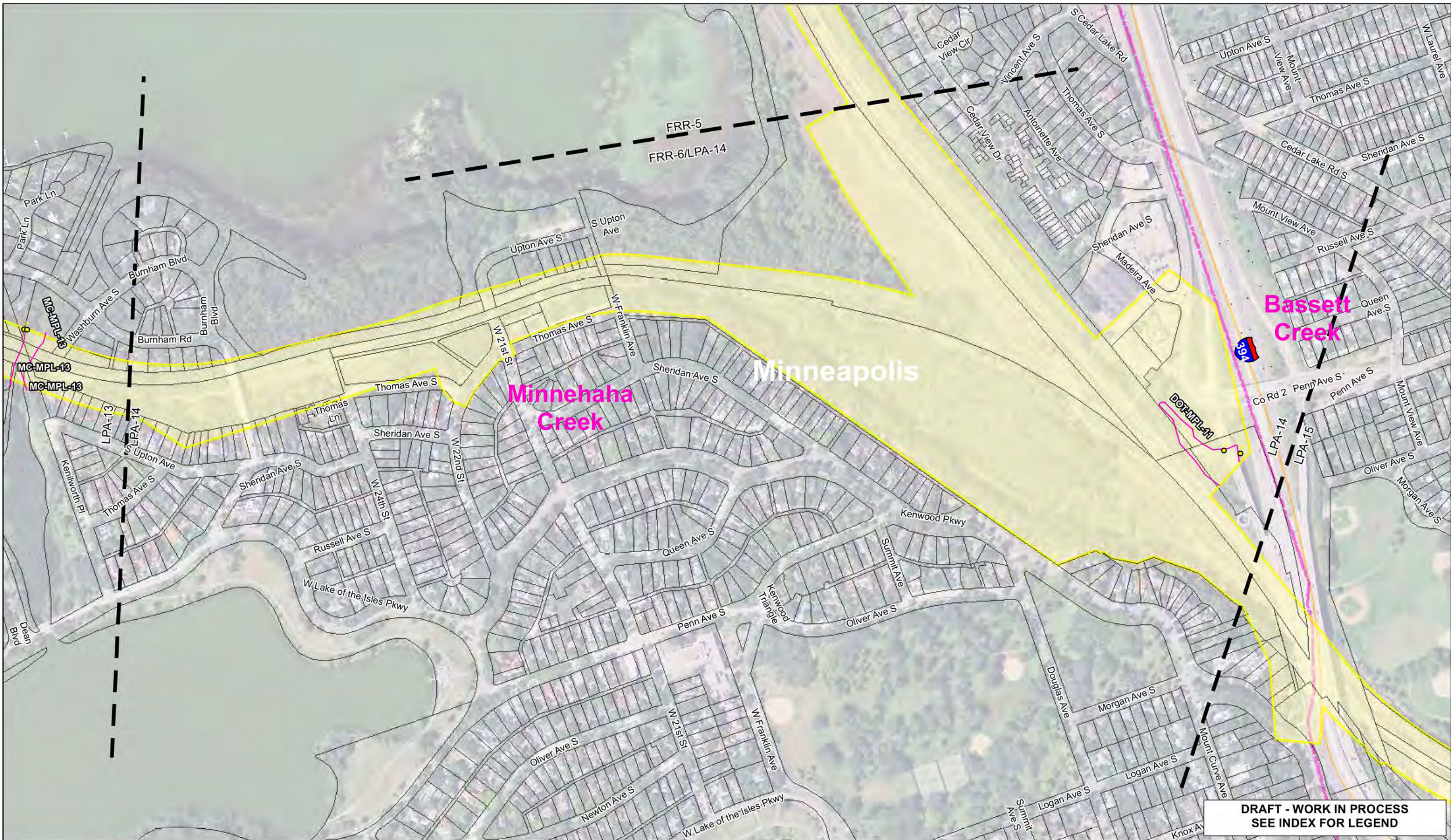
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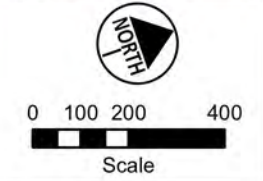


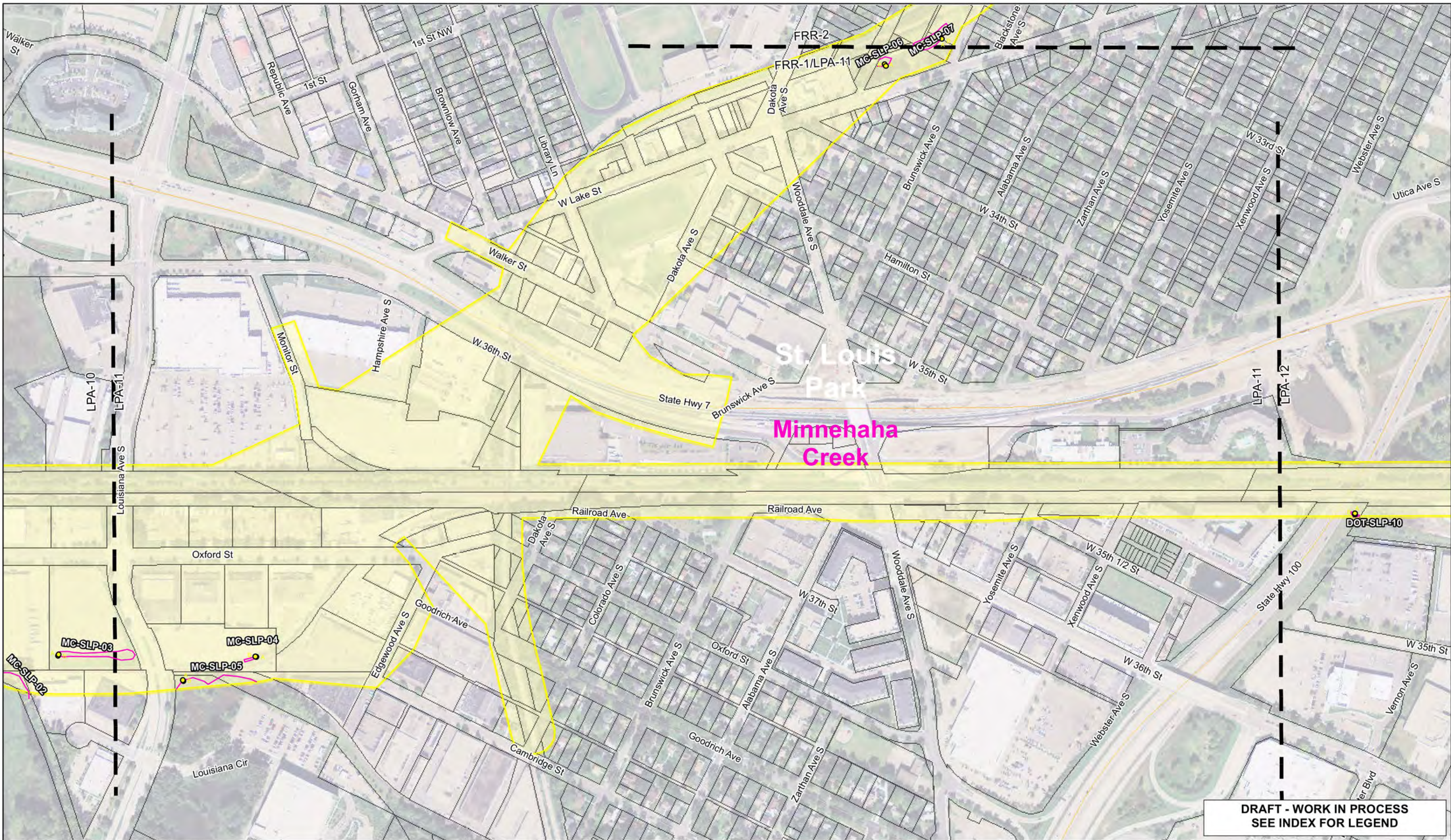
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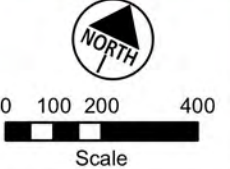


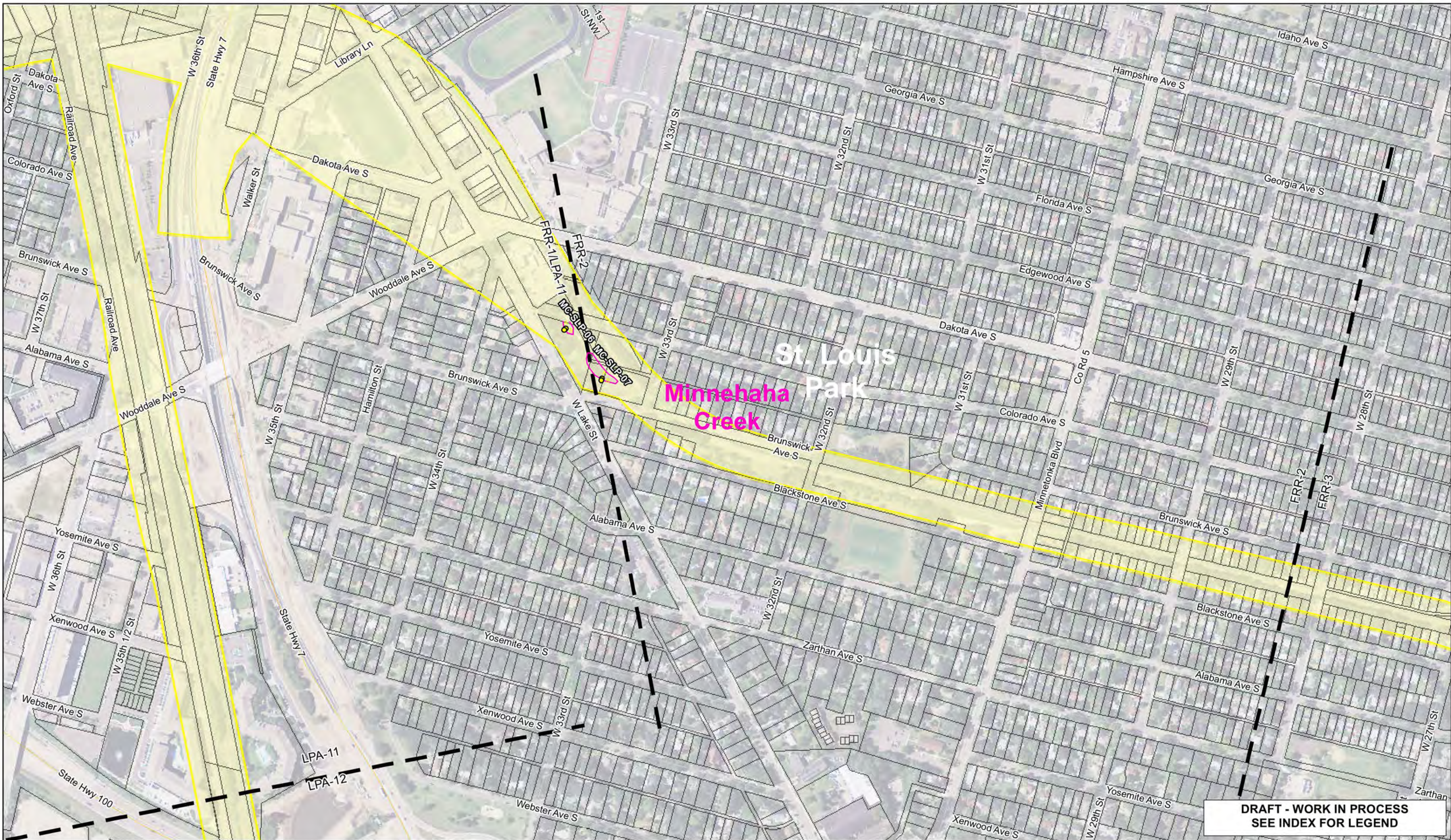
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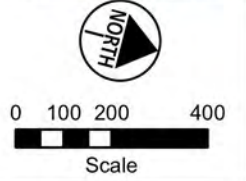


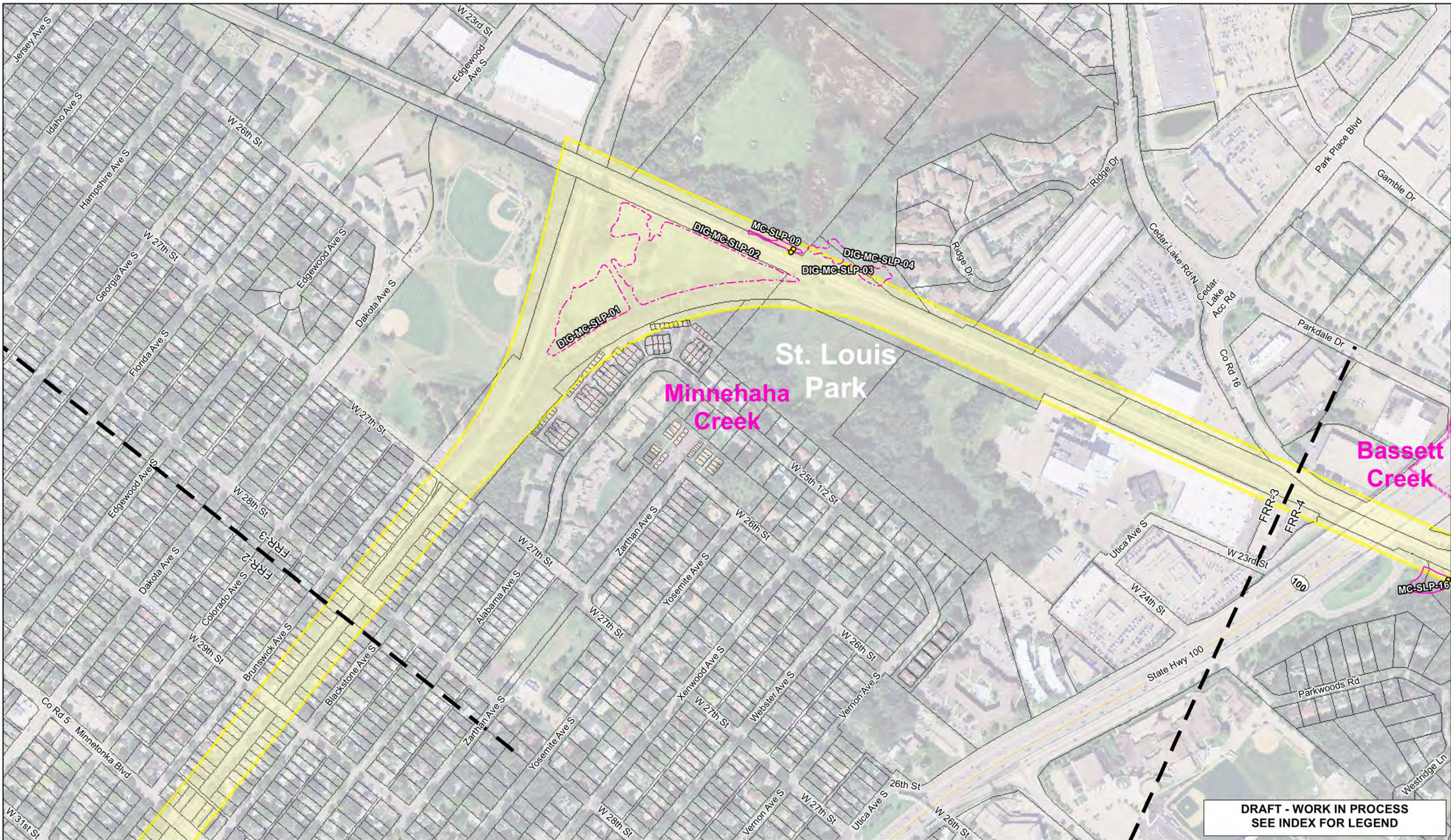
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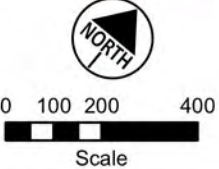


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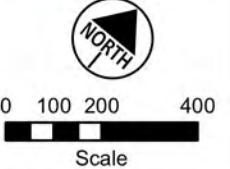


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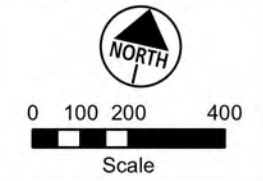


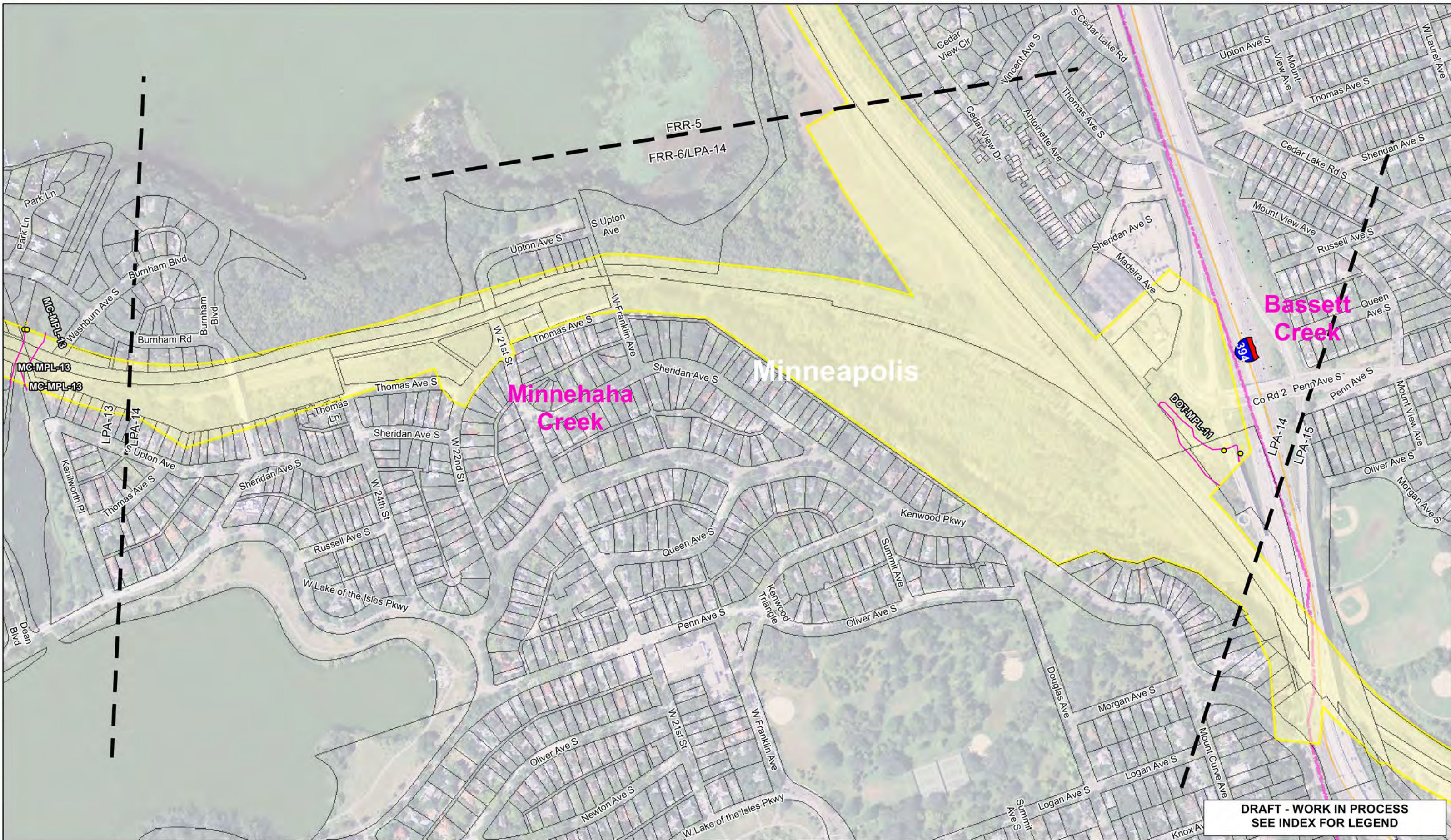
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