

Supplemental Environmental Assessment

Appendices

Prepared by the Metropolitan Council



Appendix A Agency Coordination and Correspondence



MINNESOTA HISTORIC PRESERVATION OFFICE

October 10, 2016

Jay Ciavarella Federal Transit Administration 200 West Adams Street, Suite 320 Chicago IL 60606-5253

RE: Southwest Light Rail Transit Project Multiple Communities, Hennepin County SHPO Number: 2009-0080

Dear Mr. Ciavarella:

Thank you for continuing consultation on the above project. Information received in our office on 10 August 2016 has been reviewed pursuant to the responsibilities given the State Historic Preservation Officer by the National Historic Preservation Act of 1966 and implementing federal regulations at 36 CFR § 800 and per the terms of the 2016 Memorandum of Agreement (MOA) executed for this undertaking.

We have completed our review of your letter dated 9 August 2016 which included notification of the following determinations made by your agency:

- Pursuant to Stipulations I (A) and VI of the MOA, the proposed undertaking's design elements at the 90% and 100% design phases will be in conformance with the Secretary of the Interior's Standards for the Treatment of Historic Properties (Standards) in the vicinity of several historic properties in order to minimize and avoid adverse effects; and
- Pursuant to Stipulation II (A) of the MOA, MnDOT CRU will review and compare the 90% plans to the 60% plans to determine if substantial changes have occurred to the proposed undertaking's design warranting additional consultation or if the findings and determinations made at the 60% plan stage remain valid.

We appreciated the opportunity to participate in the consultation meeting held on September 15th which provided an opportunity to discuss these determinations and review the 90% plans.

Pursuant to Stipulation VI of the MOA, in an effort to avoid adverse effects to the **Chicago, Milwaukee, St. Paul & Pacific Railroad Depot** (St. Louis Park) the undertaking's final design in the vicinity of this historic property will meet the Standards. We agree with the determination made in your August 9th letter that the 90% plans appear to be in conformance with the Standards.

We generally agree with your agency's determination that the proposed undertaking within the **Grand Rounds Historic District: Chain of Lakes Segment** has been designed in accordance with the Standards. As discussed at the September 15th consultation meeting, our office continues to have concerns regarding specific design elements in the vicinity of the Kenilworth Channel which we do not agree have been designed in accordance with the Standards or for which we do not have sufficient information to concur:

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- The color of the three (3) new concrete crossing structures has not been determined and is a significant element of the proposed design that will require examination and thorough consideration of alternatives in order to determine conformance with the Standards;
- While the proposed large "slate" slab landscaping to be installed on the slopes under the new crossing structures and adjacent to the channel may be considered compatible with the color, texture, and materials found in the surrounding landscape, this design is visually incompatible and too differentiated from the size and scale of the character-defining features of the historic property's landscape;
- The proposed patterns of placement for new trees within this corridor is overly designed and not compatible with the naturalistic vegetation features of the historic property's landscape; and
- The proposal for deconstructing and reconstructing existing WPA stone walls under the new crossing structures was very briefly discussed at the September 15th consultation meeting. To clarify, we note that there is a provision in Stipulation VII (C) for design of this work to be in conformance with the Standards and that our office will have an opportunity to review the plans and specifications for reconstruction of these features. Therefore, we assume that more details and specification will be submitted to our office at a later date.

We look forward to continuing consultation with your agency, MnDOT CRU, Metro Transit and the other consulting parties as per the terms of the MOA for this undertaking. If you have any questions or concerns regarding this comment letter please feel free to contact me at 651-259-3456 or <u>sarah.beimers@mnhs.org</u>.

Sincerely,

Sarang Bamurs

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Sarah Beimers, Manager Government Programs & Compliance

cc: Greg Mathis, Minnesota Department of Transportation, Cultural Resources Unit



REGION V Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin 200 West Adams Street Suite 320 Chicago, IL 60606-5253 312-353-2789 312-886-0351 (fax)

February 27, 2017

Sarah Beimers, Manager Minnesota Historical Society Minnesota Historic Preservation Office Government Programs and Compliance 345 Kellogg Boulevard West Saint Paul, Minnesota 55102

RE: Southwest Light Rail Transit Project, Hennepin County, Minnesota; Review of 100 Percent Design Plans, SHPO #2009-0080

Dear Ms. Beimers,

The Federal Transit Administration (FTA) is writing to continue Section 106 consultation under the terms of the Memorandum of Agreement (MOA) between the FTA and the Minnesota Historic Preservation Office (MnHPO) for the Metropolitan Council (Council) Southwest Light Rail Transit (METRO Green Line Extension) Project (Project).

First, FTA wants to thank you for participating in the consultation held last fall under MOA Stipulation I to inform the design of the Project's 100% Design Plans (100% Plans). We also want to thank you for your letters of October 10, 2016 and December 22, 2016, in which MnHPO commented on and concurred with the design of Project elements upon which we consulted. As is described in more detail below, the Council has used and will continue using the input received during this consultation to inform the 100% Plans. We also look forward to continuing consultation under Stipulation I to inform the 100% Plans for landscape elements within and in the vicinity of the Grand Rounds Historic District (GRHD).

REVIEW OF 100% PLANS UNDER PROJECT STIPULATION II

In our November 23, 2016 letter, FTA notified you that the Council intends to let multiple contracts for Project construction, with the packages for most of the contracts being finalized and issued for bid over the course of several months. Thus, the construction documents/100% Plans, which include plans, specifications and special provisions for the different bid packages will be available according to the schedule below (Table 1).

Table 1

February 8, 2017	
March 2017	
May 2017	
Widy 2017	
May 2017	
May 2017	
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May 2017	
Wiay 2017	

*Subject to change

To facilitate the Council's staged letting process, Minnesota Department of Transportation (MnDOT) Cultural Resources Unit (CRU) and FTA will review the 100% Plans under MOA Stipulation II as the 100% Plans for each bid package are prepared. FTA has determined that this approach meets the terms of Stipulation II based on the following:

- The 100% Plans for the construction contracts must coordinate with one another in order for the Project to function once constructed;
- Each bid package will include a self-contained set of 100% Plans for the discrete construction activities to be completed under the contract for the bid package;
- The first bid package we reviewed is for Civil Construction, which encompasses the vast majority of Project construction activity with potential to affect historic properties;
- MnDOT CRU and FTA will complete their review of each bid package prior to the Council commencing construction of each bid package.

Per the terms of MOA Stipulation II, as FTA and MNDOT review the 100% Plans for each bid package, FTA will notify MnHPO of MnDOT CRU's findings and FTA's determinations. Please be aware, however, that after FTA completes its review of the 100% Plans for a bid package the Council may need to issue addenda. As an example, the Council is preparing a Final Construction Protection Plan for Historic Properties (CPPHP) and the MOA provides MnHPO 30 days to review and concur with the plan. Therefore, the Draft CPPHP is included in the Civil Construction 100% Plans issued February 8, 2017. Once FTA completes its review of the Final CPPHP and MnHPO concurs, the Council will issue an addendum to incorporate the Final CPPHP into the Civil Construction 100% Plans. If the Council needs to issue additional addenda related to physical construction, MnDOT CRU and FTA will review the modification in accordance with Stipulation II.C before the Council issues the addendum (MnDOT CRU and FTA will not review addenda items for non-physical construction items, such as administrative requirements, software specifications, etc.). If MnDOT CRU determines there are no substantive changes that would result in new and/or additional adverse effects on historic properties and FTA agrees, FTA will note the review of the addendum in the next MOA quarterly report.

If MnDOT CRU determines there are substantive changes in the Project's design that would result in new and/or additional adverse effects on historic properties, or do not meet the requirements of MOA Stipulation I, and FTA agrees, FTA will consult with MnHPO and the concurring parties in accordance with MOA Stipulations II.B and III.

REVIEW OF 100% PLANS: GRAND ROUNDS HISTORIC DISTRICT (GRHD): KENILWORTH LAGOON WORKS PROJECTS ADMINISTRATION (WPA) RUSTIC STYLE RETAINING WALLS

MOA Stipulation VII.C.ii describes the process for reviewing the draft and final plans for the rehabilitation and reconstruction of portions of the GRHD: Kenilworth Lagoon WPA Rustic Style Retaining Walls. In accordance with this stipulation, on November 23, 2016, FTA provided the draft plans and specifications for the portions of the walls that are to be documented, deconstructed and reconstructed to MnHPO and the Minneapolis Park and Recreation Board (MPRB) to review. Your office concurred with the draft plans on December 22, 2016. The MPRB did not provide any comments.

Attached for your review and concurrence are the 100% Plans for the portions of the WPA Rustic Style Retaining Walls that are to be documented, deconstructed and reconstructed. These plans are included in the Project's Civil Construction 100% Plans dated February 8, 2017. In accordance with MOA Stipulation II, MnDOT CRU reviewed these plans and determined:

- The 100% Plans are consistent with the draft plans MnHPO concurred with on December 22, 2016;
- The 100% Plans meet the *Secretary of the Interior's Standards for the Treatment of Historic Properties (SOI's Standards)* (36 CFR § 68) as required by MOA Stipulation I.A; and
- The 100% Plans meet the requirements of MOA Stipulation VII.C for the portions of the walls that are to be documented, deconstructed and reconstructed.

Based on MnDOT CRU's findings, FTA has determined that the enclosed 100% Plans for the portions of the GRHD: Kenilworth Lagoon WPA Rustic Style Retaining Walls that are to be documented, deconstructed and reconstructed meet the SOI's Standards per MOA Stipulation I and the requirements of Stipulations II and VII.C.ii, and requests your concurrence within 30 days of this letter.

Please note that the Council is currently working on the 100% Plans for the rehabilitation of the portions of the WPA Rustic Style Retaining Walls located outside the Project's limits of disturbance. Once the Council completes these plans, MnDOT CRU and FTA will review them per the terms of MOA Stipulation II and submit them to your office for concurrence. After MnHPO concurs with these plans, they will be incorporated as an addendum to the Civil Contract as described above.

REVIEW OF 100% PLANS: CIVIL CONSTRUCTION

In accordance with MOA Stipulation II, MnDOT CRU reviewed the Project's Civil Construction 100% Plans, dated February 8, 2017, and determined:

- RE: Southwest Light Rail Transit Project, Hennepin County, Minnesota; Review of 100 Percent Design Plans, SHPO #2009-0080
 - The Civil Construction 100% Plans address the findings in FTA's August 9, 2016 letter, which were based on a review of the 90% Plans, related to how to further minimize effects to specific historic properties and better meet the *SOI's Standards*. The Civil Construction 100% Plans also respond to the comments FTA received during the consultation completed under MOA Stipulation I last fall to inform the design of the 100% Plans.
 - There are no substantive changes, defined as design variations resulting in a change of effect to a historic property, between the Civil Construction 100% Plans and the previously approved 60% Plans.
 - The Civil Construction 100% Plans include a few minor design adjustments/refinements within and in the vicinity of historic properties that were made after FTA completed consultation under MOA Stipulation I to inform the design of the 100% Plans. The revisions range from those stemming from continued design development to ones that respond to consulting party input. While none of these design revisions will result in a change of effect to a historic property, since they were made after FTA completed consultation under MOA Stipulation I to inform the design of the 100% Plans, we are including findings as appropriate to document the changes and our findings.
 - Minneapolis & St. Louis Railway (M.&St.L.) Depot:
 - Cedar Lake Trail Reconstruction: The 60% and 100% Plans both show the reconstruction of the Cedar Lake Trail between the depot property and the LRT guideway. The 60% plans showed the reconstructed trail generally following its existing grade and profile. The 100% Plans, however, show a slight dip in the trail profile in front of the depot. This slight change in profile is required for drainage (drainage details were not fully developed in the 60% Plans). Specifically, the dip is needed to direct storm water runoff from the trail into a catch basin, something that is needed due to the trail's proximity to the adjacent LRT guideway. Due to this slight change in the trail profile, an approximate four additional (4") inches of the retaining wall supporting the LRT guideway approach to the Excelsior Boulevard Bridge will be exposed. The actual datum height of the wall will not increase, but it may visually appear to be slightly taller since slightly more of it will be visible. Since the height of the wall is not increasing, which was the primary concern during consultation, and given the relatively small increase in perceived height, we have found that this slight design change meets the SOI's Standards as required by Stipulation I.A and will not result in a change of effect to the M.&St.L. Depot.
 - Bridge 27C10 and West Approach (light rail bridge over Excelsior Boulevard and the Twin Cities & Western Railroad [formerly M.&St.L.] line): The 90% Plans contained additional details not present in the 60% Plans, including proposed architectural concrete textures (form liner wall finishes) for the bridge and approach structure retaining walls. FTA found the initially proposed textures for the bridge pilasters and approach structure retaining walls did not meet the *SOI's Standards* as required by Stipulation I.A. Therefore, the Council changed the concrete textures for the pilasters and retaining walls.

- RE: Southwest Light Rail Transit Project, Hennepin County, Minnesota; Review of 100 Percent Design Plans, SHPO #2009-0080
 - The Civil Construction 100% Plans specify that the retaining walls will have a rectangular grid pattern texture consisting of a smooth surface with a varying pattern of reveals (irregular rectangular grid pattern). The reveals will be ³/₄" to 1" in width and 1¹/₂" in depth. We have found that this texture and pattern meets the *SOI's Standards* as required by Stipulation I.A.
 - The Civil Construction 100% Plans specify that the bridge pilasters will have a "framed limestone" texture (smooth edges with a textured concrete insert panel). The proposed texture for the insert panel is described as "limestone." This texture does not mimic masonry construction, rather it is a mostly monolithic, irregular, rough-faced texture that is somewhat similar to the surface texture of natural limestone. We find that this texture, when combined with the proposed special surface finish, which is MnDOT gray, will visually read as textured concrete and could not be misinterpreted as actual stone or as a historic feature. Therefore, we have found this texture meets the *SOI's Standards* as required by Stipulation I.A.
 - o Chicago, Milwaukee, St. Paul & Pacific Railroad (C.M.St.P.&P.) Depot:
 - Drainage Ditch: As noted in FTA's August 9, 2016 letter, the 90% Plans included a deep ditch between the depot property and the south side of the LRT guideway (eastbound track) that was not present in the 60% Plans. FTA determined the ditch did not meet the SOI's Standards and directed the Council to eliminate the deep ditch from the Project design. The Council subsequently eliminated the deep ditch and replaced it with a trail along the alignment. The trail was a locally requested capital improvement added to the Project scope at the request of the City of St. Louis Park, meaning that the Project would construct the trail, and the City of St. Louis Park would pay for its construction. The FTA included plans for the revised design in the materials provided to consulting parties on September 2, 2016. The revised design was also discussed during the consultation meeting held on September 9, 2016, to inform the design of the 100% Plans. MnHPO concurred with the revised design on October 10, 2016. After this consultation, the City of St. Louis Park decided not to fund the trail, so the Council removed it from the Project scope. Therefore, Civil Construction 100% Plans omit the trail and show a small ditch between LRT guideway and depot property. While the ditch is not as pronounced as the previous "deep ditch" design, the introduction of this element is not in keeping with the SOI's Standards as it alters the spatial relationship between the C.M.St.P.&P. Depot and the railroad corridor with which it is historically associated by introducing a physical barrier between the two. However, based on Council input, we have determined that drainage is required in this area. Therefore, to minimize the effect of the ditch on the association of the depot with the railroad corridor and meet the SOI's Standards, the cross section will be modified to minimize the visual prominence of the physical barrier. Specifically, the cross section of the ditch will have a wide, flat floor paralleling the LRT guideway and a shallower slope along its south side to create a flatter and more natural transition to the depot property. The ditch floor will align with the base of the LRT Guideway roadbed, so as not to appear as a ditch. With this

modification to the Civil Construction 100% Plans, we have found that the plans for the ditch will meet the requirements of MOA Stipulation VI and the *SOI's Standards*. *The Council will incorporate this modification into the Civil Construction 100% Plans by addendum during the bidding period*.

- Noise Wall: The plans, specifications and special provisions for the noise wall near the C.M.St.P.&P. Depot included in the 100% Plans are consistent with the materials FTA submitted to you for review on November 23, 2016, and to which MnHPO concurred on January 3, 2017. Therefore, we have found that the 100% Plans for the noise wall and related Project infrastructure meet the requirements of MOA Stipulation VI and the *SOI's Standards* as required by Stipulation I.A.
- o GRHD:
 - Kenilworth Lagoon Crossing: The plans, specifications and special provisions for the Kenilworth Lagoon crossing bridges included in the 100% Plans are consistent with the materials FTA submitted to you for review on November 23, 2016, and to which MnHPO concurred on January 3, 2017. Therefore, we have found that the 100% Plans for the new bridges and related Project infrastructure (not including landscaping) meet the *SOI's Standards* as required by Stipulation I.A.
 - Kenilworth Lagoon WPA Rustic Style Walls: The plans, specifications and special provisions included in the Civil Construction 100% Plans for the documentation, deconstruction and reconstruction of the portions of the Kenilworth Lagoon WPA Rustic Style Retaining Walls located within the Kenilworth Lagoon crossing limits of disturbance (see attached excerpts from the 100% Plans) are consistent with the materials FTA submitted to MnHPO for review on November 23, 2016, and to which MnHPO concurred on January 3, 2017. Therefore, *we have determined that the 100% Plans for the documentation, deconstruction and reconstruction of the portions of the WPA walls within the Project's limits of disturbance meet the SOI's Standards as required by Stipulation I.A and request your concurrence. Related to the WPA walls:*
 - The Civil Construction 100% Plans include specifications requiring the contractor to salvage stone from the WPA Rustic Style Retaining Wall remnants on the north side of the lagoon within the limits of disturbance to use for reconstructing and rehabilitating the walls on the south side of the lagoon.
 - The Council is preparing the rehabilitation plans for the portions of the WPA Rustic Style Retaining Walls located outside the Project's limits of disturbance. Once these plans are ready, MnDOT CRU and FTA will review them per MOA Stipulation II and submit them to MnHPO for concurrence per the terms of Stipulation VII.C.ii. Once MnHPO concurs with these plans, the Council will incorporate this modification into the Civil Construction 100% Plans by addendum during the bidding period.

- RE: Southwest Light Rail Transit Project, Hennepin County, Minnesota; Review of 100 Percent Design Plans, SHPO #2009-0080
 - Cedar Lake Parkway: The 100% Plans include two overhead mast arm signal structures at the intersection of Cedar Lake Parkway and Cedar Lake Trail (see attached excerpts from the 100% Plans) that were not included in the 60% Plans. Diamond-shaped signs with flashers will be mounted on the mast arms to alert motorists on Cedar Lake Parkway of trail users crossing the parkway. While it would be preferable to not include the mast arm structures or flashers to minimize visual effect on the GRHD: Cedar Lake Parkway, the Project has indicated that there are a high number of conflicts at the intersection during peak hours, creating a safety concern (see attached email). Therefore, to minimize the visual effect of the mast arm structures, the Project will paint the mast arm structures and the back faces of the signs dark brown to match the color of the boulevard lights located along this segment of the parkway. To further minimize the visual effect, the flashers will be linked to a passive detection device and push buttons, so that they will only be activated when a trail user crosses the parkway. With the implementation of both of these measures, we have found the mast arm structures and flashers meet the SOI's Standards as required by Stipulation I.A.
 - With the minor design refinement of the ditch near the C.M.St.P.&P. Depot noted above, all Project elements subject to Stipulation I.A included in the Civil Construction 100% Plans meet the *SOI's Standards*.
 - The Civil Construction 100% Plans meet the additional design requirements of MOA Stipulation I.B.

Based on the findings MnDOT CRU made on the Civil Construction 100% Plans dated February 8, 2017, FTA has found:

- There are no substantive changes between the Project's 60% Plans and Civil Construction 100% Plans that would cause a change of effect to historic properties, per MOA Stipulation II;
- The Civil Construction 100% Plans, with the revised design for the drainage ditch adjacent to the C.M.St.P&P. Depot, meet the design requirements of MOA Stipulations I, VI and VII.

Therefore, FTA has determined that no further Section 106 review is needed for the Civil Construction 100% Plans issued on February 8, 2017, and that the findings made based on the Project's 60% Plans for Project elements included in the Civil Construction 100% Plans remain valid.

ADDITIONAL CONSULTATION TO INFORM THE 100% PLANS: KENILWORTH CORRIDOR LANDSCAPING

During the consultation FTA held in September 2016 to inform the design of the 100% Plans, and as noted in your October 10, 2016 letter, consulting parties commented that the proposed landscape design for the Project segment within and in the vicinity of the GRHD, as described in MOA Stipulation I.A, did not meet the *SOI's Standards*. Specifically, there was concern that the proposed design was too formal and consistent in its design and plant selection and, therefore, did not properly reflect the more natural and varied character of the historic district in this area.

Once the Council addresses the comments received, FTA will hold a consultation meeting with consulting parties to seek input on the revised design. MnDOT CRU or the Council will send all consulting parties a meeting announcement when the date and time are set.

If you have any questions, please contact Reggie Arkell at (312) 886-3704 or reginald.arkell@dot.gov. Thank you.

Sincerely,

Jay M. Ciavarella

Director, Office of Planning and Program Development

Enclosures: Southwest Light Rail Transit Civil Construction Documents (excerpts)

- Kenilworth Lagoon (GRHD): WPA Rustic Style Retaining Walls (portions to be documented, deconstructed and reconstructed)
 - o Plans
 - Volume 4F Bridges (5 sheets)
 - Volume 8A Drainage (2 sheets)
 - Volume 9 Urban Design (3 sheets)
 - Master Specifications
 - Section 04 01 00 Maintenance of Historic Masonry (10 sheets)
- Cedar Lake Parkway (GRHD): mast arm mounted flasher at Cedar Lake Trail intersection
 - \circ Plans
 - Volume 10A Traffic (5 sheets)
- Email from JoNette Kuhnau, Kimley-Horn to Andrea Arnoldi and Jeff Stewart, Metro Transit, January 26, 2017 (includes email from Michael Schroeder, Minneapolis Park and Recreation Board, to JoNette Kuhnau, dated January 18, 2017) (2 sheets)

cc (via email): Reggie Arkell, Federal Transit Administration

Melissa Jenny, United States Army Corps of Engineers Brad Johnson, United States Army Corps of Engineers Greg Mathis, Minnesota Department of Transportation Kelcie Campbell, Metropolitan Council Caroline Miller, Metropolitan Council John Doan, Hennepin County Lori Creamer, City of Eden Prairie Jason Lindahl, City of Hopkins Brian Schaffer, City of Minneapolis John Byers, City of Minneapolis

Julie Wischnack, City of Minnetonka Meg McMonigal, City of St. Louis Park Michael Schroeder, Minneapolis Park and Recreation Board Bill Walker, Three Rivers Park District John Olson, St. Louis Park Historical Society Craig Westgate, Cedar-Isles-Dean Neighborhood Association Jeanette Colby, Kenwood Isles Area Association Tamara Ludt, Preservation Design Works



STATE HISTORIC PRESERVATION OFFICE

July 17, 2017

Jay Ciavarella Federal Transit Administration 200 West Adams Street, Suite 320 Chicago IL 60606-5253

RE: Southwest Light Rail Transit Project Multiple Communities, Hennepin County SHPO Number: 2009-0080

Dear Mr. Ciavarella:,

Thank you for continuing consultation on the above project. Information received in our office on 26 May 2017 has been reviewed pursuant to the responsibilities given the State Historic Preservation Officer by the National Historic Preservation Act of 1966 and implementing federal regulations at 36 CFR § 800 and per the terms of the 2016 Memorandum of Agreement (MOA) executed for this undertaking.

We have completed our review of your letter dated 22 May 2017, a submittal which included draft 100% plans for the Southwest Light Rail Transit: Kenilworth Landscape (dated 15 May 2017).

We appreciated the opportunity to participate in the consultation meeting held on June 5th at the project office which provided an opportunity to review and discuss the draft 100% plans. We also appreciate the fact that your agency and the Project have taken into consideration previous comments and recommendations made by our office and the Minneapolis Park & Recreation Board (MPRB) in an effort to align the Kenilworth Landscape treatments with requirements of the MOA in an effort to maintain the historic character of this segment of the Grand Rounds Historic District while taking into account contemporary landscape design, park recreational use, and park maintenance.

Based upon documentation provided to our office in the May 22nd submittal and during consultation at the June 5th meeting, we concur with the determination that the draft 100% landscape plans for this specific segment of the project have been designed in accordance with the Secretary of the Interior's *Standards for Rehabilitation* as required under Stipulation I (A) of the MOA.

If you have any questions or concerns regarding this comment letter please feel free to contact me at 651-259-3456 or <u>sarah.beimers@mnhs.org</u>.

Sincerely,

Sarang. Barners

Sarah Beimers, Manager Government Programs & Compliance

cc: Greg Mathis, Minnesota Department of Transportation, Cultural Resources Unit



U.S. Department of Transportation Federal Transit Administration

November 7, 2017

Sarah Beimers State Historic Preservation Office Minnesota Historical Society 345 Kellogg Blvd. W. St. Paul, MN 55102 REGION V Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin 200 West Adams Street Suite 320 Chicago, IL 60606-5253 312-353-2789 312-886-0351 (fax)

RE: Southwest Light Rail Transit Project, Hennepin County, Minnesota; Revised Determination of Effect for the St. Paul, Minneapolis & Manitoba Railroad / Great Northern Railway Main Line Rail Corridor Historic District, SHPO #2009-0080

Dear Ms. Beimers,

The Federal Transit Administration (FTA) is writing to continue Section 106 consultation under the terms of the Memorandum of Agreement (MOA) between the FTA and the Minnesota Historic Preservation Office (MnHPO) for the Metropolitan Council (Council) Southwest Light Rail Transit (METRO Green Line Extension) Project (Project).

MOA Stipulation II requires the Minnesota Department of Transportation (MnDOT) Cultural Resources Unit (CRU) and FTA to review and compare the Project's 90% design plans (90% Plans) and 100% Plans, as well as any modifications to the approved 100% Plans, prior to the start of construction, with the Project's approved 60% Plans. In accordance with this stipulation, MnDOT CRU and FTA reviewed the 90% Plans in mid-2016 and FTA notified MnHPO of its findings in a letter dated August 9, 2016. MnDOT CRU and FTA reviewed the 100% Plans for Civil Construction in early 2017 and FTA notified MnHPO of its findings in a letter dated February 27, 2017. The February 27, 2017 letter also describes the process FTA and MnDOT are using to review the 100% Plans for other bid packages, which is in process.

Modifications to 100% Plans and Additional Effects to Historic Properties

On August 16, 2017, the Council authorized negotiation and execution of agreements (Agreements) with the Burlington Northern Santa Fe Railway (BNSF) related to portions of an approximately 1.7-mile-long segment of BNSF's Wayzata Subdivision in Minneapolis from just south of the 10th Street North Bridge to just west of Cedar Lake Junction for the Project. The draft Agreements propose design modifications to the approved Civil Construction 100% Plans. Per the terms of MOA Stipulation II, MnDOT CRU reviewed the proposed design modifications to determine if they include any substantive changes to the Project design, which is defined in the MOA as "design variations resulting in a change of effect to a historic property." MnDOT CRU found that there is one historic property within the Project's architecture/history and archaeological Areas of Potential Effect that will be affected by the proposed design modifications: the St. Paul, Minneapolis & Manitoba Railroad / Great Northern Railway Main Line Rail Corridor Historic District (HE-MPC-16387; hereinafter referred to as the StPM&M / GN Historic District), which is eligible for the National Register of Historic Places. MnDOT CRU also found that the proposed modifications include substantive changes to the Project design, per the definition in

Section 106 Consultation – Revised DOE - Metropolitan Council METRO Green Line Extension Light Rail Transit November 7, 2017 Page 2 of 3

MOA Stipulation II.A that would result in a change of effect to StPM&M / GN Historic District. As required by Stipulation II.B, MnDOT CRU made a recommendation to FTA on the effects of the proposed design modifications on the historic property. MnDOT CRU found that the proposed design modifications would have an adverse effect on the StPM&M / GN Historic District.

Attached for your review is a copy of the assessment of effects report prepared by MnDOT CRU to document their findings, as well as the Preliminary Plans for the proposed design modifications upon which the assessment was based. FTA has reviewed and agrees with MnDOT CRU's findings. Therefore, *FTA has determined that the proposed Project design modifications will have an adverse effect on the StPM&M/GN Historic District*.

Next Steps: Resolution of Additional Effects

In accordance with MOA Stipulation III, FTA will consult with MnHPO and concurring parties to the MOA to prepare a mitigation plan to resolve the adverse effect. FTA is planning to hold a consultation meeting with MnHPO and MOA concurring parties within the next thirty (30) days to review the attached materials and identify measures to resolve the adverse effect. You will be notified of the time and location for this meeting when it is confirmed. FTA will incorporate the measures identified through this consultation process into the mitigation plan. Per the terms of Stipulation III, the draft mitigation plan will be completed within forty-five (45) days of this letter and provided to MnHPO and MOA concurring parties for comment. MnHPO and MOA concurring parties shall have thirty (30) calendar days to provide comments, if any, on the mitigation plan. If MnHPO and MOA concurring parties do not provide comments during this review period, FTA shall move forward with the mitigation plan as provided. If FTA receives comment during the review period, FTA and the Council shall take them into account in the development of a final mitigation plan. The mitigation plan will be final upon acceptance by FTA and MnHPO. MOA concurring parties will receive copies of all final mitigation plans and may also be invited to concur in mitigation plans.

In closing, we request that MnHPO and MOA consulting parties provide comments, if any, on FTA's findings of effect in writing by December 7, 2017. If you have any questions, please contact Bill Wheeler at (312) 353-2639 or <u>William.Wheeler@dot.gov</u>.

Sincerely, rovere

Jay M. Ciavarella Director, Office of Planning and Program Development

Enclosures:

 FTA, MnDOT CRU, and Council, Southwest Green Line LRT Extension—Section 106 Assessment of Effects for Historic Properties Supplement 1: St. Paul, Minneapolis, & Manitoba Railroad / Great Northern Railway Historic District, October 2017 Previously Approved 100% Plans

Southwest LRT Alignment: Segment E4 – Minneapolis (3 sheets) Southwest Light Rail Transit: Civil Construction, February 8, 2017

- Volume 1: Existing Conditions and Removals (excerpts: 25 sheets)
- Volume 2B: Civil (excerpts: 3 sheets)
- Volume 3B: Trackwork (excerpts: 76 sheets)

- Volume 4G: Bridges (excerpts: 56 sheets)
- Volume 6: Retaining Walls (excerpts: 33 sheets)
- Volume 8B: Drainage (excerpts: 20 sheets)
- Volume 13A: Cross Sections (excerpts: 40 sheets)

BNSF Agreement Project Modifications

Southwest Light Rail Transit: Typical Cross Sections Comparison: 100% Plans and BNSF Project Modifications – StPM&M / GN Historic District, 10/12/2017 (37 sheets)

Southwest Light Rail: Existing Trail Design and Proposed Trail Design with Realigned Northstar Tail Track, 08/07/2017 (1 sheet)

Southwest Light Rail: BNSF Wayzata Subdivision Structural Scope for Work Exhibit (Excludes Corridor Protection Barrier to Bryn Mawr), 8/21/2017 (1 sheet)

Southwest Light Rail Transit: BNSF Project Modifications: Retaining Walls, 10/16/2017 (7 sheets)

Bill Wheeler, Federal Transit Administration Elizabeth Breiseth, Federal Transit Administration Melissa Jenny, United States Army Corps of Engineers Brad Johnson, United States Army Corps of Engineers Greg Mathis, MnDOT Cultural Resources Unit Jim Alexander, Metropolitan Council Kelcie Campbell, Metropolitan Council Gary Erickson, Hennepin County Lori Creamer, City of Eden Prairie Jason Lindahl, City of Hopkins Brian Schaffer, City of Minneapolis John Byers, City of Minneapolis Julie Wischnack, City of Minnetonka Meg McMonigal, City of St. Louis Park Michael Schroeder, Minneapolis Park and Recreation Board Bill Walker, Three Rivers Park District John Olson, St. Louis Park Historical Society Craig Westgate, Cedar-Isles-Dean Neighborhood Association Jeanette Colby, Kenwood Isles Area Association Tamara Ludt, Preservation Design Works

cc:



Meeting Title: SWLRT Section 106 Consultation

Date:	11/28/2017	Time:	12:30 PM	Duration :	2 hours
Location:	Southwest LRT Project Office, Conference Room A 6465 Wayzata Boulevard, Suite 500 St Louis Park, MN 55426				
Meeting called by:	Greg Mathis,	MnDOT CRU			
Attendees:	MnHPO: Sarah Beimers Minneapolis: Brian Schaffer MPRB: Michael Schroeder FTA: Bill Wheeler, Elizabeth Breiseth (on phone) MnDOT: Stephanie Atwood St. Louis Park: Meg McMonigal Minneapolis Public Works: Paul Miller CIDNA: Mike Wilson SLPHS: John Olson SPO: Ryan Kronzer, Sophia Ginis, Kelcie Campbell, Sarah Ghandour, Bria Runzel, Michelle Julius, Tracy Fosmo, John Slack, Cory Schulz				
Purpose of Meeting:	Resolve New	Adverse Effec	ts		

Agenda & Discussion

1. Welcome & Introductions

Greg Mathis from the Minnesota Department of Transportation (MnDOT) Cultural Resources Unit (CRU) welcomed attendees and led introductions. He then provided a brief description of the proposed project modifications to be discussed.

2. Update on Project Modifications

Ryan Kronzer from the Southwest Project Office (SPO) presented an overview of the corridor protection barrier (CPB) wall included in the Metropolitan Council's proposed agreement with the Burlington Northern Santa Fe Railway (BNSF) to use a portion of BNSF's right-of-way for the project. Ryan showed and explained illustrations of cross-sections of the wall and track at various locations.

• Mike Wilson (CIDNA) asked why the LRT is higher than the freight rail alignment. Ryan and Tracy Fosmo (SPO) explained the reasons for the grade design is to provide a flat surface for the LRT track and drainage.



3. Determination of Effect Summary

Greg summarized the new effects findings that were included in the report¹ given to parties for review. He explained that FTA has determined that the proposed project modifications required by the proposed BNSF agreements will have an adverse effect on the StPM&M/GN Historic District (due to the tail track extension, trail relocation, longer CPB wall, etc.)

• Sarah Beimers (MnHPO) noted that no historic boundary was provided in the report. Greg confirmed that the boundary was not drawn in the report due to the district being 200+ miles long, so the project would not be legible if the whole district was shown on the map.

4. Resolution of Adverse Effects: StPM&M/GN Historic District

Greg explained the requirements under the MOA for resolving an adverse effect to an identified historic property.

- Sarah B. said that in letter from FTA accompanying the report, there was no statement saying that the adverse effect can be avoided and asked if FTA had made this official determination. Elizabeth Breiseth (FTA) replied that she understood the adverse effect to be unavoidable, but that FTA had not formally made that determination. Sarah B. explained that a mitigation plan cannot be created without that statement clearly being made. Elizabeth said that FTA would needs additional information from the Council before FTA could reach that decision. FTA agreed to get the statement to MnHPO as soon as possible.
- Sarah then asked about land purchases requiring federal approval. Ryan and Brian Runzel (SPO) confirmed that land purchases were not affecting this aspect of the project.

Greg gave the timeline for the mitigation plan and showed a sample panel from the BLRT project as an example of possible mitigation. He said that the SWLRT Project has committed to minimizing the effects through design in accordance with MOA Stipulation I.

Design Concepts

Corey Schulz (SPO) presented wall design options that were shown at the public open house. Greg noted that the open house was held to get additional input on the design.

- Patterns: Four wall pattern designs were shown.
 - Option 1: Block pattern. Sophia Ginis (SPO) confirmed that this was the most popular choice at the open house
 - Option 2: Sophia said this was the second choice.
 - Option 3: "board and batten" design
 - Option 4: Horizontal coping.

¹ "Section 106 Assessment of Effects for Historic Properties Supplement 1: Additional Documentation and Assessment of Additional Effects on the St. Paul, Minneapolis & Manitoba Railroad / Great Northern Railway Historic District," November 2017.



- Graphics: Corey also showed the option of graphics incorporated into the wall surface. Sophia Ginis (SPO) noted that the public liked this idea if used only at the stations.
 - Mike W. asked about graffiti removal. Brian R. said that and how the wall would look after a clean up is always a consideration.
- Color: Corey then showed options for the wall color, which ranged from light to very dark grey. Sophia noted that the public preferred the darkest wall color.
 - Mike W. said he would also like to see views of the walls in winter to get an idea of how the wall color would look against the snow when there is no grass or vegetation could such a rendering be made? SPO staff confirmed that it could be done and that they would create one.
 - Mike W. expressed a preference for Wall Pattern Options 1 and 4.

Landscape: John Slack (SPO) discussed how the wall would look once the landscaping is established and how it will buffer views of the wall. Ryan added that vines will be used where possible to give a "warmer appearance."

Discussion - Design

Greg asked for the parties' thoughts on the designs that they had seen.

- Mike W. responded that he felt that Wall Option 4 was plain and that the vines should not be used where there was rail, although he did like the vines that were used on the walls for Hiawatha LRT along Minnehaha Avenue. He asked BNSF's opinion of the wall and what they thought about the vines. Brian R. responded that they have seen it and they did have some concerns about vines on BNSF property, but because the wall is on Council property, the Council has some leverage with the design barring unnecessary maintenance concerns for BNSF.
- Sarah B. felt that Wall Option 1 "made sense" as it was not a fake stone design. She also approved of the darker color.
- A discussion arose about the reveal design in the wall. Greg said there would be a limit on the reveal. Ryan clarified that it would have a 1¹/₂" limit (deep and wide).
- Paul Miller (Minneapolis Public Works) asked about creating wintertime renditions of the proposed CPB. He added that because Minneapolis intends to develop Linden Yards, the future corridor will not be prairie, so it would not make sense to use prairie motifs in the design.
- Michael Schroeder from the Minneapolis Park and Recreation Board (MPRB) said that the project should not make the wall something it isn't. He continued that the wall is not a graphic and to "just let it be concrete." He also disliked the idea of a painted surfaced, but preferred a wall designed like one the RR would have built (utilitarian, simple). Leave the bug holes, and do not put a finish over it, just bare concrete. Sarah B. asked about graffiti concerns on an



unpainted wall. Michael S. responded that graffiti would always be an issue. He added that if the wall is painted, when the graffiti is painted over the new paint will not match, so unpainted concrete is better as it will just look like concrete again after it is cleaned. The surface will degrade but graffiti can be deterred through aggressive vine growth.

- Brian Schaffer (Minneapolis) said the some consideration should be given to wall being easily cleaned. He was particularly concerned about the Bassett Creek Valley Station where the wall is very visible and the potential for it to be tagged.
- John S. turned the conversation to potential use of vines on the wall and referenced the limitations of the landscaping due to the area. Sarah Ghandour (SPO) added that the public is also concerned about views from Bryn Mawr Meadows. Mike W. noted the poor soil quality because of the track bed. He said that the vines by Hiawatha were attractive and then asked about creating renderings showing the vines without leaves. John S. said that the renderings could be done and added that, in regard to soil quality, there has been a push for a variety of landscape enhancements that requires putting in soil volume adjacent to the wall. Michael S. responded that Bryn Mawr Meadows is working on a Master Plan, and if vines are needed for screening, this would be done within the context of the Master Plan. John S. brought up the screening's impact to the neighborhood.

Discussion – Mitigation

Greg reminded the consulting parties of some of the ideas he shared earlier and asked which, if any, they may have interest in looking into.

- Interpretation Content
 - Paul brought up the loss of the (historic) retaining walls, feeling that people would not understand what the walls are or what they meant. He believed that these would be logical places for interpretation as there are other places in the corridor where such walls still exist.
 - After getting clarification that the corridor continued to the Warehouse District, Sarah B. felt that this would provide the best context for interpretation. She asked how much interpretation does the project feel is a reasonable amount? She felt that it was important that the historic walls be documented before they are removed to record them and to use this info to prepare the interpretation for them. She added that she would like to see documentation for other lines (in general).
 - Paul noted that people may think the area at the split at Cedar Lake was always prairie and may not realize the history that it has and how industrial it was historically in Bryn Mawr. He also noted as an example that the Calhoun Towers were originally an elevator.
- Interpretation Location



- Sarah B. noted how the proposed interpretation for BLRT would be located at the stations, but for this mitigation, it may make sense to locate it along the trail. Brian S. agreed, as there is a larger story to be told, not just at the area for mitigation. Greg explained that for the interpretation of the Osseo Branch along the BLRT line, then themes also explore the Great Northern more railroad globally to provide context for the Osseo Branch.
- Interpretation Type
 - Mike S. stated that he liked the idea of integrated interpretive elements, while Sarah B. said she would also like to see phone- or web-based interpretation.
 - Greg clarified that the draft mitigation plan will discuss the process but not provide the level of detail found in the BLRT interpretive plans.
 - Sarah B. asked if design review would be part of the mitigation for the wall. Greg said this was likely as people are concerned with the aesthetics and that the MOA includes a lot of steps for design review, so the mitigation plan may include a more streamlined review process. The current plans are between 30%-60% design, so the mitigation plan may just include SHPO review of 90% design, which will include the details that everyone is concerned with, such as like aesthetic. Sarah thought this would be okay.
 - o Interpretive Panels
 - The issues of panel vandalism arose. Ryan asked if there are examples of panels in the Cities that people have not vandalized or purposefully damaged. Mike W. noted the Hennepin Avenue Bridge in Uptown. Others discussed what they had see used to successfully prevent vandalism, such as lighting, placement, etc.
 - Greg said that a future meeting might be needed to determine panel location. Sarah Ghandour (SPO) said that the stations are already equipped with infrastructure to hold panels.
 - Michael S. expressed concern that panels are only read once by a person and then become obsolete. He felt that any proposed mitigation/interpretation should be interesting and changeable. Sarah B. agreed that the interpretation should cue people in.
 - Meg McMonigal (SLP) suggested using historic photographs rather than textbased panels. Sarah B. described a set of panels set up in Northeast Minneapolis to interpret the Pillsbury A Mill site that used historic photographs incorporated into a new building.
 - o Additional Ideas
 - Paul M. suggested an audio tour, which is something the Minneapolis Public Arts Program has done. He said the tours are based on QR codes and suggested



checking with Mary Altman with the City. Michael S. proposed creating an interpretive event such as a winter festival or a "Day" event instead of installing an object as this would invite people to the area and introduce them to the space. Greg thought these were good ideas and are something the Project can consider. He noted that QR codes also were explored for BLRT, but were not used due to potentially becoming out dated and security concerns. He added that while a one-time event could be considered, an annual event would have an ongoing cost that is not consistent with the scale of the adverse effect.

- Sophia asked if the parties had a preference towards panels or interpretive elements.
 Kelcie Campbell (SPO) said that she could see a push from the group towards something creative. Brian S. said it should be whatever is feasible for the project.
- Mitigation Plan
 - Sarah B. asked about the timing for the mitigation plan. Greg confirmed that it needed to be completed within a certain time per the MOA.
 - Sarah B. said that, for the mitigation, there seemed to be general agreement that there would be some sort of physical interpretation and that there would be an online element to the interpretation. She felt that it would be good if the mitigation could link in some way to St. Anthony Falls geographically to help tell the larger story. Greg said that a discussion with the design team would be needed. Brian S. said that ownership should also be a discussion.
 - Greg explained that the mitigation plan would both have an outline of the proposed plan and spell out the consultation process.
 - Greg asked if a documentation of the walls should be included in the mitigation. Sarah B. replied that a MHPR (Minnesota Historic Property Record) form would provide additional documentation. Greg said that if a MHPR was completed, less interpretation would likely then be done. Sarah asked if the walls were unique. Greg provided a brief history of the walls as included in the report. Brian S. felt that interpretation is more important than recordation. Sarah said there could be enough description in the MHPR narration and a Level II form could be done.

5. Next Steps

Greg closed the meeting by stating that the mitigation plan would get out to consulting parties for comment by December 22, 2017, and that the next consultation meeting is planned for early next year.

Note: Subsequent to the meeting, FTA indicated the issuance of the Draft Mitigation Plan would be dependent on formal notice that the adverse effect cannot be avoided (pending).



	ACTION ITEMS:	PERSON RESPONSIBLE:	DEADLINE:
1.	Provide statement to SHPO confirming adverse effect cannot be avoided	Council, then FTA	
2.	Draft mitigation plan	FTA/MnDOT CRU	Within 45 days of FTA determining the adverse effect cannot be avoided
3.			
4.			
5.			



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14 February 2018

Ms. Kelcie Campbell, AICP, Environmental Project Manager Metro Transit – Transit Systems Development Southwest Light Rail Transit Project Office 6465 Wayzata Boulevard, Suite 500 St. Louis Park, Minnesota 55426

RE: Impacts at Bryn Mawr Meadows Park and Kenilworth Channel/Lagoon, properties of the Minneapolis Park and Recreation Board, resulting from the Southwest Light Rail Transit Project

Dear Ms. Campbell:

The Minneapolis Park & Recreation Board (MPRB) welcomes the continuing opportunity to comment on impacts on to parks within the Minneapolis park system resulting from the construction or introduction of the Southwest Light Rail Transit Project.

The MPRB was created by an act of the Minnesota State Legislature and a vote of Minneapolis residents in April 1883. The MPRB serves as an independently elected, semi-autonomous body responsible for governing, maintaining, and developing the Minneapolis park system with a mission as follows:

The MPRB shall permanently preserve, protect, maintain, improve, and enhance its natural resources, park land, and recreational opportunities for current and future generations.

The MPRB exists to provide places and recreation opportunities for all people to gather, celebrate, contemplate, and engage in activities that promote health, well-being, community, and the environment.

The MPRB understands that impacts resulting from changes in constructed elements or construction approaches may impact Bryn Mawr Meadows Park and Kenilworth Channel/Lagoon, both properties of the Minneapolis park system. The MPRB further understands, from meetings with Southwest Light Rail Transit Project staff, that these impacts are believed to minimal.

Page 2

MPRB staff have reviewed the new impacts at Bryn Mawr Meadows Park with changes related wholly to the time required to construct the Luce Line trail bridge. It is the MPRB's understanding that the time required for the construction of the bridge is anticipated to increase by nine months with a total closure period of 12 months. Further, the MPRB understands temporary trails will be paved to serve as a detour route.

Bryn Mawr Meadows Park is part of a master planning effort directed to parks northerly of I-394, an effort that is anticipated to be largely complete before the end of 2018. The potential exists for trail locations within Bryn Mawr Meadows Park to be modified as a result of its master plan. Therefore, while the MPRB does not object to the impacts of the longer period of closure for the trail bridge, we request that Southwest Light Rail Transit Project staff continue to coordinate with MPRB staff as detour routes are planned and implemented. To the extent practicable, the MPRB desires those routes to align with planned future trail locations so as to minimize future disruptions to park activities.

MPRB staff have reviewed the impacts resulting from expanded Limits of Disturbance at the Kenilworth Channel/Lagoon. It is the MPRB's understanding that changes were required to align with required mitigation defined under a Memorandum of Agreement related to Project impacts according Section 106 of the National Historic Preservation Act of 1966. The MPRB agrees with Southwest Light Rail Transit Project staff that the revised Limits of Disturbance for work related to historic walls and restoration of vegetation is appropriate and necessary. In addition, the MPRB remains keenly interested in aligning work in the channel area proposed to be performed by the Project with the MPRB's capital improvements intended for the same area, limiting disturbance to park users and neighbors to the greatest degree practicable.

In summary, the MPRB does not object to changes in the Southwest Light Rail Transit Project described in this letter and agrees with Project staff that the *de minimis* finding for Kenilworth Channel/Lagoon remains applicable.

Sincerely,

Maplat

Michael Schroeder Assistant Superintendent for Planning

Cc: Brad Bourn, President, Minneapolis Park and Recreation Board Mary Merrill, Interim Superintendent, Minneapolis Park and Recreation Board

DEPARTMENT OF TRANSPORTATION





Section 106 Assessment of Effects for Historic Properties Supplement 1:

Additional Documentation and Assessment of Additional Effects on the St. Paul, Minneapolis & Manitoba Railroad / Great Northern Railway Historic District

November 2017







Prepared by:

The Minnesota Department of Transportation Cultural Resources Unit 395 John Ireland Boulevard Saint Paul, Minnesota 55155-1899

On behalf of:

The United States Department of Transportation Federal Transit Administration Region V 200 West Adams Street, Suite 320 Chicago, Illinois 60606

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Please call 651-366-4718 or 1-800-657-3774 (Greater Minnesota). You may also send an email to <u>ADArequest.dot@state.mn.us</u>.

Summary

The Southwest Light Rail Transit (LRT) (METRO Green Line Extension) Project (Project) is an approximately 14.5-mile-long extension of the METRO Green Line (Central Corridor LRT). The line includes 16 new stations (including Town Center which is deferred for construction at a later date) and will operate from downtown Minneapolis through the communities of St. Louis Park, Hopkins, Minnetonka, and Eden Prairie, passing in close proximity to Edina. The project also includes an operations and maintenance facility in Hopkins, approximately 2,500 additional park-and-ride spaces, accommodations for passenger drop off, bicycle and pedestrian access, and new or restructured local bus routes connecting stations to nearby destinations.

The Project sponsor, the Metropolitan Council (Council), may receive funding from the Federal Transit Administration (FTA) and has received a permit from the United States Army Corps of Engineers (USACE) to construct the Project. Therefore, the Project is a federal undertaking and must comply with Section 306108 (hereinafter referred to as Section 106) of the National Historic Preservation Act of 1966, as amended (54 United States Code § 300101 et seq.) and its implementing regulations, 36 Code of Federal Regulations (CFR) Part 800 et. seq. In accordance with 36 CRF Part 800.2(a)(2), the USACE has recognized FTA as the lead federal agency responsible for fulfilling their collective responsibilities for the Project under Section 106.

Pursuant to 36 CFR Part 800 et. seq., FTA, with assistance from the Minnesota Department of Transportation (MnDOT) Cultural Resources Unit (CRU), consulted with the Minnesota Historic Preservation Office (MnHPO) and other interested parties to define an Area of Potential Effect (APE), conduct surveys to identify and evaluate historic properties within the APE for National Register of Historic Places (NRHP) eligibility, assess effects of the Project on historic properties, and resolve adverse effects. On November 10, 2015, FTA issued its final determination of effect for the undertaking, which was based on the Project's 60% Plans. Based on the 60% Plans, FTA found that the Project would have an adverse effect on historic properties. Therefore, the measures FTA and the Council agreed to implement as part of the Project to avoid, minimize, and mitigate adverse effects on historic properties are documented in the *Memorandum of Agreement between the Federal Transit Administration and the Minnesota Historic Preservation Office Regarding the Southwest Light Rail Transit (METRO Green Line Extension) Project, Hennepin County, Minnesota* (MOA), which was executed on June 21, 2016.

On August 16, 2017, the Council authorized negotiation and execution of agreements (Agreements) with the Burlington Northern Santa Fe Railway (BNSF) related to portions of an approximately 1.7-mile-long segment of BNSF's Wayzata Subdivision in Minneapolis between downtown Minneapolis and just west of Cedar Lake Junction for the Project (FTA will review the Agreements before they are executed). The Wayzata Subdivision is a contributing segment of the St. Paul, Minneapolis & Manitoba Railroad (StPM&M) / Great Northern Railway (GN) Main Line Railroad Corridor Historic District (HE-MPC-16387;

Section 106 Assessment of Effects for Historic Properties Supplement 1: Additional Documentation and Assessment of Additional Effects on the St. Paul, Minneapolis & Manitoba Railroad / Great Northern Railway Historic District

hereinafter referred to as the StPM&M / GN Historic District), which was evaluated and determined eligible for the NRHP in 2010. The terms of the draft Agreements propose modifications to the Project design both within and just outside the boundaries of the StPM&M / GN Historic District. FTA has determined that because the proposed Project modifications are located within the existing project corridor, no revision of the Project's architecture/history and archaeological APEs is necessary. MnDOT CRU and FTA also found that the StPM&M / GN Historic District is the only historic property within the Project's architecture/history and archaeological APEs that will be affected by the proposed design modifications.

In accordance with MOA Stipulation II, MnDOT CRU and FTA reviewed and compared the proposed Project design modifications with the previously approved 60% Plans to determine if they 1) include any substantive changes, defined by the MOA as "design variations resulting in a change of effect to a historic property," and 2) whether the proposed design changes to Project elements subject to MOA Stipulation I.A meet the *Secretary of the Interior's Standards for the Treatment of Historic Properties (SOI's Standards)* (36 CFR 68).

Based on a review of the Preliminary Plans for the proposed Project design modifications, MnDOT CRU and FTA have found that the proposed design modifications include substantive changes that will have an adverse effect on the StPM&M / GN Historic District. Therefore, in accordance with MOA Stipulation III, FTA will consult with MnHPO and concurring parties to the MOA to prepare a mitigation plan to resolve the adverse effects. In addition, as required by MOA Stipulation I.A., FTA will direct the Council to design Project elements related to the draft Agreements in accordance with the *SOI's Standards* to help minimize the adverse effects of the proposed design modifications on the StPM&M / GN Historic District.

When FTA issued its final determination of effect for the Project in 2015, it found that the Project would have an adverse effect on historic properties. As such, the new adverse effect finding for the StPM&M / GN Historic District will not change FTA's final determination of effect for the Project.

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Section 106 Assessment of Effects for Historic Properties Supplement 1: Additional Documentation and Assessment of Additional Effects on the St. Paul, Minneapolis & Manitoba Railroad / Great Northern Railway Historic District

Section 1: Introduction

The Metropolitan Council (Council) is proposing to construct the Southwest Light Rail Transit (LRT) (METRO Green Line Extension) Project (Project), an approximately 14.5mile-long double-track LRT line located in dedicated right-of-way, with 16 stations, of which one is deferred, and one operations and maintenance facility, beginning at the connection with the METRO Green Line and METRO Blue Line LRT lines at the existing Interchange (Target Field) Station, in Minneapolis, and extending along a southwesterly alignment to connect the cities of Minneapolis, St. Louis Park, Hopkins, Minnetonka and Eden Prairie, Minnesota.

The Council may receive funding from the Federal Transit Administration (FTA) and has received a permit from the United States Army Corps of Engineers (USACE) to construct the Project. Therefore, the Project is a federal undertaking and must comply with Section 306108 of the National Historic Preservation Act of 1966, as amended (54 United States Code [U.S.C.] § 306108) (hereinafter referred to as Section 106) and its implementing regulations, 36 Code of Federal Regulations 800 et. seq.; Section 101(b)(4) of the National Environmental Policy Act of 1969, as amended, (42 U.S.C. 4331); and other applicable federal mandates.

Pursuant to 36 CFR Part 800 et. seq., FTA, with assistance from the Minnesota Department of Transportation (MnDOT) Cultural Resources Unit (CRU), consulted with the Minnesota Historic Preservation Office (MnHPO) and other interested parties to define an Area of Potential Effect (APE), conduct surveys to identify and evaluate historic properties within the APE for National Register of Historic Places (NRHP) eligibility, assess effects of the Project on historic properties, and resolve adverse effects. On November 10, 2015, FTA issued its final determination of effect for the undertaking, which was based on the Project's 60% Plans. Based on the 60% Plans, FTA found that the Project would have an adverse effect on historic properties. Therefore, the measures FTA and the Council agreed to implement as part of the Project to avoid, minimize, and mitigate adverse effects on historic properties are documented in the *Memorandum of Agreement between the Federal Transit Administration and the Minnesota Historic Preservation Office Regarding the Southwest Light Rail Transit (METRO Green Line Extension) Project, Hennepin County, Minnesota* (MOA), which was executed on June 21, 2016.

On August 16, 2017, the Council authorized negotiation and execution of agreements (Agreements) with the Burlington Northern Santa Fe Railway (BNSF) related to portions of an approximately 1.7-mile-long segment of BNSF's Wayzata Subdivision in Minneapolis between downtown Minneapolis and just west of Cedar Lake Junction for the Project (Figures 1, 2 and 3). FTA will review the Agreements before they are executed.

The BNSF Wayzata Subdivision is a contributing segment of the St. Paul, Minneapolis & Manitoba Railroad (StPM&M) / Great Northern Railway (GN) Main Line Railroad Corridor Historic District (HE-MPC-16387; hereinafter referred to as the StPM&M / GN Historic District), which was evaluated and determined eligible for the NRHP in 2010 (Schmidt and

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Vermeer 2010). The terms of the draft Agreements propose several modifications to the Project design both within and just outside the boundaries of the StPM&M / GN Historic District.

MOA Stipulation II requires MnDOT CRU and FTA to review and compare any modifications made to the Project plans prior to the start of construction with the previously approved 60% Plans to determine if they:

- 1) Include any substantive changes, defined by the MOA as "design variations resulting in a change of effect to a historic property;" and
- 2) Whether the proposed design changes to Project elements subject to MOA Stipulation I.A meet the Secretary of the Interior's Standards for the Treatment of *Historic Properties (SOI's Standards)* (36 CFR 68).

Based on a review of the Preliminary Plans for the proposed Project design modifications, MnDOT CRU and FTA determined that the StPM&M / GN Historic District is the only historic property within Project's architecture/history and archaeological APEs that will be affected by the proposed design modifications.¹

When FTA issued its final determination of effect for the Project in 2015, it considered the following effects on the StPM&M / GN Historic District:

- Alignment shift of the BNSF mainline;
- Introduction of LRT infrastructure to the railroad corridor;² and
- Property acquisition.

FTA's November 10, 2015 findings for the StPM&M /GN Historic District, which is included in its entirety in Section 4 of this report, contains a more complete description and analysis of these effects. At the time, FTA found that with the implementation of measures included in the MOA, the Project would have no adverse effect on the StPM&M / GN Historic District. Measures included in the MOA required all project elements within and in the vicinity of the StPM&M /GN Historic District to be designed in accordance with the *SOI's Standards*.

¹ While the Project's architecture/history APE extends out a ¼ mile around the center point of stations to account for station infrastructure and other potential station-related effects to historic properties, the architecture/history APE limit for the alignment includes areas 300' on either side of the centerline of the proposed light rail alignment. Since all proposed Project design modifications are within and related to the Project alignment, not stations, the alignment APE limit was used to identify architecture/history properties that could potentially be affected by the proposed design modifications. Although the Osseo Branch of the StPM&M /GN Historic District is within the alignment APE for the Project modifications, on January 20, 2016 FTA determined that the construction of another of its undertakings, the METRO Blue Line Extension, would result in the destruction of the Osseo Branch. Therefore, effects of the modifications on it were not assessed. ² The 60% Plans upon which FTA based its November 2015 findings include approximately 0.22 miles of corridor protection barrier (CPB) wall between LRT and the BNSF main line comprised of Retaining Wall E405, which begins between 12th Street North and Glenwood Avenue and extends to Interstate 94 (I-94), and Retaining Wall E404, which extends from E405, under I-94, to a point approximately 294' west of the Lyndale Avenue bridges. Both were a minimum of 6' in height above the ground on the freight rail side of the wall.


- Corridor Protection Barrier: 100%

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Figure 2. Overview Map: Linden Yards to Cedar Lake Yard

Legend

- O LRT Stations
- LRT Alignment
- Bridge Work
- Corridor Protection Barrier: 100% Design
- Corridor Protection Barrier: New
- Retaining Walls: Historic
- Retaining Walls: New
- ----- Northstar Tail Track
- -+--+ BNSF Mainline
- ----- Osseo Branch
- ----- Cedar Lake Trail (realigned)
- Architecture/History APE
- Archaeological APE



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Figure 3. Detail Map: Glenwood Avenue Bridges

- O LRT Stations
- LRT Alignment
 - Bridge Work
 - Corridor Protection Barrier: 100% Design
 - Corridor Protection Barrier: New
 - Retaining Walls: Historic
 - Retaining Walls: New
- ----- Northstar Tail Track
- ----- BNSF Mainline
- ----- Cedar Lake Trail (realigned)
 - Architecture/History APE
 - Archaeological APE



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Upon an initial review of the Preliminary Plans for the proposed Project design modifications (see next section for a description of the design changes), MnDOT CRU and FTA determined that the proposed Project modifications are located within the existing project corridor and, therefore, the Project's existing architecture/history and archaeological APEs are sufficient to account for any potential effects to historic properties, and that no revision of the architecture/history and archaeological APE is necessary. MnDOT CRU and FTA also determined that the proposed Project modifications would only affect one previously identified historic property in the Project's architecture/history and archaeological APEs: the StPM&M / GN Historic District. Therefore, this report assesses the effects of the proposed design modifications on the StPM&M / GN Historic District, including how the proposed design modifications do or do not comply with the SOI's *Standards*. The report also includes additional historical context and physical description on the segment of the StPM&M / GN Historic District affected by the proposed design modifications. Specifically, the report looks at the approximately two-mile-long segment of the historic district in Minneapolis from approximately 7th Street North continuing southwest to just past the Project's Bryn Mawr Station (previously known as the Penn Station)³, west of Cedar Lake Junction. The additional historic context and description were used as a framework to assess the effects of the proposed design modifications on the StPM&M / GN Historic District.

Proposed Project Design Modifications

Per the terms of the MOA, FTA completed its review of the Project's 100% Plans for civil construction on February 27, 2017, and determined that they met the terms of the MOA. The terms of the draft Agreements propose modifications to the Project design. The following is a list of proposed modifications from the previously approved 100% Plans:

Northstar Tail Track

- Realign and extend the Northstar Commuter Rail tail track to maintain sufficient space within the BNSF right-of-way to allow for possible reinstallation of a second main line track:
 - Realign existing tail track from its connection with the BNSF main line just south of the 10th Street North Bridge to current end of track at the 12th Street North (Royalston Avenue) Bridge.
 - Extend tail track west approximately 1,830' from the current end of the tail track.
- Realign fencing and add an additional proposed fence between the BNSF main line track and the Northstar tail trail.

³ After FTA issued its final determination of effect for the Project in November 2015, the Penn Station was renamed Bryn Mawr Station and the Van White Station was renamed Bassett Creek Valley Station.

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Cedar Lake Trail

- Realign the existing Cedar Lake Trail to accommodate construction of the Northstar tail track extension:
 - Realign the trail from just east of the 12th Street North (Royalston Avenue) Bridge to a point under the Interstate 94 (I-94) bridges.

Drainage

• Modify the design of drainage basins and inlets to accommodate the Corridor Protection Barrier (CPB) Wall, Northstar tail track extension, and the realignment of the Cedar Lake Trail.

Bridge R0697 (LRT over BNSF)

- Modify the pier design (Piers 1–9) to heavy construction.
- Adjust the pier spacing of Piers 4 and 5 to mitigate conflict with an existing CenturyLink underground line.
- Modify the bridge snow barrier section to improve crashworthiness.

Bridges 27C16 and 27C17 (Glenwood Ave. bridges).

- Add an infill section of pier protection on the Bridge 27C16 (Glenwood West) pier.
- Modify a Bridge 27C17 (Glenwood East) pier to a solid wall pier design for crash protection adjacent to tail track.
- Revise (increase) the fence height on Bridge 27C17 (Glenwood East) over the Northstar tail track to match height over the BNSF tracks.

Retaining Walls

- Increase the limits of disturbance to build trail and new walls.
- Retaining Wall E412
 - Shift the location of the wall several feet to the west to place the wall and its footings outside of BNSF right-of-way (except at bridge tie-ins).
 - Modify the design for the wall to allow it to be shifted, including adjusting the height of the wall, previously approved 4' x 8' pattern finish surface will not change.
- Retaining Walls E406 and E408
 - Add new Retaining Walls E406 and E408 along realigned trail:
 - New walls to replace historic walls described under "Historic Retaining Walls."
 - Finish surface to match 4' x 8' grid pattern previously approved for Retaining Walls E411 and E412.
- Historic Retaining Walls
 - Remove a deteriorated historic formed concrete retaining wall that is a contributing feature of the StPM&M / GN Historic District and a non-

historic concrete block retaining wall, both on the east/southeast side of the railroad corridor, between the 12th Street pedestrian way and the 12th Street Bridge to accommodate construction of the realigned Cedar Lake Trail.

- Remove a historic stone masonry retaining wall that is a contributing feature of the StPM&M / GN Historic District on east/southeast side of the railroad corridor, between the 12th Street Bridge and Glenwood Avenue Bridge to accommodate construction of the realigned Cedar Lake Trail.
- Remove remnants of a historic heavy timber retaining wall that is a contributing feature of the StPM&M / GN Historic District on west/northwest side of the railroad corridor between the 12th Street Bridge and Glenwood Avenue Bridge to allow for the construction of the realigned Retaining Wall E412.

Corridor Protection Barrier Walls

- Permanent CPB Wall and drainage easement added (no physical construction).
- Modify the height of CPB Walls E404 and E405 up to Bridge R0697 (LRT over BNSF):
 - Increase the minimum height from 6' above the railhead to 7.5' above the railhead (approximately 10' above grade) on the freight rail side of the walls.
- Add an approximately 5,582' long (1.06 miles) of new CPB Wall along the west/northwest side of the LRT tracks from Retaining Wall E404 at the I-94 bridges to the Bryn Mawr Station: ⁴
 - Wall will extend approximately 7.5' above the railhead (approximately 10' above grade) on the freight rail side, visible height on LRT side will vary;
 - New CPB Walls will increase the total length of the barrier (walls and pier protection) between the freight and LRT from approximately 1,523' (0.29 miles) to approximately 7,105' (1.35 miles; includes pier protection for I-394 and Luce Line Trail bridges) in length.
- Modify track slabs at Linden Yard utility crossings to accommodate the CPB Wall.

Figures 1, 2 and 3 show the locations of the modifications described above. Table 2 in Section 4 of this report includes a list of plans depicting the Project modifications described above. The plans referenced are on file at the Southwest LRT Project Office.

⁴ The 5.582' of new CPB Wall includes 15.5' of pier protection under the Luce Line Trail Bridge, but not the 387' of pier protection under the I-394 bridges.

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Section 2: Section 106 Legal and Regulatory Context

Prior to implementing an undertaking, Section 106 of the NHPA requires Federal agencies to consider the effects of the undertaking on historic properties that are included in, or are eligible for inclusion in, the NRHP. Undertakings include projects a federal agency carries out, approves or licenses, or funds. Federal agencies must also give the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment on the project prior to the agency making a decision.

As described in 36 CFR § 800 et. seq., which implements Section 106, the Section 106 process includes the following steps:

- 1. Initiation of the Section 106 process:
 - Establish the undertaking;
 - Notify the State Historic Preservation Officer (SHPO) and any Tribal Historic Preservation Officers (THPOs);
 - Plan to involve the public; and
 - Identify other consulting parties.
- 2. Identification of historic properties:
 - Determine the Area of Potential Effect (APE); and
 - Complete a survey of the APE to identify historic properties that are listed in or eligible for inclusion in the NRHP.
- 3. Assessment of adverse effects:
 - Apply criteria of adverse effect.
- 4. Resolution of adverse effects:
 - Continue consultation to consider measures to avoid, minimize, or mitigate adverse effects;
 - Reach agreement with the SHPO, any THPOs, and the ACHP (if it chooses to participate in the consultation); and
 - Prepare a Section 106 agreement to document measures that will be implemented by the Federal agency to avoid, minimize, and/or mitigate adverse effects.

The 2015 report *Section 106 Assessment of Effects for Historic Properties: Southwest LRT Project, Technical Report* describes the APE for the Project, summarizes the surveys conducted by FTA of the APE to identify historic properties that may be affected by the Project, and describes properties identified that are listed in or are eligible for inclusion in the NRHP. The report documents consultation efforts completed under Section 106 to consider effects to historic properties and includes findings of effect for each listed and eligible historic property, as well as FTA's final determination of effect for the Project under Section 106 (FTA et al. 2015).

FTA's final determination of effect was that the Project would have an adverse effect on historic properties. Therefore, FTA consulted with MnHPO and other consulting parties for the Project to resolve the adverse effects. The Project MOA, executed in June 2016, documents the measures that FTA and the Council agreed to implement as part of the undertaking to avoid, minimize and/or mitigate adverse effects on historic properties.

Section 3: The St. Paul, Minneapolis & Manitoba Railroad/Great Northern Railway Historic District

Overview

The StPM&M / GN Historic District is an approximately 205-mile-long linear historic district. Although the StPM&M / GN main line extends from Minneapolis to the Pacific Ocean, the determined eligible historic district in Minnesota extends from Minneapolis Junction in northeast Minneapolis, across the Mississippi River through the Minneapolis Warehouse Historic District, west through Minneapolis and its several suburbs, and westward across Minnesota to Breckenridge, Minnesota, located on the state's border with North Dakota. The StPM&M / GN Historic District in Minnesota is eligible for the NRHP under National Register Criterion A in the area of Transportation within the historic context presented in the NRHP Multiple Property Documentation Form (MPDF): *Railroads in Minnesota*, *1862–1956*. The StPM&M / GN main line was an important component in the GN network and Minnesota's railroad network that "helped to solidify Minneapolis and St. Paul as the commercial, financial, and manufacturing center of an area extending from eastern Wisconsin to central Montana" (Schmidt and Vermeer 2010).

Under the registration requirements for Railroad Corridor Historic Districts in the MPDF: *Railroads in Minnesota, 1862–1956*, the corridor meets Registration Requirement 2:

A railroad corridor historic district provided transportation between a significant class of resource . . . and an important transfer point or terminal market for commodities, products, or services (Schmidt et al. 2007).

The corridor also meets Registration Requirement 3:

A railroad corridor historic district was an influential component of the state's railroad network, or it made important early connections within the network or with other modes of transportation (Schmidt et al. 2007).

The period of significance for the StPM&M / GN Historic District is 1880–1956, reflecting the acquisition and re-alignment by the StPM&M to the end of the historical significance of the railroad in Minnesota, as defined in the historic context *Railroads in Minnesota 1862–1956* (Schmidt and Vermeer 2010).

The previous Phase II evaluation of the historic district also confirmed that the StPM&M / GN railroad corridor retained sufficient historic integrity to convey its historic significance. The corridor retains integrity of location as it follows the original alignment. The design, materials, and workmanship reflect the early twentieth century construction, which is consistent with the period of significance. The setting is compatible, and the corridor retains integrity of feeling and association (Schmidt and Vermeer 2010).

Although the StPM&M / GN railroad corridor has defined beginning and end points, the width of the corridor is not as easily defined. The Phase II evaluation completed in 2010

only identified general boundaries for the historic district, which were generally described as including the railroad corridor right-of-way limits (Schmidt and Vermeer 2010). Usually, railroad corridors encompass the right-of-way owned by the railroad. These can vary greatly in width—from narrow areas with one set of tracks to corridors hundreds of feet wide in railyards or areas with layover tracks. In the approximately two-mile-long segment considered in this report, the historic StPM&M / GN right-of-way was adjacent to and shared the physical space in the railroad corridor with the Minneapolis & St. Louis Railway (M&StL), which purchased the southern part of the overall railroad corridor between downtown Minneapolis and Cedar Lake Junction from the StPM&M. The land area of the railroad corridor that was jointly used by the StPM&M / GN and the M&StL will be utilized for proposed Project improvements. Thus, for this report, the entire railroad corridor encompassing both the StPM&M / GN and M&StL right-of-ways will be discussed.

Context and History

The railroad corridor occupied by the StPM&M / GN railroad was among the first railroad corridors built in the State of Minnesota and has been continuously occupied by railroads since the 1860s.

In 1857, the Territorial legislature chartered four railroad companies in various sections of the state. One company, the Minnesota & Pacific Railroad (M&P), was authorized to build a main line from Stillwater northwest via St. Paul and St. Anthony to the Bois des Sioux River (near present-day Breckenridge, Minnesota/Wahpeton, North Dakota). The M&P was also authorized to build a branch line from St. Anthony through Anoka and Crow Wing to St. Vincent on the Red River near the Canadian border (Prosser 1966/2007). The M&P broke ground in St. Paul on October 1, 1857, and halted work until spring. Although its charter called for a main line running west of St. Anthony, that route required an expensive bridge across the Mississippi River. Additionally, the area west of Minneapolis was still sparsely populated and would not provide any traffic. Thus, the M&P concentrated on the branch line to St. Cloud first and graded to Clear Lake, east of St. Cloud, by 1859 before running out of money. The Panic of 1857 caused a depletion of capital investments, particularly in frontier areas such as Minnesota, and the beginning of the Civil War in 1861 further delayed any progress in railroad activities (Luecke 1997).

On March 10, 1862, the M&P was reorganized as the St. Paul & Pacific Railroad (StP&P). The company began laying track from downtown St. Paul to Minneapolis, reaching St. Anthony across the Mississippi River from Minneapolis in June, culminating in a special excursion train run from St. Paul to St. Anthony on June 29, 1862, that celebrated the connection between the two settlements. Regular passenger service with three trains daily soon followed on the ten-mile route, ending at a depot in St. Anthony. The last segment of this line, which was located along Main Street, would be replaced by 1866 with a new connection from Minneapolis Junction (Luecke 1997).

To finance construction of the main line running west of Minneapolis, the StP&P created a distinct corporation known as the First Division, with funding from the firm of Electus B. Litchfield & Company of Brooklyn, New York (Peterson 2003). The StP&P needed to have

track laid and trains running by 1867 to keep the railroad franchise and claim the land grants that would ultimately fund construction. Sporadic grading on the main line began in Minneapolis, with only seven miles of main line graded by September 1864 and no track laid (Luecke 1997). The following year, work began on the 15 miles between Minneapolis and Wayzata, which included grading, trestle construction, and preparing the grade for rails (10,000 Lakes et al. 2014).

Like other early western railroads, the StP&P was built with hand tools and primitive grading equipment and built in a hurry to meet land grant deadlines. As a result, its alignment followed a circuitous route with sharp curves. Additionally, a more direct route may have required building bridges and trestles or cutting down hills and filling low areas; it was easier and faster for the company to avoid both the labor and costs of such work (Schmidt and Vermeer 2010).

As the StP&P built south and southwest from the Mississippi in downtown Minneapolis, its engineers followed a flat plain roughly parallel to Hennepin Avenue before turning southwest just south of what would become the Oak Lake neighborhood. The railroad then continued west on flat lands toward Cedar Lake. In 1865, Cedar Lake was larger, with lake levels close to 8' higher than today. Camden Hill was a bluff close to the north side of the lake. As a result, the StP&P took the path of least resistance, building south along the east side of the lake, constructing a trestle across the eastern bay then curving north again. From there to Wayzata, engineers avoided marshes where possible and followed the knolls along the edges of wetlands (Figure 3) (10,000 Lakes et al. 2014).

While the StP&P graded and built toward Wayzata, operations still required a bridge at the Mississippi. A new bridge, built with a wooden truss system that spanned two channels of the river and crossed Nicollet Island to reach Minneapolis, opened on May 2, 1867 (10,000 Lakes et al. 2014). As described in the *St. Paul Pioneer* of May 2, 1867, the bridge consisted of two spans of 150' from St. Anthony to Nicollet Island, the segment across Nicollet Island on a track depressed about 12' below grade and "handsomely walled on both sides" and then 623' across the main channel of the river. A depot was constructed on Washington and North 4th Avenue on the Minneapolis side, allowing Minneapolis citizens to board the train there instead of crossing over to St. Anthony (Luecke 1997).

Once trains could cross the Mississippi, the StP&P finished laying rails on the previously completed grade to Wayzata by September 1867. It continued to build west, reaching the city of Litchfield by November 1868, and Willmar by November 1869. Willmar represented the half-way point between St. Paul and Breckenridge, so a division point was established there. By 1869, the work crews included nearly 1,000 men who were able to grade roughly a half mile a day (Luecke 1997). The line reached Breckenridge in 1870, completing the original main line of the first land grant railroad in Minnesota. The StP&P would continue to struggle financially, and by 1879, it fell into bankruptcy and was purchased by James J. Hill and his associates, who reorganized it into the StPM&M (10,000 Lakes et al. 2014).



Figure 1. The east side of Cedar Lake, ca. 1900, looking northwest (Minneapolis Collection, Hennepin County Library, reprinted from 10,000 Lakes et al. 2014)

With better funding, Hill's StPM&M soon acted to improve operating efficiencies and in 1879–1882, constructed a new alignment west of downtown Minneapolis called the Minnetonka Cut-Off. At Cedar Lake Junction, the new route continued west/southwest, grading away Camden Hill on the north side of Cedar Lake. This more direct line eliminated the loop south around Cedar Lake, straightened curves and reduced grades to increase operating efficiencies. Material from Camden Hill was used to fill in wetlands in the low land west of Cedar Lake Junction (Figures 4 and 5). The old StP&P line south along Cedar Lake was eventually abandoned and sold off to surrounding land owners (10,000 Lakes et al. 2014; Schmidt and Vermeer 2010). Hill's double track line to Wayzata was completed in June 1882 (Luecke 1997).

The Minneapolis & St. Louis Railway

While the StP&P was evolving, Minneapolis businessmen banded together to create a locally owned railroad to have direct connections to grain and lumber producers and markets in the region and to gain better control of transportation and shipping rates. Incorporated as the Minnesota Western Railroad in 1853, the railroad was renamed as the Minneapolis & St. Louis Railway in 1870, with construction finally beginning on the line in 1871. The M&StL remained locally owned, a factor that ensured that it was always

challenged for competition and capital by larger railroads also operating in the region (Prosser 1966/2007; Schmidt 2010; Donovan 1950).



Figure 2. Undated map showing the ca. 1865 route of the St. Paul & Pacific and Minnetonka Cut-Off. The later route is indicated with a dashed line (reprinted from 10,000 Lakes et al. 2014)



Figure 3. View of Minnetonka Cut-Off along north shore of Cedar Lake, 1914 (Minneapolis Collection, Hennepin County Library, reprinted from 10,000 Lakes et al. 2014)

In 1871, the M&StL began construction on its first line, which extended southwest from Minneapolis to Merriam (southwest of Shakopee). Between downtown Minneapolis and Cedar Lake, the M&StL purchased right-of-way just east of the original StP&P main line to construct its parallel line. Near Cedar Lake, the original StP&P line had looped around and west from the lake, but the M&StL continued southwest to Merriam Junction. An early roundhouse had been constructed just south of Glenwood Avenue opposite the StP&P roundhouse by 1885 (Sanborn Map and Publishing Company, 1885). The M&StL established its mechanical headquarters below the Kenwood bluffs (below where the Kenwood Water Tower stands today) on the northeastern side of Cedar Lake, where they would remain for another 113 years (Figure 6) (10,000 Lakes et al. 2014).



Figure 4. Minneapolis & St. Louis train yards with the Kenwood Water Tower in the distance on the far right (Norton & Peel photograph, Minnesota Historical Society)

In the 1870s, the M&StL extended lines to Albert Lea and to White Bear Lake to connect with the Lake Superior & Mississippi Railroad, thus providing key rail connections for shipping. Holding a dominant position in the Minneapolis milling district, the M&StL also established elevators along its lines. It hauled over half the flour produced in Minneapolis

in the 1870s and continued to expand its lines into Iowa, western Minnesota and Dakota Territory. The M&StL would operate throughout the late nineteenth and first half of the twentieth century but would continuously have insufficient capital to compete with the larger and more powerful railroads in Minnesota and in the region. It went into receivership in 1888 but was reorganized by 1894 as the Minneapolis & St. Louis Railway Company. The company went into receivership again in 1923, which lasted almost 20 years. The line was eventually acquired by the Chicago & North Western Railway (C&NW) in 1960, which was itself acquired by the Union Pacific Railroad in 1996 (10,000 Lakes et al. 2014; Schmidt and Vermeer 2010).

Late Nineteenth Century Growth in the Railroad Corridor

While the StPM&M was building the Minnetonka Cut-Off at Cedar Lake Junction, the Minneapolis & Northwestern began grading for the West Side line that branched off the StPM&M line at the Linden Yards (west of Lyndale, near Colfax Avenue). Begun in 1881, the line traveled through the Bassett Creek Valley northwest through the village of Osseo and along the south side of the Mississippi River to Clearwater, just east of St. Cloud, by 1882 (Luecke 1997). This line was later absorbed into StPM&M.

The StPM&M also let a contract in 1881 for a new bridge to access Minneapolis. Although completed in 1883, the Stone Arch bridge was opened for business on September 1, 1884, the same day a new Union Depot opened for business on the east side of Hennepin Avenue at the river (Luecke 1997). In 1884, the Union Depot replaced the old StP&P depot at 4th Avenue North and Washington.

By 1885, both the StPM&M and M&StL operated in a developing railroad corridor between downtown Minneapolis and the burgeoning warehousing district, running parallel to the river from the Stone Arch bridge vicinity, through the milling district, and turning southwest in the area west of Hennepin Avenue and generally along the alignment of 4th Avenue North. StPM&M freight depots were located on the west side of the railroad corridor, between Washington and 4th Street North. The M&StL passenger station stood next to its main line at 3rd Street North, while its freight depots were on the east side of the railroad corridor between 3rd North Street and to 5th Street North (Sanborn Map and Publishing Company 1885).

Maps of the era indicate that all rail lines appeared to be at grade, with as many as 14–16 lines extending through the area. The StPM&M occupied the west/northwest portion of the corridor, while the M&StL occupied the east/southeast portion.

The lines such as the StPM&M and M&StL that turned southwest at 4th Avenue North reached their greatest width in the area from 2nd Street North to 7th Street North. The corridor expanded to accommodate up to 20 tracks including the main lines, sidings and spurs in this section, and then constricted down to 6–8 tracks to turn southwest through bluffs at 12th Street North and Glenwood Avenue, before the topography flattened and bluffs receded to low, flat land (Figure 7) (C.M. Foote & Co. 1892).



Figure 5. 1892 map of Minneapolis showing location of rail lines (north is to the left) (C. M. Foote & Co. 1892)

This narrowed turn near 12th Street North was identified as early as 1879 on a bird's eye view of Minneapolis, which showed both the StP&P and M&StL lines cutting through a hill, with a bridge at 12th Street connecting the main section of the city with the residential area (later Oak Lake) to the northwest (Figure 8). It is not clear whether this cut was a natural break in the topography, or whether the StP&P railroad first identified this point to move west, but it was present by 1879. The StP&P constructed a roundhouse just west of the cut, adjacent to Western Avenue (now Glenwood Avenue) (A. Ruger 1879). By 1885, the M&StL had also completed its first roundhouse south of Glenwood on the east/southeast side of the corridor (Sanborn Map and Publishing Company 1885).



Figure 6. 1879 Bird's eye view of Minneapolis showing the railroad cutting through the hills (detail) (A. Ruger 1879).

Changes to the Landscape

The Warehouse District

Other than the cut through the hill at the 12th Street Bridge, the railroads in this corridor were originally built at grade, rather than depressed below grade with bridges overhead. During the 1880s, Minneapolis boomed, its population growing from 46,887 in 1880 to 164,738 in 1890. Development had pushed into North Minneapolis, the area northwest of the railroad corridor. The railroad tracks of the M&StL and the StPM&M / GN blocked easy access to the northwest from downtown. The City demanded that the tracks be depressed to create "underways" and that vehicular bridges be built over the yards. It also required that all expenses of crossings, underpasses, and bridges be paid by the railroad companies (Hofsommer 2005a). Litigation soon followed and resulted in a March 1888 decision by the

State Supreme Court, affirming a lower court decision that forced the railroads to lower tracks and build bridges over them at certain important streets, specifically Washington Avenue and 5th Street (Minneapolis Tribune, March 6, 1888).

It took until 1890 for the litigation to be resolved, when a compromise was finally developed in which the M&StL and StPM&M / GN split costs of demolition, excavation, bridgework and new trackage. The M&StL also constructed new passenger and freight facilities and retained its historic alignment on the south/east side of the StPM&M / GN, despite the desire of the StPM&M to move the other line out of the corridor (Hofsommer, 2005a).

Records of the StPM&M / GN showed that the Washington Avenue Bridge was completed in 1891 with plans in place for bridges at 1st, 2nd, 3rd, 4th, and 5th Streets North and at Western Avenue (Great Northern Railway, 1891 AFE#202-E). An 1891 bird's eye view of the city (Figure 9) shows through-truss bridges over the railroad corridor at 1st, 2nd, Washington, 3rd and 5th (the extent of the view in that direction) (A. M. Smith 1891). The following sections describe the changes to the landscape of the historic railroad corridor, concentrating on the period of significance from 1880–1956. The segments are described first by the side of the corridor: east/southeast side then the west/northwest side.

7th Street North to 12th Street North

The segment of the historic railroad corridor from 7th Street North to 12th North Street appears on an 1879 bird's eye view of Minneapolis (see Figure 6), which shows where the corridor began to cut into the bluff and the location where the topography rose gradually. On both sides of the railroad corridor, the land rose from the railroad grade near 7th Street. The only bridge in this vicinity in 1879 was at 12th Street, as the rails pushed through the bluffs to the flat land beyond (A. Ruger 1879).

In addition to the bridge at 12th Street North, a viaduct over the rail yard at 7th Street North was completed by 1903; it had not been constructed with the other bridges to the north in 1891 as part of the City's lawsuit against the railroad companies. A truss railroad bridge that served the Short Line Electric Railway (commonly known as the Luce Line, incorporated 1908) was constructed over the corridor along Holden Street by 1914 (Benneche 1914).

The east/southeast side of the tracks through this area generally had a "hard edge" of buildings next to the bridges. The Wyman, Partridge & Company wholesale dry goods warehouse was constructed against the 7th Street viaduct and included a warehouse extending along several spurs on the east/southeast of the railroad corridor. South from the warehouse to Holden Street were tracks operated by the Electric Short Line Railway. The topography gradually rose to the bridge at 12th Street (also called Royalston on early maps). The land immediately adjacent to the bridge rose some 20–25' above the rails and was reinforced with retaining walls. It was the site of a potato warehouse and later a gas station in the twentieth century but not connected to rail (Sanborn Map and Publishing Company 1912/1930, and 1912/1951).



Figure 7. 1891 Bird's eye view of Minneapolis. The through-truss bridges are visible at right (A. M. Smith 1891)

The west/northwest side of the corridor was generally at grade with the rails from 7th Street North until rising to the abutments for the 12th Street Bridge. From the turn of the century until the 1940s, a series of lines extended from the corridor to the northwest, serving the St. Paul & Western Coal Co. Yard. The coal yard filled the land southwest of 7th Street and extended to the back yards of residences fronting on Royalston. Those tracks were removed by the 1950s and replaced by industrial buildings, but this area remained generally at grade with the tracks (Sanborn Map and Publishing Company 1912/1951).

12th Street North to Lyndale Avenue

The topography along this section of the historic railroad corridor transitioned from the highest edges and narrowest portion of the corridor at 12th Street North, southwest past Western Avenue (Glenwood), and then gradually sloping down and widening out to a flat plane prior to Lyndale Avenue. Moving southwest from 12th Street, there was a bridge with stone abutments at Western Avenue (Glenwood) as early as 1885 (Sanborn Map and Publishing Company 1885). Although not present in 1885, a steel viaduct at Lyndale Avenue crossed the corridor by 1892 (Figure 10). This section remained in that configuration until the I-94 bridges were built adjacent to Lyndale by 1980 (C.M. Foote and Co. 1892; NETROnline historic aerial photograph 1957, 1972, 1979).



Figure 8. View of Lyndale Avenue bridge over Great Northern and M&StL tracks from south of Glenwood Avenue (Minnesota Historical Society)

The east/southeast side of the corridor remained raised approximately 20-25' above the railroad corridor, generally supported by retaining walls. The 1885 map indicates stone retaining walls from either side of 12th Street North, extending southwest through the Western Avenue bridge, then transitioning to an 8' board fence that reflected the topography that sloped down to the M&StL roundhouse. Coal yards at the rail grade filled adjacent land to Lyndale Avenue, with a retaining wall at the edge of the Chestnut Street right-of-way marking the south edge of the railroad corridor in the nineteenth century. By 1937, the M&StL roundhouse had been removed, and industrial buildings appeared along the corridor, with little demarcation between the buildings and the railroad corridor. In the post-World War II era, adjacent industrial buildings no longer required rail access in this location. The buildings faced Chestnut Street (south of the railroad corridor), with parking lots in the back along the railroad corridor. Southwest from the Western Avenue (Glenwood) bridge abutments to Lyndale, the corridor edge does not appear to have a strong demarcation or grade change by the mid-twentieth century. A power line was constructed along the east/southeast side of the railroad corridor by 1938 (Minnesota Historic Aerial Photos Online, 1938; NETROnline historic aerial photograph 1957).

The west/northwest side of the corridor from 12th Street North to Lyndale Avenue retained more of its earthen embankments over time than the east/southeast side. On the north end of the 12th Street Bridge, the properties were at least 20–25' above the railroad corridor at the intersection of Holden, 12th, and Highland (later Royalston Avenue) in the Oak Lake residential area. Some remnants of this residential area remained until the 1950s when the entire Oak Lake neighborhood had been redeveloped to industrial and

commercial uses. At track level, a stone retaining wall ran under Western Avenue (Glenwood) on the west/northwest side, although its extent is not clear from the maps. As the railroad corridor passed Western Avenue (Glenwood), the topography sloped down to track level where a StP&P roundhouse was located prior to its removal in 1897 (Great Northern Railway, 1897 AFE #499-E and #583-E). The site west of the roundhouse contained various furniture companies and lumber yards from the 1880s into the mid-twentieth century. Later, an iron works and a coal yard moved onto the western portion of the property, with a rail line serving the coal yards. These industrial properties were close to grade level of the railroad corridor, since they required various rail tracks over time to receive materials and ship their products. Although the rail line was removed, the buildings here did not change drastically from the 1930s to 1957 (Sanborn Map and Publishing Company 1912/1930, and 1912/1951; NETROnline historic aerial photograph 1957).

Lyndale Avenue to Cedar Lake Junction

The topography of this segment of the historic railroad corridor is flat for most of the distance from Lyndale to Cedar Lake Junction. As noted in the history, the original rail alignment followed low-lying, flat land west until it reached the vicinity of Cedar Lake Junction, where Camden Hill was cut down when the StPM&M built the Minnetonka Cut-Off in 1879–82. While the topography did not experience many changes after this early construction period, this section would ultimately see the greatest reduction of railroad uses and circulation changes. Those changes, however, would not happen until the 1980s, after the period of significance.

From the 1880s until the 1920s, this section would have few bridges or roadways that intersected with it. By 1892, the only bridge crossing west of Lyndale was at Laurel Avenue, which carried a Twin City Rapid Transit streetcar line west over the lowlands and tracks toward Glenwood Park. By 1912, an additional crossing was added at Superior Avenue (now Wayzata Boulevard), running west from Loring Park. These provided the only grade-separated circulation over the railroad corridor until the 1970s. By 1972, work had begun on expanding Superior Avenue; Laurel Avenue was being disconnected and its bridge would eventually be removed (NETROnline historic aerial photograph 1957, 1972).

Moving west from Lyndale Avenue, on the east/southeast side of the railroad corridor, was the StPM&M / GN's Linden Yard. The sidings on the yard extended approximately one mile to where I-394 now crosses over the railroad corridor. Within the right-of-way, tracks angled across platted lots and blocks, meaning that several east-west streets platted on the grid dead-ended into the railroad corridor. Several spur tracks also ran down the corridor, providing connections to coal piles and a few businesses, including the Anheuser Busch Brewing Association facility near the foot of Hawthorne Avenue. These blocks on the east/southeast side of the railroad corridor still had some residential uses. However, the space between the StPM&M and M&StL rail lines had two elevators (Figures 11 and 12), filling all the land and with tracks from each line running through the elevators. Elevator #1, with a capacity of 800,000 bushels, was farthest east, roughly between the alignment of Aldrich and Bryant Avenues. Elevator #2, with a capacity of 1,200,000 bushels, was adjacent on the southwest, between the alignment of Bryant and Colfax Avenues. The

elevators were identified first as the Minneapolis Elevator Company, later owned by Great Northern, and by the 1950s, they were owned by Archer Daniels Midland (Sanborn Map and Publishing Company 1885, 1912/1951; Great Northern Railway Railroad Valuation Map 1940).



Figure 9. View of Great Northern elevator, ca. 1905 (Minnesota Historical Society)



Figure 10. View of Great Northern Elevator from corner of Linden and Lyndale Avenues North, looking west, October 28, 1965. Minneapolis Gas Company building is at right. (Norton & Peel photograph, Minnesota Historical Society)

Mixed commercial and residential uses persisted adjacent to the railroad corridor until the turn of the century, but by 1912, the Minneapolis Gas Light Company's 172 million cubic-foot storage tank was located just west of Lyndale Avenue. This use appeared to be the beginning of continuous use of this location for utility companies. The railroad corridor continued southwest until it intersected with Laurel Avenue and The Parade park area, just west of Dupont Avenue. By 1912, the approach for the Laurel Avenue viaduct over the tracks began east of Dupont and north of the Dunwoody Industrial Institute grounds. Continuing southwest, the topography began to rise to the Kenwood bluffs that defined the southeast edge of the railroad corridor. Superior Avenue (now Wayzata Boulevard) ran along the base of the bluff, first at grade, and by the 1930s, it had been elevated to bridge the railyards (Figure 13) (Sanborn Map and Publishing Company 1885, 1912/1951; Minnesota Historic Aerial Photos Online, 1938).



Figure 11. 1949 aerial view of Highway 12 (Wayzata Boulevard) showing Cedar Lake railroad yard at right, looking east (Minneapolis Star Tribune photograph, Minnesota Historical Society)

Soon after the M&StL was established, the railroad built a shop complex on the flat land at the base of the Kenwood bluff and south of Superior Avenue/Wayzata Boulevard, which served as the mechanical headquarters of the M&StL. The M&StL Cedar Lake Yards, as they were known (not to be confused with the StPM&M / GN Cedar Lake Yard that was located west of Cedar Lake Junction on the Minnetonka Cut-Off), were located below the bluff where Kenwood Parkway ran, near the site of the Kenwood Water Tower. The railroad apparently scraped back the bluffs to carve out space for a six-stall roundhouse in the nineteenth century (Egan 1903; Hofsommer 2009). The M&StL continued to expand its yard operations in this area on the northeastern side of Cedar Lake and remained for the next century (Figure 14), until the M&StL was sold to the C&NW in 1960. The yards were

gradually decommissioned, abandoned, and demolished in the 1970s and 1980s (10,000 Lakes et al. 2014).



Figure 12. View of Cedar Lake railroad yards, 1957 (Norton & Peel photograph, Minnesota Historical Society)

In the 1880s, on the west/northwest side of the tracks west of Lyndale Avenue was the location of the North Star Lumber Company and its storage yards, as well as other construction material yards. The land on the west/northwest side appeared to be flat and generally at grade with the rail yards. This site adjacent to Lyndale Avenue would later house industrial uses. A Northern States Power substation was located at the foot of Aldrich, extending west to Colfax Avenue; the substation would be located on the site for the next century. Approximately three blocks to the west at Lyndale Junction, the Osseo Branch extended through the Bassett Creek Valley to the northwest. The StPM&M main line continued southwest along low-lying, flat ground for approximately one mile to Cedar Lake Junction, crossing under the Laurel Avenue Bridge, and the Superior Avenue (Wayzata Boulevard) bridge. The topography rose gradually toward the Superior Avenue Bridge, which connected to the Camden Hills. The StPM&M had cut into the Camden Hills in 1879-82 for the Minnetonka Cut-Off and continued to operate on that line. The Camden Hills bordered the StPM&M line on the north as it made its way to Minnetonka (Sanborn Map and Publishing Company 1885, 1912/1951; Minnesota Historic Aerial Photos Online, 1938; 10,000 Lakes et al. 2014).

The StPM&M gradually expanded its yards (known as Linden Yards) in the flat lands along this segment, adding over 20 tracks in the area between Lyndale Junction and the Superior Avenue Bridge. The tracks constricted under the Superior Avenue Bridge, and then expanded again, with multiple StPM&M lines to the southwest toward Cedar Lake Junction (Figure 15) (Minnesota Historic Aerial Photos Online, 1938; Great Northern Railway Railroad Valuation Map 1930, Rev. 1956; NETROnline historic aerial photograph 1957, 1972).



Figure 13. 1927 Bird's eye view of Minneapolis from Kenwood Water Tower showing the railyards and Great Northern Elevator to the left (Minnesota Historical Society)

Physical Description

The StPM&M / GN Historic District is an approximately 205-mile-long linear historic district. Although the StPM&M / GM main line extends from Minneapolis to the Pacific Ocean, the determined eligible historic district in Minnesota extends from Minneapolis Junction in northeast Minneapolis, across the Mississippi River through the Minneapolis Warehouse Historic District, west through Minneapolis and its several suburbs, and westward across Minnesota to Breckenridge on the state border with North Dakota. The portion of the historic district documented in the following sections is an approximately two-mile-long segment in Minneapolis beginning roughly at 7th Street North and extending to west of Cedar Lake Junction, which is the segment of the historic district subject to the proposed Project design modifications(see Figures 1, 2 and 3). This width of this segment of the historic district varies considerably from approximately 100' to hundreds of feet at the railroad yards within the Warehouse District, Linden Yard west of Lyndale Avenue, and Cedar Lake Yard located between Cedar Lake Junction and Cedar Lake. This segment of the

historic district includes a variety of features, both natural and man-made, and functions that collectively constitute a historic landscape. From between approximately 12th Street North and just past Glenwood Avenue, the historic district also includes the M&StL right-of-way, to include a historic cut in which the StPM&M / GN and M&StL rights-of-way were colocated and which also includes an associated grade separation.

The StPM&M / GN Historic District in its entirety has both urban and rural components from the density of the Minneapolis Warehouse District, through modern suburbs, historic small and mid-sized towns, and rural areas along its route to Breckenridge. The two-mile corridor examined in this study, although located in the heart of the city, is more illustrative of a rural historic landscape than an urban landscape. Rural historic landscapes are typically based on historic occupation or land use, which may include both transportation systems and industrial uses. The pattern of railroad building in the nineteenth century, with its emphasis on speedy and expedient construction, can best be described using the landscape characteristics identified for rural historic landscapes by the National Park Service (NPS) (McClelland et al, 1989/1999). According to the NPS, the features and functions of a rural historic landscape can include:

- Land uses and activities
- Patterns of spatial organization
- Response to the natural environment
- Cultural traditions
- Circulation networks
- Boundary demarcations
- Vegetation related to land use
- Buildings, structures, and objects
- Clusters
- Archaeological sites
- Small-scale elements

The StPM&M / GN Railway Historic District does not contain all of these features and functions. They vary by area, as the tracks move from the dense and spatially constricted corridor near Target Field at 7th Street North out to the flat, less developed, and most expansive area at Bryn Mawr Meadows.

Although the StPM&M / GN Historic District has defined beginning and end points, the width of the corridor is not as easily defined. The Phase II evaluation completed in 2010 only described general boundaries as including the railroad corridor right-of-way limits (Schmidt and Vermeer 2010). Railroad corridors typically encompass the right-of-way owned by the railroad, which can vary from narrow areas with one set of tracks to corridors hundreds of feet wide in railyards or areas with layover tracks. In the approximately two-mile-long segment documented in this report, the historic StPM&M / GN right-of-way included several yards and junctions, and was adjacent to and shared the physical space in the railroad corridor with the M&StL, which purchased the southern area

of the overall railroad corridor in the nineteenth century (Table 1). The area devoted to rail uses of both railroad lines matches the historic corridors including yard areas. Through the entirety of this segment from 7th Street North to Cedar Lake Junction, the setting included both railroad corridors, making the overall railroad corridor a larger facility than just the StPM&M / GN railroad corridor.

GN Mile	BNSF Mile	Abbreviation Key
Post	Post	
	(BNSF 2016)	
	11.595	7th Street North Bridge
	11.603	10th Street North Bridge
	11.786	12th Street North (Royalston Avenue) Bridge
	11.862	Western Avenue (Glenwood Avenue) Bridge
	12.082	I-94 / Lyndale Avenue bridges
	_	Linden Yards
	12.238	Lyndale Jct. switch (actual Jct. with Osseo Branch)
12.17	12.4	Lyndale Jct.
	12.5	Van White Boulevard Bridge
13.0	13.0	Cedar Lake Jct.
	13.075	Wayzata Boulevard (I-394) bridges
	13.217	Cedar Lake Jct. switch (actual Jct. with M&StL, now TC&W)
		Cedar Lake Yard
	14.7	Cedar Lake

Table 1. Location of Features Along the Documented Segment of the StPM&M /GN Historic District

The primary features in the StPM&M / GN and M&StL corridor from 7th Street North to Cedar Lake Junction include the main line of the StPM&M / GN (now BNSF) (contributing) that is consistently farthest west/northwest in the corridor, the adjacent tail track for the Northstar commuter rail (non-contributing – post dates the period of significance), and the Cedar Lake Trail (non-contributing), which was constructed on the alignment of the M&StL on the east/southeast portion of the corridor. West of I-94, the space between the BNSF line and the trail gradually grow farther apart, leaving a widening, flat area in the center where StPM&M / GN and M&StL rail yards (StPM&M / GN yards are contributing) were historically located. The StPM&M / GN main line track and trail gradually come together again as the former rail yard narrows to pass under I-394 to Cedar Lake Junction (Figures 16 and 17). Scattered along the entirety of the railroad corridor segment documented in this report there are numerous small-scale, non-countable features such as signs, automatic block signals, signal bungalows, switches with switch stands or switch housings, and other small pieces of railroad related infrastructure.



Figure 14. Looking north along Cedar Lake Trail to Target Field, August 2017



Figure 15. Looking north from Cedar Lake Trail across former railyard to BNSF tracks, August 2017

Throughout the corridor, the StPM&M / GN main line and the Northstar tail track are on a slightly raised roadbed of crushed granite ballast, with a track structure consisting of wood ties, and steel rails. The Northstar tail track currently ends prior to 12th Street North. The Cedar Lake Trail is paved with bituminous and is built up approximately 5' above the

existing rail bed in the area from 7th Street North to the south, but lowers down to parallel the rail grade past the 12th Street Bridge (Figure 18).



Figure 16. Looking northwest across BNSF and Northstar tracks to boundary with Mary's Place, August 2017

The edges of the corridor are varied in topography and land uses. The railroad corridor that contained the StPM&M / GN and M&StL was several hundred feet wide in the densely developed Minneapolis Warehouse District north of 7th Street, and began to constrict down to a narrow corridor at 7th Street North. The section in the Warehouse District north of 7th Street is depressed from surrounding grades approximately 20–25', the result of a railroad grade separation project in the 1890s (contributing).

From 7th Street North to 12th Street North, the railroad corridor is relatively narrow, approximately 100' wide with adjacent land at-grade. At 12th Street, the corridor narrows to cut through the bluff area, with retaining walls and earthen embankments approximately 20–25' high. The steep topography forms the boundaries for this segment of the corridor, which continues through Glenwood Avenue. West of Glenwood, the topography gradually slopes down to grade on either side of the railroad corridor to I-94. Once the corridor emerges on the west from the tunnel-like effect created by the I-94 and Lyndale Avenue Bridges, the edges of the corridor are less defined by topographic change. On the east/southeast side is a gentle slope with vegetation, which flattens out along the Cedar Lake Trail and extends under I-394. Southwest past I-394, the former M&StL railyard extended to the Kenwood bluffs, forming a southeastern edge to the railroad corridor. The BNSF main line marks the west/northwest edge of the corridor west of I-94, and adjacent

land is also flat toward Bryn Mawr Meadows Park west of the Bassett Creek Valley Station (Figures 19, 20, and 21).



Figure 17. The original curve cut through the bluffs at 12th Street and Glenwood Avenue, August 2017

In the late 19th and early 20th centuries, many businesses and industries that received and shipped large amounts of materials and goods set up near the tracks to take advantage of the transportation services offered by the StPM&M / GN and M&StL. Many of these businesses were served by sidings and spurs that extended off the railroad corridor onto these properties. However, by the mid-twentieth century, many of the business that once relied on rail service left the area, changed to trucks for their primary mode of transportation, or were replaced by land uses not needing rail service. As a result, the numerous sidings and spurs that once extended out from the railroad corridor to adjacent properties were removed.



Figure 18. Looking east towards downtown through the tunnel-like effect under Lyndale and I-94, August 2017



Figure 19. Looking southwest from Cedar Lake Trail at vegetation near I-394, August 2017

A pattern of grade separations for railroads, vehicles, and pedestrians has been typical in the railroad corridor. Bridges that currently cross the corridor include 7th Street North (historic crossing, bridge non-contributing – post dates the period of significance), 10th

Street North (non-contributing – crossing post dates the period of significance), 12th Street North (Royalston Avenue) (crossing historic, bridge non-contributing – post dates the period of significance), Glenwood Avenue (crossing historic, bridge non-contributing – post dates the period of significance), I-94 (non-contributing – crossing post dates the period of significance), Lyndale Avenue (crossing historic, bridge non-contributing – post dates the period of significance), and Wayzata Boulevard (I-394) (crossing historic, bridges noncontributing – post date the period of significance). Since 1970, bridges have been removed at Holden Avenue and Laurel Avenue. Currently, there is a trail connection from the Cedar Lake Trail to 12th Street North on the east/southeast side (non-contributing); it follows the general street alignment of the original plat for that location. Since the 1970s, in the era when the Laurel Avenue Bridge was removed, a pedestrian bridge over the corridor to Bryn Mawr Meadows has been present west of Van White Boulevard.

The corridor is also defined by elements that contribute to the setting and feeling of the corridor. The cut through the bluff from 12th Street North to Glenwood Avenue required retaining walls from the beginning, and some remain from the period of historic significance (see Figures 1 and 3). The east/southeast side has a series of varied retaining walls that reflect different periods of construction and redevelopment. Immediately west of the 12th Street pedestrian way along the railroad corridor, a modern concrete block retaining wall (non-contributing) has been added up to the 12th Street Bridge abutments. The retaining wall on the west side of the abutments is a historic formed concrete wall (contributing) that is deteriorated with much of the surface worn away. There is a secondary concrete retaining wall on the top of the bluff in this area, set back a few feet from the lower wall. The concrete wall extends west to meet the historic stone masonry wall (contributing) that likely dates to the 1880s or possibly earlier; it extends to the Glenwood bridge abutment. West of the Glenwood Avenue Bridge there is a modern concrete block wall (non-contributing) (Figures 22, 23, and 24).

On the west/northwest side of the railroad corridor, the land between 12th Street North and Glenwood Avenue has remained undeveloped since the 1860s. It is a grass-covered earth embankment (contributing) with a bluff above. Both are further vegetated with volunteer trees and shrubs. There are remnants of a heavy timber wall (contributing) on the lower portion (approximately 6–8' high) (Figures 25 and 26).

This segment also retains vegetation related to the rail trench, because of the remaining grassy bluffs on the west/northwest side, and on and along the retaining walls on the east/southeast side. Vegetation on both sides of the railroad corridor includes volunteer trees, shrubs growing on the earthen embankments of the trench on and on top of the hillsides, and grasses and wild flowers in the shallow drainage ditches lining the tracks.

Throughout the entire railroad corridor, chain link fences (non-contributing) provide boundaries to the corridor, as well as within the corridor between the Trail and the railroad tracks. Within the area from 7th Street North to I-94, the chain link fencing provides views from the Trail to the BNSF and Northstar lines. West of I-94, the chain link fences are covered with vegetation that prevents any views; that is also the area where the

Trail split s away from the BNSF mainline and passes through the former railyard (Figures 27 and 28).



Figure 20. Modern concrete block wall (left) and deteriorated historic formed concrete retaining wall with secondary wall above (right) on the east/southeast side of the corridor north of 12th Street, August 2017

Historically, the views of the entire railroad corridor were limited in the area from 7th Street North to I-94 because the corridor passed through the trench. West of I-94, the corridor was more visible from a distance, and views varied from the built-up area near Lyndale to the wide open railyards to the west. Near Lyndale, the railroad corridor was dominated by the Great Northern (later ADM) Elevator (non-extant), a massive structure that filled the open area between tracks. Adjacent land uses also crowded the edges of the tracks near the elevator. Moving west, there were up to two dozen tracks, often filled with rail cars or waiting trains. For residents living on the bluff, or traveling over the area on Superior Avenue/Wayzata Boulevard or Laurel Avenue, the overall view at the southwestern end of the railroad corridor remained industrial due to the large numbers of rail cars, as well as the M&StL shops at the base of the Kenwood bluff. This view persisted to the 1980s when the rail facilities were gradually removed (Figure 29).


Figure 21. End of 12th Street Bridge abutment and beginning of historic stone masonry retaining wall extending to Glenwood on east/southeast side of corridor, August 2017



Figure 22. Historic stone masonry retaining wall east of Glenwood on east/southeast side of corridor, August 2017



Figure 23. Bluff west of 12th Street on west/northwest side of corridor, August 2017



Figure 24. Bluff on west/northwest side of corridor between 12th Street and Glenwood, which has never been developed, with timber wall remnants on the right, August 2017



Figure 25. Cedar Lake Trail looking northeast towards Target Field from under the 12th Street Bridge, August 2017



Figure 26. Looking west from Glenwood showing trail and location of LRT embankment and bridge next to tracks, August 2017



Figure 27. 1950 aerial view showing Wayzata Boulevard (left), Great Northern corridor (center and right), and Cedar Lake (far right). The railroad corridor can be seen extending to downtown Minneapolis (center rear) (Norton & Peel photograph, Minnesota Historical Society)

Section 4: Assessment of Effects

Assessing Effects on Historic Properties

The criteria that must be used to assess effects of Federal undertakings on historic properties that are listed in or are eligible for listing in the NRHP is set forth in 36 CFR § 800.5(a)(1):

An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative.

An adverse effect can occur if any aspect of a historic property's integrity is diminished. Examples of adverse effects are identified in 36 CFR § 800.5(a)(2) and include, but are not limited to:

Physical destruction of or damage to all or part of the property;

Alteration of a property that is not consistent with the Secretary of the Interior's (SOI's) Standards for the Treatment of Historic Properties (36 CFR § 68) and applicable guidelines;

Removal of the property from its historic location;

Change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance;

Introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features;

Neglect of a property that causes its deterioration; and

Transfer, lease, or sale of property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance.

It is important to note that just because an undertaking may have an effect on a historic property it does not necessarily constitute an adverse effect. For example, project elements may be visible from a historic property without the effect rising to the level of an adverse effect. In this example, factors to consider when assessing whether the visual effect is adverse would include proximity of project components to the historic property, the nature of the element being introduced to the setting, the significance of the views to and from the

historic property, and the overall importance of integrity of setting to the historic property's ability to convey its significance and maintain its eligibility for the NRHP. Direct effects, however, are often more likely to result in an adverse effect due to the actual physical changes they often cause to a historic property, although one notable exception is rehabilitation projects completed in accordance with the *SOI's Standards*.

Effects Assessment and Effects Findings for the StPM&M / GN Historic District

The only historic property within the Project's architecture/history and archaeological APEs that will be affected by the proposed Project design modifications is the StPM&M / GN Historic District. Therefore, in accordance with MOA Stipulations II and III, MnDOT CRU reviewed the Preliminary Plans for the proposed design modifications and applied the criteria of adverse effect in accordance with 36 CFR 800.5(a). Reference materials utilized in assessing effects of the proposed Project design modifications on the StPM&M / GN Historic District, but not included in the body of this report, are summarized in Table 2.

Title	Abbreviation Key		
Materials Previously Reviewed under the MOA			
Southwest Light Rail Transit Civil Construction: February 8, 2017 (100% Plans)			
Volume 1: Existing Conditions and Removals	Civil Vol. 1		
Volume: 2B: Civil	Civil Vol. 2B		
Volume: 3B: Trackwork	Civil Vol. 3B		
Volume: 4G: Bridges	Civil Vol. 4G		
Volume: 6: Retaining Walls	Civil Vol. 6		
Volume: 8B: Drainage	Civil Vol. 8B		
Volume 13A: Cross Sections	Civil Vol. 13A		
Proposed Project Modifications Materials			
Southwest Light Rail Transit: Typical Cross Sections Comparison: 100% Plans and BNSF Project Modifications – StPM&M / GN Historic District	PPM TCSC		
Southwest Light Rail: Existing Trail Design and Proposed Trail Design with Realigned Northstar Tail Track, 08/07/2017PPM E&P Trail+Tail Track			
Southwest Light Rail: BNSF Wayzata Subdivision Structural Scope for Work Exhibit (Excludes Corridor Protection Barrier to Bryn Mawr), 8/21/2017	PPM SSW		
Southwest Light Rail Transit: BNSF Project Modifications – PPM RTW Retaining Walls, 10/16/2017			

Table 2. Reference Key – Assessment of Effects

Original Assessment of Effect Finding

When FTA issued its final determination of effect for the Project on November 10, 2015, which was based on the Project's 60% Plans, it made the following finding regarding the StPM&M / GN Historic District (the effects considered are summarized in the first paragraph of the finding):

Effects from the Project on the StPM&M / GN Historic District include alterations to the corridor, a minor alignment shift of a short segment of the line, introduction of LRT infrastructure into the corridor, property acquisition, and potential development/redevelopment catalyzed by the Project adjacent to the line around the Van White Station. The Project will permanently acquire and incorporate, either through fee title purchase or easement, approximately 1.53 acres of property from the historic StPM&M / GN Historic District. However, this land will remain in a rail-related use and not otherwise be infringed on by incompatible development. Approximately 5.42 acres will be temporarily occupied for construction access.

North of Lyndale Avenue, the depressed grade separation in which the railroad line is located that extends northeasterly along the corridor through the Minneapolis Warehouse Historic District will be widened approximately 20–25' into the earthen embankment on either side to accommodate LRT. Along one section of the railroad line, beginning near I-94 to approximately Royalston Avenue (a total length of 2,543'), the existing BNSF main line track will be shifted from 0–11' northward within the historic right-of-way. BNSF freight rail operations will also continue. LRT tracks, the overhead power system, a TPSS, and signal bungalows will also be constructed in the corridor. Several bridges will be constructed near stations and across the StPM&M / GN Historic District to provide pedestrian access across the corridor.

At the east end of the Penn Avenue Station, a pedestrian bridge will extend northwest over the Historic District to connect with a passenger drop-off area at South Wayzata Boulevard. At the west end of the Van White Station, an existing pedestrian bridge will be removed and replaced by a new pedestrian bridge that will extend northwest over the Historic District to connect with the Luce Line Regional Trail. Within the depressed grade separation, between the Interstate 394 and North 12th Street bridges over the trench, a new, approximately 900'-long light rail bridge will be constructed to cross Glenwood Avenue at-grade and then carry the light rail tracks over the existing railroad tracks between Glenwood Avenue and North 12th Street. As part of this, the existing vehicular bridge that carries Glenwood Avenue over the trench will be replaced with two new vehicular bridges that will tie into the light rail bridge. The light rail bridge and its western approach will be located within the StPM&M / GN Historic District, in the widened portion of the grade-separation trench. The proposed widening of the corridor, rail alignment shift, and introduction of LRT-related infrastructure are generally compatible with the character of the historic district and will change only a relatively short segment within the linear railroad resource, which extends to the western border of Minnesota. The continuity of the linear resource will be maintained and the alignment shift will remain within the historic corridor. The slight alignment shift of the railroad, the introduction of LRT infrastructure, and property acquisition will slightly alter the feeling of this short segment of the overall district, but will not diminish its overall historic integrity, or its ability to convey its significance.

Portions of the historic district are located within a quarter mile of the Penn, Van White, and Royalston stations. A station area planning study indicated that there is strong potential for the Project to catalyze development/redevelopment around these stations. Development catalyzed by the Project would change the setting of historic district as it passes through the areas of redevelopment. However, these areas are already developed and redevelopment will not diminish the ability of the historic district to convey its historic significance.

To minimize effects on the StPM&M / GN Historic District, which will also minimize visual effects on the Osseo Branch of the StPM&M / GN Historic District (see Section 7.1.15), the Project will design Project elements within and adjacent to the StPM&M / GN Historic District in accordance with the *SOI's Standards.* The project will also continue to consult with MnSHPO and other consulting parties on the design of the alterations to Kenilworth Lagoon and Cedar Lake Parkway to confirm compliance with the *SOI's Standards.* Therefore, with implementation of these measures, which will be documented in the Section 106 MOA, a finding of No Adverse Effect has been made for the StPM&M / GN Historic District (FTA et al. 2015).

Assessment of the Proposed Project Design Modifications

The effects of the proposed Project design modifications on the StPM&M / GN Historic District include both direct and indirect effects to an approximately two-mile-long segment of the approximately 205-mile historic district. The segment subject to the proposed design modifications extends from approximately BNSF Mile Post (MP) 11.6, just south of the 10th Street Bridge, to approximately MP 13.3, just west of Cedar Lake Junction (visual effects extend beyond these limits). The proposed design modifications within and in the vicinity of the StPM&M / GN Historic District include design changes to previously approved Project elements, additional alterations and additions to the historic district within a historic cut that extends from just north of 12th Street North to Lyndale Avenue, and the introduction of an additional CPB Wall from just east of I-94 to the Project's Bryn Mawr Station. The new CPB Wall will increase the total length of continuous CPB (walls and pier protection) in the corridor from approximately 1,136' (0.22 miles, not including the pier protection under the I-394 and Luce Line Trail bridges) to approximately 7,105' (1.35

miles; includes pier protection for I-394 and Luce Line Trail bridges) in length. The height of the CPB Walls will also increase from a minimum of 6' above the railhead to 7.5' above the railhead (approximately 10' above grade) on the freight rail side of the walls (visible height on the LRT side will vary). These design changes are subject to MOA Stipulation I.A, which requires all Project elements within and in the vicinity of the StPM&M / GN Historic District be designed in accordance with the *SOI's Standards* in order to minimize effects and avoid adverse effects on the historic district. Each design modification is evaluated below for adherence to the *SOI's Standards*. If an element does not meet the *SOI's Standards*, an assessment of effects is presented based on the criteria for an adverse effect described in 36 CFR 800.5(a) (Civil Vols. 3B and 6; PPM TCSC; PPM RTW).

The addition of the Northstar tail track to the historic district on the present alignment of the Cedar Lake Trail generally meets the *SOI's Standards*. Throughout the period of significance there were multiple sidings and spurs within the historic district and its immediate setting between 7th Street North and Lyndale Avenue. Therefore, extending the tail track will introduce a new element to the district that is in keeping with its historic character. The new track will be in the same general location as track that existed during the period of significance, but will be constructed with heavy rail and concrete ties, which will differentiate it from track that would have existed during the period of significance. Thus, it meets the *SOI's Standards*, which require new work be differentiated from the old, but compatible with the historic materials, features, size, scale and proportion, and massing to protect the integrity of the property and its environment (C.M. Foote & Co. 1892; GN 1930; GN 1940; Civil Vols. 3B and 13A; PPM TCSC; PPM E&P Trail+Tail Track; PPM SSW).

The drainage modifications include below ground drainage and ditches along the tracks and trail. Both were included in the Project's 60% Plans upon which FTA issued its final determination of effect for the Project on November 10, 2015. The design modifications to the below ground drainage will not be visible, so it will not alter the visual character of the historic district and its setting. Drainage ditches are a common and necessary feature found along the entirety of the historic district, providing necessary drainage to drain water away from the railroad tracks in the district. The proposed design modifications to the Project's ditch designs are generally consistent with the designs included in the Project's 60% Plans in terms of profile and section, so they are not a substantive change. The designs are also compatible with the design of ditches found throughout the historic district. Therefore, they meet the SOI's Standards that require new construction to be "compatible with the historic materials, features, size, scale and proportion, and massing to protect the integrity of the property and its environment." During much of the period of significance, two StPM&M / GN main line tracks were located in the historic district. The drainage modifications will also allow space for the potential reconstruction of a second BNSF main line track in the historic district in the future, which meets the SOI's Standards that allow for the replacement of missing historic features (Civil Vols. 8B and 13A; PPM TCSC).

Extension of the Northstar tail track necessitates the relocation of the existing Cedar Lake Trail to the south/southeast from approximately 12th Street North to Lyndale Avenue. The relocation of the trail will increase the limits of disturbance into the embankments lining

the historic railroad cut in the vicinity of 12th Street North. The trench and the feeling of enclosure provided by the edges is an important character defining feature of the railroad corridor in the area between 12th Street North and Lyndale Avenue. The proposed Project modifications include the removal of several historic retaining walls along both sites of the tracks that date from the period of significance and are contributing elements of the historic district. On the southeast, there is a historic formed concrete retaining wall east of 12th Street North, with a secondary wall at the top of the bluff. Between 12th Street North and Glenwood Avenue, on both sides of the tracks, there are contributing. The wall on the east/southeast side of the cut a fully intact stone masonry wall that likely dates to the 1880s, while there are scattered remnants of a heavy timber wall on the west/northwest side of the corridor. The historic walls will be replaced with new retaining walls that will be set back from the historic retaining walls, thus altering (widening) the width of the historic cut. Retaining walls will also be added to partially replace contributing historic earthen embankments dating from the late 1860s or 1870s that are covered with vegetation, further altering the historic character of the historic district in this area. The destruction of the historic retaining walls also does not meet the SOI's Standards which recommend that "the replacement of intact or repairable historic materials or alteration of features, spaces and spatial relationships that characterize a property will be avoided" and that "new construction will be undertaken in such a manner that, if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired." The widening of the historic cut and the introduction of taller, modern concrete retaining walls that will replace historic stone and concrete walls and vegetated earthen embankments will also change the character of this segment of the historic district, thus further diminishing the ability of this segment of the historic district to convey its integrity of design, workmanship, setting, feeling, and association. The further widening of the trench also does not meet the SOI's Standards, which requires that a new use require only "minimal change to its distinctive materials, features, spaces, and spatial relationships." While moving Retaining Wall E412 outside the historic district could be seen as minimizing the impacts of the new wall, because the spatial relationships of the trench are an important character defining feature of the historic district in the vicinity of 12th Street North, placing it outside the boundaries alters the spatial relationships of the trench, so in the future it will feel larger than it was historically. Moreover, the clear boundaries and setting of the historic district in this area, which are defined by the trench, will no longer be clearly defined. Collectively, these modifications to the Project will result in the physical destruction of contributing features of the historic district and will, therefore, adversely affect the integrity of design, workmanship, setting, feeling, and association of this section of the historic district (Civil Vols. 1, 2B, 3A, 8B and 13A; PPM TCSC; PPM E&P Trail+Tail Track, PPM SSW; PPM RTW).

Bridge R0697 (LRT over BNSF) and Bridges 27C16 and 27C17 (Glenwood Avenue Bridges) were included in the Project's 60% Plans upon which FTA issued its final determination of effect for the Project on November 10, 2015. When FTA reviewed the Project's 100% Plans for civil construction on February 28, 2017, it found that the design for these bridges meets the *SOI's Standards* as required by MOA Stipulation I.A. The proposed modifications to these bridges including minor design changes, such as heavier pier designs, slightly

adjusted pier spacing of two piers, modification to a barrier section on the deck and increasing a railing height to match other railings, and adding a section of pier protection. The design changes to these bridges are minor, meet the *SOI's Standards*, and are not a substantive change that would result in a change of effect to the StPM&M / GN Historic District. However, as noted above the required related work also necessitates the removal of historic retaining walls that contribute to the historic district, which will adversely affect the historic integrity of design, materials, workmanship, setting, feeling, and association of the StPM&M / GN Historic District in this area (Civil Vol. 4G; PPM SSW).

The last major element of the proposed design modifications is the introduction of approximately 5,582' of new CPB Wall (includes pier protection under the Luce Line Trail Bridge [15.5'], but not the 387' of pier protection under the I-394 Bridges) along the Project alignment from a point approximately 294' west of the I-94 bridge, where it will connect with Retaining Wall E404, westward to the Project's Bryn Mawr Station near Cedar Lake Junction. The majority of the CPB Wall will be constructed within the boundaries of the StPM&M / GN Historic District, between the LRT tracks and the BNSF main line track. At a minimum the top of the CPB Wall will be 7.5' above the top of rail on the BNSF main line track, or 10.8' above grade. Due to differences in the elevations of the freight rail and LRT alignments, on the LRT side, at a minimum the top of the CPB Wall will be 5.5' above the LRT railhead, or approximately 8.7' above grade (PPM TCSC).

Along the entirety of the segment of the StPM&M / GN Historic District and its setting where the CPB Wall is proposed to be constructed, the historic district and portions of its setting are characterized by open areas with very flat topography where multiple tracks and other rail-related shops and industries were located. This condition existed throughout the period of significance. The open spaces include most of the StPM&M / GN right-of-way as well as the M&StL right-of-way that was co-located within the same railroad corridor and is an important character defining feature of historic district's setting between 3rd Street North and Cedar Lake Junction in Minneapolis. The introduction of the CPB Wall to the historic district will change physical and spatial relationships of the BNSF main line with other physical features of the overall railroad corridor, both within the historic district and its setting. It will also create a visual element that diminishes the integrity of the property's significant historic features. More specifically, the introduction of the CPB will create a physical as well as a visual barrier between the main line track and historic yards that are also contributing elements to the historic district, thereby diminishing the ability of the segment of the historic district in which the CPB Wall is located from being able to convey its magnitude and function, as well as the association of the main line tracks with their associated yards and the M&StL main line and yards that are also important features of the historic district's setting. Thus, the introduction of the CPB Wall to the historic district will both directly and indirectly alter characteristics of a historic property that qualify it for inclusion in the National Register in a manner that would diminish the integrity of the property's design, setting, feeling, and association. Therefore, the construction of the CPB Wall will result in an additional adverse effect to the StPM&M / GN Historic District (Civil Vols. 3A, 6, and 13A; PPM TCSC; PPM E&P Trail+Tail Track).

Project Determination of Effect

Based on the results of the assessment of effect analysis conducted by MnDOT CRU under delegation from FTA, which is documented above, *FTA has found that the Project will now have an Adverse Effect on the StPM&M / GN Historic District*. Therefore, in accordance with MOA Stipulation III, FTA will consult with MnHPO and concurring parties to the MOA to prepare a mitigation plan to resolve the adverse effects. In addition, as required by MOA Stipulation I.A., FTA will direct the Council to design proposed changes to Project elements in accordance with the *SOI's Standards* to help minimize the adverse effects of the Project modifications on the StPM&M / GN Historic District.

When FTA issued its final determination of effect for the Project in 2015, it found that the Project would have an adverse effect on historic properties. As such, the new adverse effect finding for the StPM&M / GN Historic District will not change FTA's final determination of effect for the Project.

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Appendix B 2013 Royalston Station/Interchange Project Connection Technical Issue Resolution





Royalston Station/Interchange Project Connection (TI-20)

DRAFT Technical Issue Resolution Analysis September 2013





Royalston Station/Interchange Project Connection (TI-20)

DRAFT Technical Issue Resolution Analysis

Prepared By

Reviewed By



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Executive Summary

This Technical Memorandum summarizes the evaluation of the Southwest Light Rail Transit (SWLRT) connection to The Interchange, including the crossing of the SWLRT alignment at 7th Street, the alignment configuration of SWLRT within the Royalston Avenue right-of-way (ROW), and the location of the Royalston Station platform.

The results of this analysis were used to determine the preferred alignment along this segment of the project. The preferred alignment and station details will be further refined as the project advances through Final Design. The major decisions and design components of the alignments are described below.

Connection of SWLRT to The Interchange

The connection of SWLRT to The Interchange and the crossing of 7th Street are critical in terms of light rail transit (LRT) and traffic operations, and visual impacts. Coordination between SWLRT and Bottineau LRT alignments yields several possible configurations for connecting both systems to The Interchange.

The current design of The Interchange plans for SWLRT to cross over 7th Street on an LRT bridge which allows the future Bottineau LRT to cross under SWLRT before crossing the intersection of 7th Street/Olson Memorial Highway at-grade. Two other options were studied. One option has SWLRT crossing 7th Street at-grade with Bottineau LRT grade separate with a bridge, and the other option is to have both SWLRT and Bottineau LRT cross at-grade (either sharing two tracks or with four tracks).

The analysis of these alternatives considered LRT operations, structural design criteria, constructability, traffic operations, and visibility. It was determined that the preferred option for connection to The Interchange includes SWLRT crossing over 7th Street on an LRT bridge and the future Bottineau LRT to cross at-grade. This configuration accommodated the design of The Interchange, which is currently under construction. LRT operations and infrastructure investments made at The Interchange benefit the existing Blue line and Green line. This configuration is the most constructible of the grade separated options. Traffic impacts are also minimized with this configuration compared to the other options studied.



Preferred Connection to The Interchange



Alignment of SWLRT on Border Avenue

Border Avenue was studied as a potential alternative alignment for SWLRT from The Interchange to Holden Street. The primary reason this alignment was studied as an alternative was to locate the station closer to the Farmer's Market on Border Avenue between 3rd and 4th Avenue.



Proposed Border Avenue Alignment

The analysis of the Border Avenue alignment considered LRT operations, roadway configurations, and traffic operations. It was determined that Border Avenue is not a feasible alignment option for SWLRT. The capacity of LRT operations is significantly reduced from the currently planned configuration. Also, failing traffic operations would be expected according to the 2030 peak hour traffic models at the intersection of 7th Street and Olson Memorial Highway. The limited ROW on Border Avenue would reduce the travel lane to 16 feet in one direction, and eliminate the existing on-street parking. The narrow roadway would restrict turning movements and access to adjacent properties. Additional ROW would need to be acquired to accommodate the station platform on Border Avenue.

Alignment of SWLRT on Royalston Avenue

The location of the SWLRT alignment within the ROW of Royalston Avenue affects traffic operations, roadway configurations and property access, platform location and pedestrian access, bus access, utilities, and



visibility. Four candidate alignment configurations were developed, which were labeled: Center, West Side, East Side, and Modified East Side. See Appendix D, Exhibits 6, 7, 8, and 9.

The analysis of these alignment alternatives considered LRT operations, roadway configurations, traffic operations, cultural resources, existing property access and turning accommodations, and visual impacts. It was determined that the Modified East Side alignment on Royalston Avenue is the preferred location for SWLRT. This alignment maintains access to the existing properties on the west side of Royalston Avenue and provides the greatest turning accommodations for trucks accessing local businesses. Potential for on-street parking is provided in the southbound direction. The side platforms for LRT allow for the most efficient use of the ROW and provide good pedestrian access. The horizontal shift in the LRT bridge at the corner of 7th Street and Royalston Avenue reduces the visual impact to the Sharing and Caring Hands building. See Appendix E for Turning Templates.



Preferred Royalston Modified East Alignment

Platform Location on Royalston Avenue

The location of the LRT platform within the Royalston Avenue ROW was studied, and two locations were determined to be the most feasible. The first location has two side platforms on the east side of the Royalston Avenue ROW located just north of the curve on Royalston Avenue near Holden Street. The second location has two side platforms located on the diagonal immediately south of a reconstructed Royalston Avenue/Holden Street intersection (centered over existing Holden Street).



The analysis of these platform locations considered platform visibility, pedestrian and bus access, roadway configuration, right-of-way impacts, traffic operations, and the connection of SWLRT to the existing rail corridor near Glenwood Avenue. It was determined that the first location with two side platforms on the east side of the Royalston Avenue ROW located just north of the curve on Royalston Avenue is the preferred location for the Royalston Avenue platform.



Preferred Royalston Station Platform Location



Connection of SWLRT to Existing Rail Corridor

From Royalston Avenue, the SWLRT alignment curves into the existing BNSF rail corridor near Glenwood Avenue. The alignment described by the Draft Environmental Impact Statement (DEIS) showed SWLRT crossing through Holden Street west of the intersection with Royalston Avenue resulting in closure of Holden Street. The DEIS alignment then descends from Royalston Avenue until it reaches the BNSF rails at-grade and then crosses underneath the existing Glenwood Avenue bridge. The DEIS alignment posed several challenges, including the necessity to relocate the existing BNSF tracks from the western span to the eastern span of the Glenwood Avenue bridge so that SWLRT could occupy the eastern span. This requires a LRT flyover bridge west of I-94 to cross the BNSF tracks. There are also impacts to the Cedar Lake Trail and Bassett Creek Tunnel at the Glenwood Avenue bridge.

An alternative alignment crosses through Holden Street at-grade and then crosses over the existing BNSF tracks on a new bridge structure. It continues from the bridge onto elevated retained embankment within the existing rail corridor. The alignment then crosses through Glenwood Avenue at-grade between two new single-span bridges on either side of the SWLRT structure. The new western bridge spans the existing BNSF rail and a future freight rail line, and the new eastern bridge spans the Cedar Lake Trail. The profile of SWLRT then descends to match grade prior to crossing under the existing I-94 bridge. This alignment eliminates the need for the LRT flyover bridge over the BNSF tracks west of I-94 and eliminates impacts to the Cedar Lake Trail and Bassett Creek Tunnel. This alignment has been determined to be the preferred option for SWLRT.



I. Background and Analysis Objectives

The objective of this Technical Memorandum is to identify the alignment and platform location for the Royalston Avenue Station between The Interchange and the existing freight rail corridor.

This Technical Memorandum summarizes the evaluation of the Southwest Light Rail Transit (SWLRT) configurations at The Interchange, including the crossing of the SWLRT alignment at 7th Street, the alignment of SWLRT within the Royalston Avenue right-of-way (ROW), and the location of the Royalston Station platform. These configurations were evaluated to determine if other options provide advantages over the alignment shown in the Draft Environmental Impact Statement (DEIS) Locally Preferred Alternative (LPA).

The alternatives considered were developed and refined in a series of meetings between March 2013 and August 2013 with an Issue Resolution Team assembled for this segment of the project. The Issue Resolution Team was led by the SWLRT Project Office (SPO) and involved representatives from the City of Minneapolis, Hennepin County, Minneapolis Park Board, and consulting staff.

Section II of this document describes the three alignments that were evaluated for SWLRT between the location east of the Van White Station and The Interchange. Section III summarizes the fundamental differences of each of the three alignments and provides a basis for decision making. The appendices provide the technical comparisons and background analysis used to evaluate the various components of each alternative.

The results of this analysis were used to determine the preferred alignment along this segment of the project, as well as the preferred Royalston Station Platform location. The preferred alignment will be further refined as the project advances through Final Design.



II. Issue Description and Analysis

This section addresses the Royalston Station/Interchange Project Connection issue area (TI-20) by comparing three possible alignments for SWLRT and their associated station locations from The Interchange to the crossing of I-94. The advantages and disadvantages of each of these three alignments will also be discussed.

1. Alignment 1: SWLRT Grade Separated Over 7th Street

Royalston Center Location, Grade Separated under Glenwood Avenue (LPA Modified)

In the DEIS, the SWLRT LPA begins westward at Pier 9 of The Interchange and is identified as a grade separated alignment under 7th Street as a tunnel. The alignment then turns south running above 5th Avenue in the center of the Royalston Avenue right-of-way (ROW). The Royalston Station is a center platform on the southern end of Royalston Avenue just prior to the horizontal curve on Royalston near Holden Street. From the station, the alignment continues south through Holden Street and down into the existing BNSF rail corridor, crossing under the existing bridge at Glenwood Avenue before crossing under I-94. Between I-94 and Van White Memorial Boulevard, the light rail transit (LRT) alignment crosses the BNSF tracks via a flyover bridge.

After the LPA was identified, The Interchange project was implemented and changed the track alignment between Target Field Station and 7th Street. The change involved elevating SWLRT on a bridge over 7th Street to connect to The Interchange. Because the LPA as identified in the DEIS, is not compatible with the current design of The Interchange, we have modified the LPA to be grade separated over 7th Street. Our analysis is based on the LPA Modified alignment. See Appendix A.

1.1 SWLRT Alignment and Operations

Refer to **Exhibit 1** in Appendix D for the track alignment.

The LPA Modified configuration has SWLRT occupying Tracks 1 and 2, and Bottineau LRT occupying Tracks 3 and 4 at The Interchange. The SWLRT alignment continues as a grade separated bridge over 7th Street as it turns south on Royalston Avenue. The grade separation of SWLRT and Bottineau LRT near The Interchange allows both systems to operate at as much as 7.5 minute headways in both directions. Additional connections at The Interchange and 7th Street crossing alternatives were evaluated as part of this study. See Appendix A for a discussion and comparison of those alternatives.

The SWLRT elevated bridge structure enters the Royalston Avenue ROW at the center median and crosses over 5th Avenue to the bridge abutment, located just south of 5th Avenue. The profile then transitions down to grade in the center median of Royalston Avenue. The alignment continues in the center median, where the station is located near the southern end of Royalston Avenue. The alignment on Royalston Avenue allows for 15 mph SWLRT operations. See Appendix B for a detailed discussion of SWLRT alternative alignment configurations on Royalston Avenue. The alignment continues directly south, and begins to cut into the existing grade as it approaches Holden Street. Holden Street is closed at Royalston Avenue as the SWLRT alignment is approximately 10 feet- 8 inches below existing grade.

The SWLRT alignment continues to drop in grade as it makes a 25 mph curve into the existing BNSF rail corridor under Glenwood Avenue. The two SWLRT tracks occupy the western span under the Glenwood Avenue bridge, and the existing BNSF rail is relocated to the eastern span of the bridge with the Cedar Lake Trail. The alignment continues southwest and crosses under the existing I-94 bridge.

1.2 Platform Location, Pedestrian Access, and Bus Access

Refer to **Exhibit 3** in Appendix D for access information.



The station has a center platform located just north of the curve on the Royalston Avenue center median. Pedestrians would access the station at-grade from 5th Avenue from the north, and from a new at-grade crossing on Royalston Avenue just south of the platform. Walking distance from the SWLRT platform to the Farmer's Market is approximately 1,430 feet, and walking distance from Target Center to the platform is approximately 2,440 feet.

The site is to be served by five bus routes—5, 19, 22, and 755 on 7th Street with projected stops in each direction at 5th Avenue and 7th Street, with intersections potentially signalized for pedestrian movements. The walking distance to the bus stops for routes on 7th Street is approximately 760 feet. Route 9 runs east and west on Glenwood Avenue and has stops at the corner of Glenwood Avenue and 12th Street. This platform is located approximately 915 feet from the bus stops for Route 9.

1.3 Roadway Configurations/Right-of-Way

The existing ROW of Royalston Avenue is 100 feet wide as shown in the existing typical section in Figure 1-1.



Figure 1-1: Existing Typical Section on Royalston Avenue

The proposed SWLRT alignment in the center of Royalston Avenue is mostly within the existing ROW as shown in the proposed typical section in Figure 1-2, and maintains all access to existing property adjacent to Royalston Avenue. Additional ROW is required near the southern end of Royalston Avenue from the Two Couples, L.L.C. parcel on the west to accommodate the roadway and sidewalk alignment changes.

Royalston Avenue becomes a divided 2-lane road with no on-street parking and 16 foot travel lanes in each direction. New sidewalks are on both sides of Royalston Avenue at the edge of the ROW. While property access is maintained for the businesses on Royalston Avenue, vehicle turning accommodations are limited due to the reduced pavement width and the shift of the curb towards the edge of the ROW. The roadway configurations associated with each of the alternative alignment locations is discussed in further detail in Appendix B.

Access between Royalston Avenue and Holden Street is severed due to the necessary change in grade and subsequent retaining walls required for SWLRT. Holden Street has an existing 60 foot ROW. To maintain Border Avenue and Holden Street south of 3rd Avenue, a cul-de-sac would be constructed and additional ROW would need to be acquired. One property access on Holden Street would require closure.







1.4 Freight Rail

With this alignment of SWLRT, the BNSF track must be relocated to the eastern span of the Glenwood Avenue bridge. The access road for BNSF would be located between the BNSF track and LRT tracks.

1.5 Traffic

The intersections near the Royalston Station were modeled using the software VISSIM. Intersection counts from 2011-2013 were used with the new downtown signal timings and a 0.5% growth rate per year. The 2030 AM and PM peak hours were modeled using 3-car trains for SWLRT and Bottineau LRT at 7.5-minute headways.

For this alignment, the LRT mid-block crossings were controlled by gates on Royalston Avenue and Holden Street. Gate down times of 45 seconds (one 3-car train) to 80 seconds (two 3-car trains) were used. These mid-block crossings were blocked about 20% of peak hours. The results of the analysis are shown in Table 1-1.

	2030 AM Peak		2030 PM Peak	
	Olson Memorial Highway/ Border Ave/ Oak Lake Ave	Olson Memorial Highway/ 6 th Ave/ 7 th St	Olson Memorial Highway/ Border Ave/ Oak Lake Ave	Olson Memorial Highway/ 6 th Ave/ 7 th St
No Build	A	С	В	D
Southwest At-Grade Bottineau Grade Separated	D	E	С	Е
Southwest Grade Separated Bottineau At-Grade	С	E	В	D

Table 1-1: Traffic Impacts (Level of Service)



Level of Service (LOS) is a qualitative indication of traffic operations defined in the Highway Capacity Manual in terms of letter grades A through F. LOS A indicates free flow conditions while LOS F represents breakdown conditions with extreme delay, where the traffic volume exceeds the capacity of the roadway or intersection. LOS D or better is generally considered acceptable for peak hours in urban areas.

This study shows that the intersections studied function acceptably; however, mitigation would be needed at the intersection of 7th Street/6th Avenue/Olson Memorial Highway to achieve LOS D operations with Bottineau LRT crossing at-grade. Average vehicle delays experienced through the network were 30-40 seconds per vehicle. Preemption of the Royalston Avenue/Glenwood Avenue signal is not necessary.

1.6 Structures

The elevated bridge structure across 7th Street extends to the elevated structure of The Interchange on a curved alignment across 7th Street and matches into the center median of Royalston Avenue. Starting at Pier 9 of The Interchange, Unit 1 of the bridge will span past the Hennepin Energy Recovery Center (HERC) driveway in similar fashion and material as The Interchange Bridge R0646. Bridge Unit 1 will be comprised of prestressed concrete beams. Just west of the HERC driveway, the bridge will transition to a horizontal curved alignment. The curved bridge, Unit 2, is suited to be either curved steel girders or a concrete box girder design. With the available clearance over 7th Street in excess of 16 feet -4 inches, the concrete box girder has been selected as Unit 2 of the bridge and would be constructed on temporary structures called falsework. The box girder section allows clear-spanning 7th Street with piers located behind the sidewalks on both sides of the roadway. The box girder continues to the north side of 5th Avenue where the structure transitions to Unit 3, a slab-span type structure that allows for an adequate vertical clearance of 14 feet - 6 inches for 5th Avenue. The south side of the slab-span is where the bridge ends at its abutment.

Beyond the abutment location, retaining walls on each side of the track bed will descend south until the existing grade is reached. Shortly thereafter, the station is located in the center median of Royalston Avenue.

Continuing beyond the LRT station, the alignment descends into the freight rail corridor and passes beneath the Glenwood Avenue bridge. Through the descent, retaining walls will be required.

The horizontal arrangement under the Glenwood Avenue bridge could be one of two scenarios, either freight and LRT occupy the space between the west abutment and the pier or LRT occupies from the west abutment to the pier and BNSF occupies from the pier to the east abutment. If the pier of the existing bridge is held constant, and the BNSF and LRT tracks pass to the west of the pier, the west abutment would need to be relocated further to the west. The span from the new west abutment to the existing pier would be longer and would require a deeper beam depth. With the superstructure of the existing Glenwood Avenue bridge being continuous steel beams, the entire deck of the bridge would require replacement. Assuming the profile grade of Glenwood Avenue is held constant (due to its already steep grades), the deeper beam depth would decrease the vertical clearance to the tracks below. This would adversely infringe on the bridge clearance to the tracks. For this reason, the horizontal arrangement places LRT west of the pier and BNSF to the east of the pier.

The LPA Modified alignment does not adequately address the space constraints under the Glenwood Avenue bridge. The horizontal clearances of the freight and LRT alignments to fixed objects such as abutment faces and piers, along with the horizontal clearances between the various tracks does not physically fit through the substructures (abutments and piers) of the existing bridge. Additionally, the relocated BNSF tracks would require lowering the grade under the Glenwood bridge to achieve vertical clearances for the freight rail. This has implications for the Bassett Creek tunnel which runs directly under the relocated rail, and would require further structural evaluation.

Beyond the I-94 bridge, the SWLRT alignment crosses the BNSF tracks via a flyover bridge. This structure would need to clear the BNSF tracks both horizontally and vertically.

Refer to Figure 1-3 for the section at the Glenwood Avenue bridge.



1.7 Regional Trails

The existing Glenwood Avenue bridge has two spans. This SWLRT alignment would consume the space in the western span, while the eastern span would be occupied by the relocated BNSF freight rail and the Cedar Lake Trail or a future rail line.

1.8 Constructability

This configuration, with SWLRT occupying Tracks 1 and 2, and Bottineau LRT occupying Tracks 3 and 4 at The Interchange, works well with the anticipated sequencing of construction. Tracks 1 and 2 would be built elevated for SWLRT prior to construction of Tracks 3 and 4 for Bottineau LRT. This allows Bottineau LRT to build the at-grade alignment adjacent to and underneath the elevated SWLRT. The elevated SWLRT bridge over 7th Street would have traffic impacts during construction as 7th Street and Royalston Avenue would require restricted traffic lanes or intermittent closures during construction.

Fifth Avenue from 7th Street to Royalston Avenue would be temporarily closed during the construction of the elevated SWLRT bridge. The construction of the rails and center platform on Royalston Avenue would be limited to the existing median, but on-street parking would be eliminated during construction to allow for a shift in traffic and construction access. Southbound Royalston Avenue would require temporary closure during construction of the at-grade crossing of LRT on the southern end of Royalston Avenue.



Figure 1-3: LPA Modified Typical Section at Glenwood Avenue Bridge

1.9 Visual Impacts

The elevated bridge structure from The Interchange across 7th Street will have a moderate visual impact to the Sharing and Caring Hands building at the corner of 7th Street and Royalston Avenue. The edge of the bridge structure is approximately 51 feet from the building. A detailed analysis of the visual impacts of all alternative alignments is found in Appendix B.



1.10 Utilities

Existing utilities along the alignment will be impacted and require relocation. This includes both public and private utilities. Each of the three main alignment alternatives has various utility impacts; many of the impacts are common to all three alternatives. For a complete list of utility impacts for this alignment refer to Appendix B.

Impacts unique to this alignment of SWLRT are listed in the table below.

Sanitary Sewer	Reconstruct 80 feet +/- of 15 inch VCP and one manhole at 5 th Avenue and Royalston Avenue to relocate existing manhole outside of utility free zone
Centerpoint Energy	Relocate 900 feet +/- of 6 inch gas main between 6 th Avenue and Holden Street

1.11 Environmental Considerations

The alignment of SWLRT from The Interchange to I-94 has minor risks of necessary environmental mitigation measures. There is a moderate risk of encountering contaminated soil. An archeological Phase II evaluation is planned for this area. There is a potential archeological site under the northbound lanes of Royalston Avenue south of 5th Avenue that would have a moderate risk of being impacted by the project.


2. Alignment 2: SWLRT Grade Separated Over 7th Street

Royalston Modified East Location with East Side Platform, Glenwood Avenue At-Grade

This SWLRT alignment option begins at Pier 9 of The Interchange and crosses over 7th Street on a grade separated bridge. The alignment then turns south running in the center of the Royalston Avenue ROW until 5th Avenue, where it transitions to the east side of Royalston Avenue. The Royalston Station has side platforms at the southern end of Royalston Avenue just prior to the horizontal curve on Royalston Avenue near Holden Street. From the station, the alignment continues south through the intersection of Royalston Avenue and Holden Street and then over the BNSF tracks on a new bridge, crossing Glenwood Avenue at-grade before transitioning down into the existing rail corridor to be at-grade to cross under I-94.

2.1 SWLRT Alignment and Operations

This alignment has the same configuration for the connection to The Interchange and crossing of 7th Street as SWLRT Alignment 1 in Section 1. See **Exhibit 2** in Appendix D.

The SWLRT elevated bridge structure enters the Royalston Avenue ROW at the center median and crosses over 5th Avenue to the bridge abutment, located just south of 5th Avenue. The alignment then gradually shifts to the east side of the Royalston Avenue ROW as the profile transitions down to grade. The alignment continues on the east side of Royalston Avenue, where the station is located near the southern end of Royalston Avenue. The alignment on Royalston Avenue allows for 15 mph SWLRT operations. See Appendix B for a detailed discussion of SWLRT alternative locations on Royalston Avenue. The alignment follows the curve on Royalston Avenue before turning south through the intersection of Royalston Avenue and Holden Street at-grade.

The SWLRT alignment then makes a 10 mph curve as it crosses over the existing BNSF tracks on a new bridge structure. It continues from the bridge onto elevated retained embankment within the existing rail corridor. The alignment then crosses Glenwood Avenue at-grade between two new single-span bridges on either side of the SWLRT structure. The western span contains the existing BNSF rail and a future freight rail line, and the eastern span contains the Cedar Lake Trail. The profile of SWLRT then descends to match grade prior to crossing under the existing I-94 bridge.

2.2 Platform Location, Pedestrian Access, and Bus Access

The station has two side platforms on the east side of the ROW located just north of the curve on Royalston Avenue as shown in **Exhibit 3** of Appendix D. Pedestrians would access the station from the adjacent sidewalk or 5th Avenue from the north, and from at-grade sidewalks south of the platform. This platform is located approximately 915 feet from the bus stops for Route 9 located at the corner of Glenwood Avenue and 12th Street. The walking distance to the bus stops for Routes 5, 19, 22, and 755 on 7th Street is approximately 760 feet.

Walking distance from the SWLRT platform to the Farmer's Market is approximately 1,430 feet, and walking distance from Target Center to the platform is approximately 2,440 feet.

2.3 Roadway Configurations/Right-of-Way

The proposed SWLRT alignment is mostly within the existing 100 foot ROW, and maintains all access to existing property adjacent to Royalston Avenue as shown the proposed typical section in Figure 2-1. Additional ROW is required near the southern end of Royalston Avenue from the Two Couples, L.L.C. parcel on the west to accommodate the roadway and sidewalk alignment changes. Also, ROW from the City of Minneapolis parcel on the east side of Royalston Avenue is needed for the sidewalk that runs adjacent to the station platform.



Royalston Avenue from Holden Street to just south of 5th Avenue becomes a 32 foot wide, 2-lane roadway with on-street parking (southbound) on the west side of the ROW. New sidewalks are proposed on both sides of Royalston Avenue behind the curbs, and SWLRT is adjacent to the east ROW line. From 5th Avenue to the north, Royalston Avenue transitions to a 26 foot wide, 2-lane roadway and the SWLRT alignment shifts over head to the existing center median of Royalston Avenue on a bridge structure.

By skewing the SWLRT bridge over 5th Avenue from the center of Royalston Avenue to the east side of the ROW, vehicle turning accommodations and pedestrian access are improved at the intersection of Royalston Avenue and 5th Avenue. The pedestrian crosswalk across Royalston Avenue from the south side of 5th Avenue is aligned at an angle due to a driveway directly across from the intersection.

Vehicle turning movements were analyzed and accommodations are improved for property access on the west side of Royalston Avenue due to the increased pavement width. See Appendix E for Turning Templates. The roadway configurations associated with each of the alternative alignment locations is discussed in further detail in Appendix B.

Access between Royalston Avenue and Holden Street is maintained, with an at-grade crossing of SWLRT through the intersection.



Figure 2-1: Proposed Typical Section on Royalston Avenue (East Side Alignment)

2.4 Freight Rail

With this alignment of SWLRT, the BNSF track would remain in the western span of the Glenwood Avenue bridge. The access road for BNSF would be located to the west of the BNSF track.

2.5 Traffic

The same model and general assumptions were used for this traffic model as the previous alignment. The intersection of Royalston Avenue and Holden Street was modeled as a preempted signal, and eastbound right-turns on red from Holden Street were not allowed. This intersection would likely not require gates under signalized control.

This study shows that all intersections studied functioned acceptably, with little difference from Alignment 1.



2.6 Structures

The elevated bridge structure across 7th Street is basically the same as described in Section 1.6 with slight changes to the alignment. Unit 1 is comprised of prestressed concrete beam structures, Unit 2 is a concrete box girder with at least 16 feet - 4 inches clearance to 7th Street, and Unit 3 is a slab span with at least 14 feet - 6 inches clearance to 5th Avenue. The south side of the slab-span is where the bridge abutment will be located.

Beyond the abutment location, retaining walls will extend south until the existing grade is reached. Shortly thereafter, the station is located on the east side of the Royalston Avenue ROW.

From the Royalston station, SWLRT travels through the intersection of Royalston Avenue and Holden Street at-grade as it approaches the existing freight rail corridor. It would then cross over the existing BNSF tracks on a new short single-span bridge. This bridge could be a slab-span superstructure or possibly a shallow depth (short height) beam superstructure. This bridge will have excess deck area created by the sharp skew and curving track alignment.

As described in Section 1.6, there is not sufficient space through the substructures of the Glenwood Avenue bridge to accommodate the horizontal clearances between track centerlines and to obstructions. For this reason, the Glenwood Avenue bridge will need to be removed and replaced. To maintain high track speeds, and to avoid closure of Holden Street, an at-grade LRT crossing of Glenwood Avenue near the middle of the existing bridge is suggested. To achieve this at-grade crossing, an earthen fill section near the middle of the existing bridge has been introduced. This earthen fill bisects the one existing bridge and creates two separate bridges. The west bridge will span over the BNSF tracks, and the east bridge will span over the trail and future rail tracks. Both bridges will have relatively short spans that can accommodate similar structure depths as the existing bridge, thus preserving vertical clearances to the tracks below. Retaining walls support this earthen fill, and also serve as the bridge abutments for the new Glenwood Avenue bridges and the new skewed bridge over the BNSF tracks.



These two new single span bridges permit SWLRT to cross over the BNSF tracks at Glenwood Avenue instead of introducing the flyover bridge between I-94 and Van White Memorial Boulevard.

Figure 2-2: Proposed Typical Secton at Glenwood Avenue Bridge

After crossing Glenwood Avenue at-grade, the profile of SWLRT descends to match the existing grade of the rail corridor. The retaining walls supporting the SWLRT earthen fill transition to grade with the alignment. SWLRT then passes beneath the existing I-94 bridges. Refer to Figure 2-2 for the proposed section at the Glenwood Avenue bridge.



2.7 Regional Trails

As described above in Section 2.6, the reconstructed Glenwood Avenue bridge would have two single span bridges. The existing Cedar Lake Trail would be located under the eastern span. There would be minimal impacts to the existing trail due to this alignment.

2.8 Constructability

This alignment is similar to that described in Section 1.8 from The Interchange to the north end of Royalston Avenue. This configuration works well with the anticipated construction at The Interchange, and would have impacts to roadways during the bridge construction over 7th Street.

Construction on Royalston Avenue has moderate impacts to traffic. The rails and platform will be constructed in the existing northbound lanes, which would require temporary closure or re-routing of traffic. Royalston Avenue would also require a temporary closure during construction of the at-grade crossing of LRT on the southern end of Royalston Avenue.

2.9 Visual Impacts

The visual impacts for this alignment are similar to that described in Section 1.9. The edge of the bridge structure is approximately 42 feet from the Sharing and Caring Hands building at the corner of 7th Street and Royalston Avenue. A detailed analysis of the visual impacts of all alternative alignments is found in Appendix B.

2.10 Utilities

Existing utilities along the alignment will be impacted and require relocation. This includes both public and private utilities. Each of the three main alignment alternatives has various utility impacts; many of the impacts are common to all three alternatives. For a complete list of utility impacts for this alignment refer to Appendix B.

Impacts unique to this alignment of SWLRT that vary from the alignment described in Section 1.10 are listed in the table below.

Sanitary Sewer	Reconstruct 325 feet +/- of brick sewer north of the Holden Street and Royalston Avenue intersection.
Centerpoint Energy	Relocate 1,400 feet +/- of 6 inch gas main between 6 th Avenue and Holden Street

2.11 Environmental Considerations

This alignment has similar environmental considerations as described in Section 1.11.



3. Alignment 3: SWLRT Grade Separated Over 7th Street

Royalston Modified East Location with Diagonal Platform, Glenwood Avenue At-Grade

Similar to SWLRT Alignment 2, this alignment begins at Pier 9 of The Interchange and crosses over 7th Street on a grade separated bridge. The alignment then turns south running in the center of the Royalston Avenue ROW until 5th Avenue, where it transitions to the east side of Royalston Avenue. The Royalston Station has side platforms on a diagonal alignment between Royalston Avenue and Glenwood Avenue. From the station, the alignment crosses over the BNSF tracks on a new bridge, crossing Glenwood Avenue at-grade before transitioning down to be at-grade to pass beneath I-94.

3.1 SWLRT Alignment and Operations

This alignment has the same configuration for the connection to The Interchange and crossing of 7th Street as the other two alignments described previously. See **Exhibit 4** in Appendix D.

The SWLRT alignment enters the Royalston Avenue ROW as described in Section 2. The alignment continues on the east side of Royalston Avenue until the mid-block, where it turns in a slightly southeast direction. The diagonal platform (northeast-southwest) station is located centered on the existing Holden Street curve.

The SWLRT alignment then makes a 10 mph curve as it crosses over the existing BNSF tracks on a new bridge structure. It continues from the bridge onto elevated retained embankment within the existing rail corridor as described in Section 2.

3.2 Platform Location, Pedestrian Access, and Bus Access

The station has two side platforms located on the diagonal immediately south of the reconstructed Royalston Avenue /Holden Street intersection as shown in **Exhibit 5** of Appendix D. This platform is located closer to the bus stops for Route 9 located at the corner of Glenwood Avenue and 12th Street than the East Side Platform, with a walking distance of approximately 440 feet. The walking distance to the bus stops for Routes 5, 19, 22, and 755 on 7th Street is longer than the East Side Platform, at approximately 1,325 feet.

Pedestrians would access the station from the at-grade sidewalks connecting to Royalston Avenue and Holden Street. A new pedestrian bridge would connect the south side of the platform with Glenwood Avenue over the BNSF rail corridor. Walking distance from the SWLRT platform to the Farmer's Market is approximately 1,075 feet, and walking distance from Target Center to the platform is approximately 2,175 feet.

3.3 Roadway Configurations/Right-of-Way

This alignment maintains all access to existing property adjacent to Royalston Avenue similar to the alignment described in Section 2. This alignment requires additional ROW for the diagonal platform location as well the track alignment south of the platform compared to the east side and center placement alignments. Additional ROW is also required for the realignment of Holden Street.

The configuration of Royalston Avenue is similar to the alignment described in Section 2 from the north end to the mid-block south of 5th Avenue. Royalston Avenue becomes a 32 to 38 foot wide, 2-lane roadway with on-street parking (northbound and southbound) on the west side of the ROW.

The intersection of Royalston Avenue and Holden Street is reconfigured to allow for the diagonal platform location. Holden Street is curved sharply bringing it closer to the Two Couples LLC building and aligning it with Royalston Avenue in a north-south orientation. Royalston Avenue is re-aligned north of the existing bridge over the BNSF right-of-way to make the intersection with Holden Street nearly perpendicular. The LRT at-grade crossing is on the realigned portion of Royalston Avenue just east of the intersection with Holden Street.



3.4 Freight Rail

This alignment has the same impacts to the existing freight rail tracks as that described in Section 2.4.

3.5 Traffic

The same model and general assumptions were used for this traffic model as the other alignments. The atgrade LRT crossing of Royalston Avenue would likely require gates under signalized control due to the location of the crossing not being through the intersection.

3.6 Structures

The bridge and retaining wall structures are basically the same as described in Section 2.6, except the distance from the platform to Glenwood Avenue is greatly diminished resulting in a minimal distance of walls. This short distance means that the profile grade of Glenwood Avenue must be higher than existing, and the grades will be steeper than the existing.

A separate pedestrian bridge from the southeast end of the platform provides a link over the depressed corridor to Glenwood Avenue.

3.7 Regional Trails

This alignment, similar to that described in Section 2, has the no impacts to the existing Cedar Lake Trail.

3.8 Constructability

This alignment is similar to that described in Section 2.8 from The Interchange to the midblock of Royalston Avenue south of 5th Avenue.

Construction of this alignment has major impacts to traffic on Royalston Avenue and Holden Street due to the reconfiguration of the intersection. This reconstruction would require temporary closure of both streets. The overall impacts due to construction of this alignment would be greater than the alignment described in Section 2.

3.9 Visual Impacts

The visual impacts for this alignment are similar to that described in Section 2.9. A detailed analysis of the visual impacts of all alternative alignments is found in Appendix B.

3.10 Utilities

Existing utilities along the alignment will be impacted and require relocation. This includes both public and private utilities. Each of the three main alignment alternatives has various utility impacts; many of the impacts are common to all three alternatives. For a complete list of utility impacts for this alignment refer to Appendix B.

Utility impacts for this alignment are similar to those described in Section 2.

3.11 Environmental Considerations

This alignment has similar environmental considerations as described in Section 1.11.



III. Evaluation of Alternatives

Each of the three alternative alignments for SWLRT from The Interchange to I-94 will be summarized with the advantages and disadvantages of each. From the analysis performed, Alignment 2 is the preferred alternative.

1. SWLRT Alignment 1 (LPA Modified)

The LPA Modified alignment is grade separated over 7th Street, runs in the center median on Royalston Avenue with a center platform, cuts through Holden Street (closing it to traffic due to grade differences), and enters the BSNF rail corridor at-grade before passing under the existing Glenwood Avenue bridge as shown in **Exhibit 1** of Appendix D.

This alignment presents many challenges, and has been determined to not be a feasible option for SWLRT. The following are reasons why this alignment is <u>not</u> recommended for further study:

- Alignment in center median of Royalston Avenue limits truck turning accommodations for property access on west side of Royalston Avenue
- Royalston Avenue becomes a divided 2-lane road with no on-street parking and 16 foot travel lanes in each direction
- Center platform does not allow for an efficient use of ROW width
- Holden Street is cut off from Royalston Avenue due to the descending LRT tracks, and would become a cul-de-sac; this requires additional ROW and the closure of one property access driveway
- Placing SWLRT under the existing Glenwood Avenue bridge requires the relocation of existing BNSF tracks, impacts the Bassett Creek Tunnel, and possibly impacts the Cedar Lake Trail
- Requires a fly-over LRT bridge west of I-94 to cross BNSF tracks

2. SWLRT Alignment 2

This alignment for SWLRT is grade separated over 7th Street, runs on a modified east side Royalston Avenue location with an east side platform, crosses through the intersection of Royalston Avenue and Holden Street, crosses over the BNSF tracks on a new bridge, crosses Glenwood Avenue at-grade between two new bridges, and descends to grade in the BNSF corridor before passing under the existing I-94 bridges as shown in **Exhibit 2** of Appendix D.

The following are <u>advantages</u> of this alignment:

- Maintains existing connection with Holden Street and Royalston Avenue
- Requires minimal additional ROW
- Shorter walking distances to bus stops for Routes 5, 19, 22, and 755 on 7th Street
- Does not require pedestrian bridge over rail corridor
- Elevation of existing Glenwood Avenue bridge can be matched, without raising the existing grade

3. SWLRT Alignment 3

This alignment for SWLRT is grade separated over 7th Street, runs on a modified east side Royalston Avenue location before making a diagonal through Holden Street where the platform is located, crosses over the BNSF tracks on a new bridge, crosses Glenwood Avenue at-grade between two new bridges, and descends to grade in the BNSF corridor before passing under the existing I-94 bridges as shown in **Exhibit 4** in Appendix D.

The following are <u>advantages</u> of this alignment:

- Shorter walking distances to Farmer's Market and Target Center
- Shorter walking distances to bus stops for Route 9 on Glenwood Avenue



• Enhances proximity of platform to Glenwood Avenue



Appendix A – Interchange Area Connection and 7th Street Crossing

The connection of the SWLRT to The Interchange and the crossing of 7th Street are critical in terms of LRT and traffic operations, and visual impacts. Coordination between the SWLRT and Bottineau LRT alignments yields several possible configurations for connecting both systems to The Interchange. These configurations are discussed in detail in this section. The configuration discussed in Section A-1 has been determined to be the preferred alternative for connection of SWLRT to The Interchange.

A-1 Alternative 1: SWLRT above 7th Street to Royalston / Bottineau At-Grade on 7th Street

The LPA identified SWLRT as a grade separated alignment under 7th Street as a tunnel. After the LPA was prepared, The Interchange project was implemented which changed the track alignment between Target Field Station and 7th Street. The change involved elevating SWLRT on a bridge over 7th Street. The Interchange track alignment also allows for the potential future Bottineau LRT alignment to cross under the SWLRT alignment within The Interchange project limits before crossing 7th Street at-grade. For this analysis, the LPA has been modified to be grade separated over 7th Street and Bottineau LRT crossing 7th Street at-grade. This option is referred to as the LPA Modified Alignment.

Track Alignment

Refer to Figure A-1 for the connection of SWLRT to The Interchange. This configuration has SWLRT using Track 1 westbound and Track 2 eastbound, and Bottineau LRT using Interchange Track 3 westbound and Track 4 eastbound. The SWLRT tracks are a continuation of Hiawatha LRT northbound Track 1 and southbound Track 2, and the future Bottineau LRT Track 3 and Track 4 would utilize the diverging routes on turnouts from Interchange Tracks 1 and 2, respectively.

The profile of SWLRT over 7th Street is governed by clearance over Bottineau LRT Track 4, and not 7th Street. As SWLRT turns south with a 20 mph curve toward Royalston Avenue, it crosses over 7th Street at an elevation that is 32.2 feet from top of rail (TOR) to existing grade. The resulting clearance is 24.2 feet with an 8 foot - 0 inches structure depth assumption. This profile is based on a box girder bridge type that reduces the bridge soffit width up to 14 feet. This elevation is similar for all Royalston Avenue alignments and the narrow soffit assumption is used for all Royalston Avenue alignments as well. Due to the existing profile of Royalston Avenue which rises drastically from north to south, the profile must be grade separated over 5th Avenue but can return to grade prior to the Royalston Station platform.





Figure A-1: Interchange Connection with SWLRT Elevated

Light Rail and Traffic Operations

The grade separation of SWLRT and Bottineau LRT allows both lines to merge into Hiawatha LRT with samedirection movements. This was planned so that peak operations of 7.5 minute headways in each direction on both lines (3.75-minute combined headways) at The Interchange could be accommodated (the SWLRT project has not confirmed the headway capacity of The Interchange track and signal design). The travel time for SWLRT is expected to be nearly the same as an at-grade crossing, assuming LRT pre-emption across the 7th Street intersection.

With SWLRT grade separated over 7th Street and Bottineau LRT at-grade, the Olson Memorial Highway/6th Avenue/7th Street intersection is expected to operate near capacity in the 2030 AM peak, but can be mitigated to LOS D. The elevated structure for SWLRT also lessens traffic impacts at the intersection of Royalston Avenue and 5th Avenue, and on Olson Highway Service Road by being grade separated from traffic.

Structures

The elevated bridge structure across 7th Street extends to the elevated structure of The Interchange on a curved alignment across 7th Street and matches the center median of Royalston Avenue. The profile grades will provide a smoother, faster ride.

Constructability

This configuration works well with the sequencing of construction anticipated at The Interchange. Tracks 1 and 2 would be built elevated for SWLRT prior to construction of Tracks 3 and 4 for Bottineau LRT. This allows Bottineau LRT to be at-grade adjacent to and underneath the existing elevated SWLRT.

Visual Impacts

The elevated structure crossing 7th Street has moderate visual impacts to Sharing and Caring Hands, the building located at the corner of 7th Street and Royalston Avenue. The bridge structure would come to within 51 feet of the Sharing and Caring Hands building and would partially obscure views from the large windows on the west side of the building.



A-2 Alternative 2: SWLRT At-Grade on 7th Street / Bottineau Above 7th Street

As an alternative to SWLRT being grade separated above 7th Street, a configuration was evaluated to grade separate Bottineau LRT above 7th Street with SWLRT crossing 7th Street at-grade. This configuration poses several challenges.

Track Alignment

As Figure A-2 for the connection of SWLRT to The Interchange shows, this configuration reverses the assignment of tracks at The Interchange, and has SWLRT using Tracks 1 and 2, and Bottineau LRT using Tracks 3 and 4. The profile of SWLRT descends to match grade as it leaves The Interchange and heads towards 7th Street. This allows both tracks of Bottineau LRT to pass over the outbound track of SWLRT prior to entering The Interchange. The profile of Bottineau LRT Tracks 3 and 4 would be at an elevation that is 26.8 feet from TOR to existing grade (compared to 32.2 feet in the LPA Modified). As SWLRT turns south toward Royalston Avenue, it crosses 7th Street at-grade. The SWLRT alignment would then run at-grade along the Royalston Avenue ROW. The intersection of Royalston Avenue and 5th Avenue would be at-grade.



Figure A-2: Interchange Connection with SWLRT At-Grade

Light Rail and Traffic Operations

The grade separation of SWLRT and Bottineau LRT allows both systems to operate at as much as 7.5 minute headways in both directions. The travel time for SWLRT is expected to be nearly the same as an at-grade crossing, assuming LRT pre-emption across the 7th Street intersection. If SWLRT is implemented but Bottineau LRT is not, one Interchange turnout (Switch 189) would be permanently used for a diverging move, without a straight movement. Because of the direct fixation track system and tight clearances, it would be difficult to remedy this situation.

With Bottineau LRT either not present or grade separated and SWLRT crossing 7th Street at-grade, the Olson Memorial Highway/6th Avenue/7th Street intersection is expected to operate near capacity in both 2030 peaks with several failing movements and a LOS E. Traffic impacts are more severe in this configuration than Alternative 1. The eastbound free right turn from Olson Memorial Highway is a major movement at this intersection, which would be impacted with SWLRT at-grade at 7th Street. For this reason, SWLRT being grade separated and Bottineau LRT being at-grade at this intersection is recommended.



Structures

The bridge for SWLRT extends from the existing tie-in at The Interchange Pier 9 over the HERC driveway to the west abutment. There are no other bridge structures for SWLRT at The Interchange connection for this configuration.

Constructability

This configuration provides some challenges with the sequencing of construction anticipated at The Interchange. Tracks 1 and 2 would be built at-grade for SWLRT prior to construction of Tracks 3 and 4 for Bottineau LRT. This would require Bottineau LRT to build the elevated structure adjacent to and over the existing at-grade SWLRT alignment.

Visual Impacts

There are no considerable visual impacts related to the at-grade crossing of SWLRT at 7th Street. The elevated structure for Bottineau LRT at the intersection of 7th Street and 6th Avenue would provide some impacts to traffic at the intersection, but would not visually impact any of the adjacent buildings.

A-3 Alternative 3: SWLRT and Bottineau At-Grade on 7th Street

As another alternative, a configuration was looked at to have both SWLRT and Bottineau LRT cross 7th Street at-grade. This would reduce the visual impacts of a LRT bridge over 7th Street. This configuration poses several challenges which will be detailed in the following sections.

Track Alignment

This configuration has repurposed Interchange tracks, with SWLRT using Tracks 1 and 2, and Bottineau LRT using Tracks 3 and 4 as shown in Figure A-3. The profiles of SWLRT and Bottineau LRT descend to match grade as they leave The Interchange and head towards 7th Street. SWLRT inbound Track 2 would cross Bottineau LRT Track outbound Track 4 at-grade through the double crossover at The Interchange (this crossover is currently to be used only with non-revenue tail track movements. The conflicting movements would be in opposite directions, and would effectively cause a single-track segment supporting bi-directional operations for a length of 200 to 300 feet. As SWLRT turns south toward Royalston Avenue it crosses 7th Street at-grade, and Bottineau LRT crosses the intersection of 7th Street and 6th Avenue at-grade. The SWLRT alignment would then run at-grade along the Royalston Avenue ROW. The intersection of Royalston Avenue and 5th Avenue would include an at-grade crossing of SWLRT.





Figure A-3: Interchange Connection with SWLRT and Bottineau At-Grade

Light Rail and Traffic Operations

Operating SWLRT and Bottineau LRT trains in opposing movement at-grade through The Interchange double crossover will reduce the capacity of both lines, as well as capacity of the existing Hiawatha LRT and planned Central Corridor LRT operations. While only a simulation of the LRT would confirm what the resulting headway would be, the planned combined 3.75 minute headways in each direction is likely infeasible, and unreliable. In addition, the scheduling of all four lines in the full build-out would have to be oriented to protect the movements at the double crossover, which would negatively affect the LRT operations across 7th Street. The travel time for SWLRT would likely be impacted to account for the schedule pad that would be added as part of the protection of on-time performance.

This configuration was not modeled for traffic impacts at the intersection of 7th Street/6th Avenue/Olson Memorial Highway due to the fact that the configuration with one of the LRT alignments at-grade has LOS E operations. Failing traffic operations are expected in the 2030 peak hours due to the fact that one train every 1.9 minutes (or one train at least every signal cycle) is expected, and at 10 mph the crossing is blocked for 30-40% of the time during peak hours.

Structures

The bridges for SWLRT and Bottineau LRT extend from the existing tie-in at The Interchange Pier 9 over the HERC driveway to the west abutment. There are no other bridge structures for SWLRT at The Interchange connection for this configuration.

Constructability

This configuration does not create significant constructability issues for SWLRT. The vehicle traffic at the atgrade crossing of the tracks would need to be coordinated during construction of SWLRT.

Visual Impacts

The visual impacts of this configuration would be limited to only the surface and signal-related improvements required for at-grade crossings of both SWLRT and Bottineau LRT.



Appendix B – Royalston Alignment Configurations

The location of the SWLRT alignment within the ROW of Royalston Avenue affects traffic operations, roadway configurations and property access, platform location and pedestrian access, bus access, utilities, and visual impacts. Four candidate alignment configurations were developed which were labeled Royalston Center, West Side, East Side, and Modified East Side. For the purpose of comparison, these alignments are all assumed to be grade-separated over 7th Street as described in Section A-1. The Royalston Modified East Side alignment discussed in Section B-4 has been determined to be the recommended alternative for SWLRT.

B-1 Royalston Center Alignment

This section of the alignment extends westward from the crossing over 7th street to the center median of Royalston Avenue as shown in **Exhibit 6** of Appendix D.

The alignment continues in the median of Royalston Avenue to the south and crosses through the Holden Street/Royalston Avenue intersection with a 10 mph reverse curve. (Using a 15 mph curve, which would improve travel times, was investigated, and would result in the LRT alignment crossing Holden Street to the north of the intersection with Royalston Avenue similar to the LPA Modified alignment, which would more negatively impact traffic operations and require re-profiling or closure of Holden Street.) It then enters the existing rail corridor near Glenwood Avenue, which was discussed previously in Section II.

Light Rail and Traffic Operations

The curve from The Interchange to Royalston Avenue allows for 20 mph operations on SWLRT as described in Section A-1, 10 mph operations through the Holden Street intersection, and 20 mph operations on the structure over BNSF. The travel time for the center alignment is similar to the other three alignments with a negligible difference, based on similar geometry.

This alignment functions acceptably with respect to traffic operations.

Platform Location and Pedestrian Access

The station has a center platform located just north of the curve on Royalston Avenue. Pedestrians would access the station at-grade from 5th Avenue from the north, and from a new at-grade crossing on Royalston Avenue just south of the platform.

Roadway Configurations

As Figure B-1 for the proposed typical section with SWLRT in the center of Royalston Avenue shows, the proposed SWLRT alignment is entirely within the existing 100 foot ROW, and maintains all access to existing property adjacent to Royalston Avenue.

Royalston Avenue becomes a divided 2-lane road with no on-street parking and 16 foot travel lanes in each direction. New sidewalks are on both sides of Royalston Avenue at the edge of ROW. While property access is maintained for the businesses on Royalston Avenue, vehicle turning accommodations are limited due to the reduced pavement width and the shift of the curb towards the edge of ROW. Turning simulations of various vehicle types were performed for this configuration. It was determined that the changes primarily affect the WB-65 semi-trailer configurations that presently serve businesses along Royalston Avenue. The reduced throat width at the intersections is also a hindrance. The vehicles can make the turns but they will need to run outside of their lanes to do so.





Figure B-1: Proposed Typical Section on Royalston Avenue (Center Alignment)

Bus Access

The site is to be served by five bus routes—5, 19, 22, and 755 on 7th Street with projected stops in each direction at 5th Avenue and 7th Street, with potential intersection signalization for pedestrian movements. Route 9 runs east and west on Glenwood Avenue and has stops at the corner of Glenwood Avenue and 12th Street/Royalston Avenue.

Utilities

The following table summarizes the impacts to existing utilities for the Royalston Center Alignment option.

Water	Reconstruct water main intersection at 7 th Street and Royalston Avenue. 6 inch water main on 7 th Street will require a cased crossing of SWLRT alignment.
	Reconstruct 1,400 feet of 8 inch water main in Royalston Avenue parallel to proposed alignment.
	Reconstruct 8 inch water main at intersection of Royalston Avenue and 5 th Avenue for a cased crossing of alignment.
	Reconstruct 6 inch water main south of the intersection of Royalston Avenue and Holden Street for a cased crossing of alignment.
Sanitary Sewer	Reconfigure at 7 th Street to relocate manhole outside of utility free zone.
	Reconstruct 80 feet +/- of 15 inch VCP and one manhole at 5 th Avenue and Royalston Avenue to relocate existing manhole outside of utility free zone.
Storm Sewer	Reconstruct 160 feet +/- of 12 inch VCP at south end of Royalston Avenue to relocate manhole outside of utility free zone.
Xcel	Reconfigure/raise OHP alignment crossing at 7 th Street. Raise OHP crossing of alignment at 5 th Avenue and Royalston Avenue. Raise OHP crossing of alignment south of 5 th Avenue and Royalston Avenue.
	Reconfigure P-UG at Royalston Avenue/Holden Street intersection.



	CenturyLink aerial is with Xcel.
Centerpoint Energy	Relocate 400 feet +/- of 6 inch gas main between 6 th Avenue and 5 th Avenue. Reconfigure 2 inch gas crossing of alignment at 5 th Avenue.
	Relocate 500 feet +/- of gas main north of Holden Street.

Visual Impacts

The elevated structure crossing 7th Street has moderate visual impacts to Sharing and Caring Hands, the building located at the corner of 7th Street and Royalston Avenue. The bridge structure would come to within 51 feet of the Sharing and Caring Hands building and would partially obscure views from the large windows on the west side of the building.

B-2 Royalston West Side Alignment

This section of the alignment extends westward from the crossing over 7th Street to the west side of Royalston Avenue as shown in **Exhibit 7** of Appendix D. It continues to the south with a 15 mph curve and crosses Holden Street at-grade, north of the Royalston Avenue intersection, with a 15 mph reverse curve. This is similar to the 15 mph curve used for the Royalston Avenue Center alignment mentioned in Section B-1 and has similar impacts. This alignment cannot cross through the Holden Street/Royalston Avenue intersection, even at slower speeds. It then enters the existing rail corridor near Glenwood Avenue, which was discussed previously in Section II.

Light Rail and Traffic Operations

The curve from The Interchange to Royalston Avenue allows for 20 mph operations, similar to the Center alignment. South of Royalston Station, 15 mph reverse curves are located between the station and the Glenwood Avenue bridge (one less curve than the Center Alignment). The alignment is 30 feet longer than the Center Alignment, but the travel time would be slightly faster based on the 15 mph curve near the station platforms.

This alignment functions acceptably with respect to traffic operations. Gate arms are required for the at-grade LRT crossing on Holden Street west of the intersection with Royalston Avenue.

Platform Location and Pedestrian Access

The station has two side platforms located just north of the curve on Royalston Avenue. Pedestrians would access the station from the adjacent sidewalk on the west, and from a new at-grade crossing on Royalston Avenue just south of the platform.

Roadway Configurations

The proposed SWLRT alignment is entirely within the existing 100 foot ROW as shown in the proposed typical section in Figure B-2. All existing driveways on the west side of Royalston Avenue would be severed.

Royalston Avenue becomes a 32 foot wide, 2-lane roadway with on-street parking (northbound) on the east side of the ROW. New sidewalks are on both sides of Royalston Avenue at the edge of ROW.





Figure B-2: Proposed Typical Section on Royalston Avenue (West Side Alignment)

Bus Access

The existing bus routes that serve this area were discussed in Section B-1.

Utilities

The following table summarizes the impacts to existing utilities for the Royalston West Side Alignment option.

Water	Reconstruct water main intersection at 7 th Street and Royalston Avenue. 6 inch water main on 7 th Street will require a cased crossing of SWLRT alignment.
	Existing 8 inch water main in Royalston Avenue is parallel to the alignment and outside of the utility review zone; therefore little to no impact is anticipated.
	Reconstruct 8 inch water main at intersection of Royalston Avenue and 5 th Avenue for a cased crossing of alignment.
	Reconstruct 6 inch water main south of the intersection of Royalston Avenue and Holden Street for a cased crossing of alignment.
Sanitary Sewer	Reconstruct 80 feet +/- of 15 inch VCP and one manhole at 5 th Avenue and Royalston Avenue to relocate existing manhole outside of utility free zone.
Storm Sewer	Reconstruct 60 feet +/- of 21 inch VCP, 30 feet +/- of unknown size sewer, and relocate 2 manholes outside of utility free and review zone at 7 th Street and Royalston Avenue.
Xcel	Reconfigure/raise OHP alignment crossing at 7 th Street. Raise OHP crossing of alignment at 5 th Avenue and Royalston Avenue. Raise OHP crossing of alignment south of 5 th Avenue and Royalston Avenue.
	Reconfigure/raise OHP oblique crossing of alignment at intersection of Royalston Avenue and Holden Street. Reconfigure P-UG at same intersection.
	CenturyLink aerial is with Xcel.



Centerpoint	Relocate 400 feet +/- of 6 inch gas main between 6 th Avenue and 5 th Avenue.
Energy	
	Reconfigure 2 inch gas crossing of alignment at 5 th Avenue.

Visual Impacts

The elevated structure crossing 7th Street has limited visual impacts to Sharing and Caring Hands, the building located at the corner of 7th Street and Royalston Avenue. The bridge structure would come to within 68 feet of the Sharing and Caring Hands building and would partially obscure views from the large windows on the west side of the building.

B-3 Royalston East Side Alignment

This section of the alignment extends westward from the crossing over 7th Street to the west side of Royalston Avenue as shown in **Exhibit 8** in Appendix D. It continues on the east side of Royalston Avenue to the south and crosses through the Holden Street and Royalston Avenue intersection at-grade with 10 mph reverse curves. (Similar to the Royalston Center Alignment, using a 15 mph curve, which would improve travel times, was investigated, and would result in the LRT alignment crossing Holden Street to the north of the intersection with Royalston Avenue, and would have similar impacts). It then enters the existing rail corridor near Glenwood Avenue, which was discussed previously in Section II.

Light Rail and Traffic Operations

The curve from The Interchange to Royalston Avenue allows for 20 mph operations as was mentioned in Section A-1, 10 mph operations through the Holden Street intersection, and 25 mph operations on the structure over BNSF. The alignment is 50 feet shorter than the Royalston Center Alignment, and the travel time is similar, based on similar geometry.

This alignment functions acceptably with respect to traffic operations. No gate arms are required for the atgrade LRT crossing through the intersection of Royalston Avenue and Holden Street with a signal at this intersection. Preemption of the signal at this intersection is recommended but not required.

Platform Location and Pedestrian Access

The station has two side platforms located just north of the curve on Royalston Avenue. Pedestrians would access the station from the adjacent sidewalk or 5th Avenue, and from a new at-grade crossing on Royalston Avenue just south of the platform.

Roadway Configurations

The proposed SWLRT alignment is entirely within the existing 100 foot ROW as shown in the proposed typical section in Figure B-3. All existing driveways on the west side of Royalston Avenue would be maintained.

Royalston Avenue becomes a 32 foot wide, 2-lane roadway with on-street parking (southbound) on the west side of the ROW. There is also the potential for northbound parking north of 5th Avenue. New sidewalks are on both sides of Royalston Avenue behind the curbs, and SWLRT is adjacent to the east ROW line. Vehicle turning accommodations are improved for property access on the west side of Royalston Avenue due to the increased pavement width based on turning simulations of various vehicle types. The east side alignment alternatives provide the greatest flexibility for large vehicles making turns within the ROW.





Figure B-3: Proposed Typical Section on Royalston Avenue (East Side Alignment)

Bus Access

The existing bus routes that serve this area were discussed in Section B-1.

Utilities

The following table summarizes the impacts to existing utilities for the Royalston East Side alignment option.

Water	Reconstruct water main intersection at 7 th Street and Royalston Avenue 6 inch water main on 7 th Street will require a cased crossing of SWLRT alignment.
	Reconstruct 1,400 feet of existing 8 inch water main in Royalston parallel to proposed alignment.
	Reconstruct 8 inch water main at intersection of Royalston Avenue and 5 th Avenue for a cased crossing of alignment.
	Reconstruct 6 inch water main south of the intersection of Royalston Avenue and Holden Street for a cased crossing of alignment.
Sanitary Sewer	Reconfigure at 7 th Street to relocate manhole outside of utility free zone.
	Reconstruct 325 feet +/- of brick sewer north of Holden Street and Royalston Avenue intersection.
Storm Sewer	Reconstruct 160 feet +/- of 12 inch VCP at south end of Royalston Avenue to relocate manhole outside of utility free zone.
Xcel	Reconfigure/raise OHP alignment crossing at 7 th Street. Reconfigure OHP crossing of alignment at 5 th Avenue and Royalston Avenue. Reconfigure OHP crossing of alignment south of 5 th Avenue and Royalston Avenue.
	Reconfigure P-UG at Royalston Avenue/Holden Street intersection.



	CenturyLink aerial is with Xcel.
Centerpoint Energy	Relocate 1400 feet +/- of 6 inch gas main between 6 th Avenue and Holden Street.
	Reconfigure 2 inch gas crossing of alignment at 5 th Avenue.

Visual Impacts

The elevated structure crossing 7th Street has considerable visual impacts to Sharing and Caring Hands, the building located at the corner of 7th Street and Royalston Avenue. The bridge structure would come to within 28 feet of the Sharing and Caring Hands building and would significantly obscure views from the large windows on the west side of the building.

B-4 Royalston Modified East Side Alignment

This alignment is similar to Royalston East Side of Section B-3, except that the track alignment is skewed between 5th Avenue and 7th Street to occupy the median as shown in **Exhibit 9** of Appendix D. This adjustment was done to locate the LRT bridge further away from the Mary's Place property and to improve the intersection of 5th Avenue and Royalston Avenue. The alignment south of the Royalston Station is similar to the Royalston East Side alignment. The Royalston Modified East Side Alignment has been determined to be the preferred alignment for SWLRT on Royalston Avenue.

Light Rail and Traffic Operations

The curve from The Interchange to Royalston Avenue allows for 20 mph operations on SWLRT similar to the other alignments. A reverse curve is introduced between 5th Avenue and the station platform. South of the platforms, the alignment is similar to the Royalston East Side Alignment. The travel time for this alignment is similar to the Royalston East Side Alignment.

This alignment functions acceptably with respect to traffic operations. No gate arms are required for the atgrade LRT crossing through the intersection of Royalston Avenue and Holden Street with a signal at this intersection. Preemption of the signal at this intersection is recommended but not required.

Platform Location and Pedestrian Access

The station has two side platforms located just north of the curve on Royalston Avenue similar to the East Side Alignment. Pedestrians would access the station from the adjacent sidewalk or 5th Avenue, and from a new atgrade crossing on Royalston Avenue just south of the platform.

Roadway Configurations

The proposed SWLRT alignment is entirely within the existing 100 foot ROW. All existing driveways on the west side of Royalston Avenue would be maintained, as with the Center or East Side Alignments.

Royalston Avenue from Holden Street to just south of 5th Avenue becomes a 32 foot wide, 2-lane roadway with on-street parking (southbound) on the west side of the ROW. New sidewalks are on both sides of Royalston Avenue behind the curbs, and SWLRT is adjacent to the east ROW line. From 5th Avenue to the north Royalston Avenue transitions to a 26 foot wide, 2-lane roadway and the SWLRT alignment shifts to the existing center median of Royalston Avenue. This combines the benefits of enhanced vehicle turning accommodations for property access on the west side of Royalston Avenue, on-street parking for southbound traffic, and shifts the elevated structure away from the existing buildings on the north end of Royalston Avenue. See Appendix E for Turning Templates of the Royalston Modified East Side Alignment.



Bus Access

The existing bus routes that serve this area were discussed in Section B-1.

Utilities

The following table summarizes the impacts to existing utilities for the Royalston Modifed East Side Alignment option.

Water	Reconstruct water main intersection at 7 th Street and Royalston Avenue. 6 inch water main on 7 th Street will require a cased crossing of SWLRT alignment.
	Reconstruct 1,400 feet of 8 inch water main in Royalston Avenue parallel to proposed alignment.
	Reconstruct 8 inch water main at intersection of Royalston Avenue and 5 th Avenue for a cased crossing of alignment.
	Reconstruct 6 inch water main south of the intersection of Royalston Avenue and Holden Street for a cased crossing of alignment.
Sanitary Sewer	Reconfigure at 7 th Street to relocate manhole outside of utility free zone.
	Reconstruct 80 feet +/- of 15 inch VCP and one manhole at 5 th Avenue and Royalston Avenue to relocate existing manhole outside of utility free zone.
	Reconstruct 325 feet +/- of brick sewer north of Holden Street and Royalston Avenue intersection.
Storm Sewer	Reconstruct 160 feet +/- of 12 inch VCP at south end of Royalston Avenue to relocate manhole outside of utility free zone.
Xcel	Reconfigure/raise OHP alignment crossing at 7 th Street. Reconfigure OHP crossing of alignment at 5 th Avenue and Royalston Avenue. Reconfigure OHP crossing of alignment south of 5 th Avenue and Royalston Avenue.
	Reconfigure P-UG at Royalston Avenue and Holden Street intersection.
	CenturyLink aerial is with Xcel.
Centerpoint	Relocate 1400 feeet +/- of 6 inch gas main between 6 th Avenue and Holden Street.
Спегду	Reconfigure 2 inch gas crossing of alignment at 5 th Avenue.

Visual Impacts

The elevated bridge structure from The Interchange across 7th Street is the same as the Center Alignment, reducing the visual impacts to the buildings on the north end of Royalston Avenue compared to the East Side Alignment. By placing the travel lanes on the west side of the Royalston Avenue ROW north of 5th Avenue, the additional area provided between the SWLRT bridge structure and the Sharing and Caring Hands building could be utilized for enhanced pedestrian facilities.



Appendix C – Border Alignment Configurations

Border Avenue was studied as a potential alternative alignment for SWLRT from The Interchange to Holden Street. The primary reason this alignment was studied as an alternative was to locate the station closer to the Farmer's Market on Border Avenue between 3rd and 4th Ave. The following sections will describe in detail why Border Avenue is not recommended as the alignment for SWLRT.

C-1 SWLRT and Bottineau LRT At-Grade (Four Tracks at 7thStreet /Split at Interchange)

As Figure C-1 for the track alignment shows, this configuration has SWLRT using Interchange Tracks 1 and 2, and Bottineau LRT using Interchange Tracks 3 and 4. Similar to the alignment described in Section A-3, the profiles of SWLRT and Bottineau LRT descend to match grade as they leave The Interchange and head towards 7th Street. SWLRT crosses 7th Street at-grade and runs west adjacent to Olson Memorial Highway in the median separating this road from the Olson Highway Service Road. Bottineau LRT crosses the intersection of 7th Street and Olson Highway at-grade and then is in the median of Olson Memorial Highway. The SWLRT alignment would then turn south along the east side of the Border Avenue ROW, and turn east along the north side of the Holden Street ROW before turning southwest and entering the existing rail corridor near Glenwood Avenue. This alignment is approximately 1,150 feet longer than the Royalston Center Alignment.



Figure C-1: Border Alignment with Four Tracks at 7th Street

Light Rail and Traffic Operations

Similar to the operation described in Section A-3, the inbound and outbound movements for both SWLRT and Bottineau LRT would operate in The Interchange Station area in opposite directions. The Interchange double crossover, which is currently proposed to sort only tail track movements, would now be sorting revenue movements. The signaling for The Interchange interlocking likely would have to be changed. Even with signaling changes, it is unlikely that planned peak headways could be accommodated even with operations



timed for handling the opposing movements at The Interchange. If operations are timed for The Interchange opposing movements, the at-grade movements at 7th Street would not be optimized, meaning that the chances that two or more LRT movements occurring in one gate downtime event would be low. In addition, all LRT movements across 7th Street would require complete pre-emption in order to protect the optimized scheduling around the opposing movements at The Interchange. Because of street-running events and other typical disruptions to LRT operations, the optimized scheduling at the opposing movement locations at The Interchange will degrade in day-to-day operations, and a schedule buffer would likely need to be added. Also, there are long 10 mph LRT curves at the southern end of Border Avenue and on Holden Street.

With both SWLRT and Bottineau LRT at-grade, the Olson Memorial Highway/6th Avenue/7th Street intersection is expected to have failing operations in the 2030 peak hours. This configuration would likely require the closure of Olson Memorial Highway frontage road to the east of Border Avenue. Closure of this road is not anticipated to have noticeable traffic impacts to Olson Memorial Highway/6th Avenue/7th Street, but it negatively impacts access to Border Avenue and Royalston Avenue.

Platform Location and Pedestrian Access

The station has a center platform located on Border Avenue just north of 4th Avenue as shown in **Exhibit 10** of Appendix D. Pedestrians would access the station from sidewalks at-grade on Border Avenue.

Roadway Configurations

The existing ROW of Border Avenue is 66 feet wide as shown in the existing typical section in Figure C-2.

Additional ROW width (16 feet - 20 feet) would be required for approximately 900 feet to accommodate the station platform and pedestrian access. All existing driveways on the east side of Border Avenue and the north side of Holden Street would be severed.

Border Avenue becomes a single 16 foot lane southbound on the west side of the ROW with no on-street parking as shown in the proposed typical section in Figure C-3. New sidewalks would be located on both sides of Border Avenue. The connections at the Olson Highway Service Road would be maintained, however on-street parking would be limited to one side of the roadway direction from Border Avenue to Royalston Avenue. The reduced roadway width on Border Avenue would impact vehicle turning accommodations at driveway on the west side of Border Avenue. Major right-of-way acquisitions would be required to connect SWLRT to Glenwood Avenue, and to flatten the long 10 mph LRT curves on Border Avenue and Holden Street.





Figure C-2: Existing Typical Section on Border Avenue



Figure C-3: Proposed Typical Section on Border Avenue without Platform

Bus Access

The site is to be served by five bus routes—5, 19, 22, and 755 on 7th Street with projected stops in each direction at 5th Avenue and 7th Street, with potential intersection signalization for pedestrian movements. Route 9 runs east and west on Glenwood Avenue and has stops at the corner of Glenwood Avenue and 12th Street. The platform location on Border Avenue creates greater walking distances from the 5th Avenue and 7th Street intersection.

Utilities

The following table summarizes the impacts to existing utilities for the Border SWLRT alignment option.

Water	Reconstruct 8 inch water main at intersection of 7 th Street and 6 th Avenue for a cased crossing of alignment.
	Reconstruct 1,550 feet +/- of 6 inch water main in Border Avenue between 6 th Avenue and Holden Street to relocate it outside of utility free and review zones; offset (west) of existing water main to WB centerline varies between 1.5 feet and 9 feet.
	Reconstruct 575 feet +/- of 6 inch water main in Holden Street to relocate it outside of utility free and review zone.
	Reconstruct 8 inch water main cased crossing of proposed alignment at Glenwood Avenue 320 foot +/- water main, 175 foot +/- casing. Note: GIS location of water main runs through the footprint of the Glenwood Avenue bridge abutments. Reconstruction



	will probably require abandonment of existing in-place, and replacement outside of bridge abutments – estimated relocation lengths could vary significantly.
Sanitary Sewer	Reconstruct 175 feet +/- of existing brick sewer (size unknown), 90 feet +/- of 12 inch VCP, and 3 manholes at the intersection of 6 th Avenue and Border Avenue to relocate existing manhole outside of utility free zone.
	Reconstruct 170 feet +/- of 15 inch VCP, 80 feet +/- of 12 inch VCP, and 3 manholes to relocate manholes and pipe outside of utility review and free zones. New sewer to be water main quality pipe to accommodate anticipated proximity to relocated water main.
	Extend east end of existing sewer in Holden Street 10 feet +/- and construct one manhole to relocate existing manhole outside of utility review zone.
Storm Sewer	Reconstruct 484 feet +/- of 21 inch RCP, 365 feet +/- of 30 inch RCP, 175 feet +/- of 36 inch RCP, and 15 manholes to relocate existing drainage system and access outside of utility free and review zones.
Xcel	Reconfigure OHP crossing at intersection of 6 th Avenue, 7 th Street, and Royalston Avenue. Pole relocations and raise crossing.
	Raise OHP crossings of alignment south of 6 th Avenue and Border Avenue, 4 th Avenue and Border Avenue and on Holden Street
	OHP entire length of Border Avenue on west side may need to be relocated, temped, and/or supported to accommodate relocation of water main.
Centerpoint	Relocate 856 feet +/- of 6 inch gas main between 6 th Avenue and 4 th Avenue
Energy	Relocate 623 feet +/- of 4 inch gas main between 4 th Avenue and Holden Street
	Reconfigure 8 inch gas crossing of alignment at 4 th Avenue
	Reconfigure 4 inch gas crossing of alignment at 3 rd Avenue

Visual Impacts

There are limited visual impacts due to this configuration of SWLRT on Border Avenue. Alignment is at grade and within existing street ROW.

C-2 SWLRT and Bottineau LRT At-Grade (Two Tracks at 7th Street / Split at Border Avenue)

Similar to the alignment described in Section C-1, both SWLRT and Bottineau LRT cross 7th Street at-grade. With this alignment, only two tracks cross 7th Street, carrying both SWLRT and Bottineau LRT operations. The split of the two alignments occurs on Olsen Memorial Highway Service Road (which would be closed) at a double crossover. There would be conflicting movements at the double crossover, similar to that described in Section C-1 for The Interchange double crossover. The SWLRT westbound track would cross the Bottineau LRT eastbound track in the double crossover. The conflicting movements would be in opposite directions, and would effectively cause a single-track segment supporting bi-directional operations for a length of 200 to 300 feet.



The track geometry on Border Avenue and west is similar to the alignment described in Section C-1. All curves described below between Olson Memorial Highway and Glenwood Avenue would be 10 mph. The SWLRT alignment would turn south from Olson Memorial Highway along the east side of the Border Avenue ROW. The alignment would then turn east along the north side of the Holden Street ROW before turning southwest and entering above the BNSF on a new bridge and then crossing Glenwood Avenue at-grade. This alignment is approximately 1,150 feet longer than the Royalston Center Alignment.



Refer to Figure C-4 for the track alignment.

Figure C-4: Border Alignment with Two Tracks at 7th Street

Light Rail and Traffic Operations

This configuration has the same operational challenges as that described in Section C-1, except that the double crossover movements are west of 7th Street instead of at The Interchange. Having 2 tracks cross 7th Street instead of 4 will improve grade crossing geometry. The scheduling of all four lines in the full build-out for both SWLRT and Bottineau LRT would have to be oriented to protect the movements at the double crossover. This would negatively affect the LRT operations across 7th Street, more so than described in Section C-1, as the double crossover is closer to 7th Street where the need for maximum train separation is required. Also, as with Section C-1, SWLRT would operate at 10 mph on Holden Street and Border Street.

With both SWLRT and Bottineau at-grade, the Olson Memorial Highway/6th Avenue/7th Street intersection is expected to have failing operations in 2030 AM Peak and close to capacity operations in 2030 PM Peak. This configuration would likely require the closure of Olson Memorial Highway frontage road to the east of Border Avenue. Closure of this road is not anticipated to have noticeable traffic impacts to Olson Memorial Highway/6th Avenue/7th Street, but it negatively impacts access to Border Avenue and Royalston Avenue.

Platform Location and Pedestrian Access

Similar to Section C-1.

February 2018



Roadway Configurations

Similar to Section C-1.

Bus Access

Similar to Section C-1.

Utilities

Similar to Section C-1.

Visual Impacts

Similar to Section C-1.

APPENDIX D – EXHIBITS







APPENDIX E – TRUCK TURNING TEMPLATES











































DRAFT-WORK IN PROCESS







DRAFT-WORK IN PROCESS

Appendix C Corridor Protection Barrier Noise Assessment



Internal Memorandum

DATE: December 12, 2017

TO: Kelcie Campbell, SPO

FROM: Lance Meister, Cross-Spectrum Acoustics

SUBJECT: Corridor Protection Barrier Assessment

<u>Summary</u>

There is a concern among residents near the freight tracks that the presence of the corridor protection barrier would cause reflections of noise from the freight trains and LRT trains which would increase noise levels at locations north and south of the freight tracks, respectively.

This memorandum summarizes the results of a noise assessment for the corridor protection barrier between the BNSF freight tracks and the LRT tracks between the Bryn Mawr Station and Interstate 94 based on Wall 403 draft 100% plans prepared in November 2017.

The results indicate that the presence of the corridor protection barrier would increase noise levels to the north of the freight tracks by 0 to 0.4 dB. The results indicate that the presence of the corridor protection barrier would have no effect on the noise levels to the south of the freight tracks.

The presence of the I-394 bridge (included in the Project design evaluated in the Final EIS) would act as a noise barrier for residence to both the north and south as the trains travel under the bridge, reducing both the direct noise and any potential reflected noise from the freight and LRT. There would be no increase in noise due to the bridge for any locations.

Typically, noise level changes of less than 3 dB are not perceptible in an uncontrolled environment such as outdoor locations. The increase in noise due to the barrier is negligible.

It is important to note that there are no noise impacts identified at any residences or other sensitive receptors in the area, and the results of this assessment and the effects of the corridor protection barrier would not change the impact results.

Analysis – North of Freight Tracks

For residences north of the freight tracks, the freight train, acting as a noise barrier for the reflected noise from the freight train, would block the majority of the reflected noise from the corridor protection barrier. In order to assess the effects of the corridor protection barrier at locations to the north of the freight tracks, two different noise models were used to assess the effects of the corridor protection barrier on noise levels at residences and Bryn Mawr Meadows Park to the north of the freight tracks. The inputs to both models included the locations of the freight tracks and the distances between each location. Inputs also included the elevations of the barrier, train and residences to determine the heights of each element relative to each other. A location map is shown at the end of this memorandum.

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FTA Noise and Vibration Model Results

The first model used was the FTA noise and vibration guidance manual noise barrier model which assesses the line source (freight train) propagation, the path lengths and path length differences due to a barrier and the associated barrier attenuation to determine the reduction in noise levels due to the presences of a barrier (the freight train). The model assumed no absorption of noise by the corridor protection barrier or the freight train in the path of the reflected noise. The results of the noise modeling indicated an increase in noise to the north of 0.4 dB at the residences, and an increase of 0 to 0.4 dB at Bryn Mawr Meadows Park, depending on the location within the park relative to the barrier (a barrier is more effective when the receiver is closer to the barrier).

SoundPlan Essentials Acoustic Prediction Software Results

The second model used was SoundPlan Essentials acoustic prediction software, which maps noise levels for outdoor noise sources. The model looked at the noise levels to the north of the tracks with and without the corridor protection barrier. The model assumed no absorption of noise by the wall and a short train (300') as the barrier between the corridor protection barrier and the residences. The results indicated an increase in noise to the north of 0.2 dB at the residences and an increase of 0 to 0.2 dB at Bryn Mawr Meadow Park, depending on the location within the park. For longer train lengths (800' and greater), there would be no increase in noise as the contribution of flanking noise around the train decreases relative to the corridor protection barrier for longer train lengths.

Analysis – South of Freight Tracks

For residences to the south of the LRT tracks, the LRV would act as a significant noise barrier to the reflected sound off the corridor protection wall and block the reflected noise from the LRT vehicle. The LRV is approximately 10 feet higher in elevation than the corridor protection wall and there would be no path for a reflection from the wall to pass over the vehicle. In order to show this, two different noise models were used to assess the effects of the corridor protection barrier on noise levels at residences to the south of the LRT tracks. The inputs to both models included the locations of the LRT tracks and the distances between each location. Inputs also included the elevations of the barrier, train and residences to determine the heights of each element relative to each other. A location map is shown at the end of this memorandum.

FTA Noise and Vibration Model Results

The first model used was the FTA noise and vibration guidance manual noise barrier model which assesses the line source (LRT) propagation, the path lengths and path length differences due to a barrier and the associated barrier attenuation to determine the reduction in noise levels due to the presence of a barrier (the LRT). The model assumed no absorption of noise by the corridor protection barrier or the LRT in the path of the reflected noise. The results of the noise modeling indicated an increase in noise to the south of less than 0.1 dB at the residences.

SoundPlan Essentials Acoustic Prediction Software Results

The second model used was SoundPlan Essentials acoustic prediction software, which maps noise levels for outdoor noise sources. The model looked at the noise levels to the south of the tracks with and without the corridor protection barrier. The model assumed no absorption of noise by the wall and the LRT as the barrier between the corridor protection barrier and the residences. The results indicated an increase in noise to the south of 0.0 dB at the residences.

Location Map - Attached



Appendix D Public Involvement

Public Engagement Plan for BNSF Agreement Modifications

Proposed Corridor Wall Protection and Trail Design Public Engagement October 12, 2017

The Metropolitan Council takes public engagement seriously as demonstrated by the hundreds of community meetings/events/presentations held which attracted thousands of residents and businesses as well as establishing advisory groups to advise staff and public officials during project decision-making. The proposed wall design process is no different and the Council has designed a process to ensure meaningful and transparent engagement. Public input will occur through a variety of methods:

Basset Creek Valley Working Group

The Basset Creek Valley Working Group (BCVWG) is modeled after the success of the Kenilworth Landscape Design Group. The BCVWG was created to:

- Serve as a voice for the community and liaison to the appointing organization;
- \circ $\;$ $\;$ Provide guidance on the aesthetic treatment of the corridor protection wall; and
- Advise on communications and outreach strategies related to the process.

The group had their first meeting on October 4 and toured the corridor on October 12. It is anticipated they will meet an additional 2-3 times through early December 2017. All the working group's meeting information is posted on the project's website including agendas, presentations and meeting notes. The work of the BCVWG will be shared with the SWLRT Corridor Management Committee during the design process. Meetings of the BCVWG and the SWLRT CMC are open to the public.

- Presentations to Community/Neighborhood Groups: Our outreach team has provided an overview of the proposed wall to and received feedback from the following groups to date:
 - 9/13: Bryn Mawr Board
 - 9/14: Harrison Neighborhood
 - 9/19: Bassett Creek Redevelopment Oversight Committee
 - 10/11: Bryn Mawr Board

Staff will attend additional meetings with community groups through December on this topic.

- Corridor Tours: SPO hosted two public policy tours in September with more planned in October. In addition, three public tours are scheduled to encourage local residents to learn about the proposed wall. They include the following dates and times to accommodate a variety of schedules and needs of the public:
 - Monday, October 23, 4:30 6:00 p.m.
 - Thursday, October 26, 12:00 1:30 p.m.
 - Wednesday, November 8, 7:30 9:00 a.m.
- Community Open House/Pop-Up Events: A community open house will be held as part of the engagements process. It is anticipated the open house will be held the week of November 13. In addition, staff will host pop-up info sessions along the trail to share information with commuter and recreation trail users.
- Project Website: The project's website (SWLRT.ORG) serves as the repository of project information for the public. The website contains a "Construction" page that includes information about the freight rail corridor protection for the project and will be updated as design progresses.

Meeting Summaries from Engagement Events

Date: September 13, 2017 Time: 6:30-8:00 PM Meeting location: Bryn Mawr Elementary School Cafeteria, 252 Upton Ave S, Minneapolis, MN 55405 Name of Stakeholder: Bryn Mawr Board Participants: 20, including board members and other residents SPO Staff: Sophia Ginis, Rachel Auerbach

Main Themes:

- Updated Bryn Mawr board on dimension/locations of SWLRT corridor protection wall, answered questions relating to the wall
- Went over engagement process going forward for input on wall aesthetics
- Provided update on BLRT upcoming early construction and OCS design

Summary of meeting:

Sophia reviewed the locations and dimensions of the wall, walking the board through some graphics that had just been developed by SPO that showed plan view and cross section details. Sophia explained that the wall was added because BNSF is requiring it as a condition for sharing their property. She reviewed the dimensions from the freight and LRT side and explained why they are different, as well as distances for the trails.

Board members asked about why the project office hadn't anticipated the wall, who was paying for it, why BNSF wanted it, and how trail access would be accommodated. Board members also asked about animal crossings, if passengers in the LRT would see the wall or be above it, and about ways to deter graffiti. There was also a long discussion about whether the wall would bounce more noise from the freight trains back into the neighborhood.

Sophia shared a brief BLRT update regarding Bassett Creek Tunnel construction, including OMH closure, detours, and timeline. She also explained how BPO was soliciting feedback on the design of unique OCS poles.

Follow-Up

- Continue updating Bryn Mawr board on wall as more details are unveiled
- Share details of Bassett Creek Working Group
- Share comments about noise concerns with environmental team

Date: September 14, 2017 Time: 6:00-7:00 PM Meeting location: Harrison Neighborhood Association, 503 Irving Ave N, Minneapolis, MN 55405 Name of Stakeholder: Harrison Neighborhood Residents Participants: 15 SPO/BPO Staff: Sophia Ginis, Shelley Miller

Main Themes:

- Provided update on BLRT upcoming early construction and OCS design
- Update members on the proposed Corridor Protection Wall

Summary of meeting:

The first topic of this meeting was to solicit input on BLRT OCS design. The group preferred paint to toppers and that full corridor should have painted polls instead of focusing on wayfinding or just the station area. If toppers are used they should just be a few and they should be visible from the station. The group thought that there didn't need to be one theme, that graphics could change as one progresses down the corridor. Some suggested that the design should change as it moves between station, possibly every three blocks to provide sense of movement. Themes suggested included diversity, nature, family and movement.

Sophia shared an update regarding Bassett Creek Tunnel construction, including OMH closure, detours, and timeline.

Sophia reviewed the proposed locations and dimensions of the SWLRT Corridor Protection Wall. Sophia explained that the wall was added because BNSF is requiring it as a condition for sharing their property. She reviewed the wall height from the freight and LRT side and explained why they are different, as well as distances for the trails. Residents expressed that it didn't seem like a significant addition.

Follow-Up

- Bring BLRT OCS concepts
- Bring updates on other opportunities to comment on the proposed SWLRT Corridor Protection Wall

Date: September 19, 2017
Time: 6:00-8:00 PM
Meeting location: Harrison Neighborhood Association, 503 Irving Ave N, Minneapolis, MN 55405
Name of Stakeholder: Bassett Creek Valley Redevelopment Oversight Committee (ROC)
Participants: 20 from Harrison and Bryn Mawr
SPO Staff: Sophia Ginis

Main Themes:

- Updated Bryn Mawr board on dimension/locations of SWLRT corridor protection wall, answered questions relating to the wall
- Reviewed the engagement process going forward for input on proposed wall aesthetics

Summary of meeting:

Sophia reviewed the locations and dimensions of the wall via a presentation that had detailed plan view and cross section details. The Committee asked many questions about the dimensions and access points. She reviewed the dimensions from the freight and LRT side and explained why they are different, as well as distances for the trails.

Committee members asked about where the Bassett Creek Tunnel was located. They also brought up similar concerns as BMNA about graffiti and noise.

Follow-Up

• Solicit additional feedback in October

Date: October 11, 2017 Time: 6:30-8:00 PM Meeting location: Bryn Mawr Elementary School Cafeteria, 252 Upton Ave S, Minneapolis, MN 55405 Name of Stakeholder: Bryn Mawr Board Participants: 20 SPO Staff: Sophia Ginis, Rachel Auerbach

Main Themes:

- Solicit feedback on possible aesthetic design direction for the corridor protection wall
- Give an overview of the environment analysis being undertaken

Summary of meeting:

Sophia reviewed aesthetic design ideas to date and asked for input. Barry and Sarah from the Bassett Creek Valley Working Group also added their perspective from what the committee has discussed. Overall the Board agreed with the direction of the BCVWG, to keep the wall simple, possibly using a block texture. The board also supported the idea of planting vines and having graphics at select locations. People liked the prairie plants and Jay suggested that we could reflect neighborhood and railroad history in the graphics, as many of the people that original lived in the surrounding area worked in the yards for the railroads.

Board members were also invited to attend the upcoming walking tours and the plan for a November 15, 2007 Open House was mentioned.

Sophia also reviewed that FTA and the Council are conducting environmental evaluation processes that will:

- Address Minnesota Environmental Policy Act and NEPA requirements
- Evaluate proposed changes to Project design since the Final EIS published
- Consider the presence of the proposed wall to documented impacts and mitigation
- Determine if additional environmental evaluation is required
- Document will be available to the public

Topics the review will include were discussed as well as the anticipated schedule. A brief overview of the 106 Process and anticipated adverse effect was also discussed.

Barry Schade then spoke in support of a petition to encourage the Met Council to perform an EAW of the proposed wall and explained why he thought the process was necessary. Barry Schade moved to have BMNA petition the Met Council to perform an EAW and after a couple edits the motion was approved by the board. The board stated that they would not be collecting signatures but would send the resolution official to SPO:

Resolution from BMNA

10/11/2017

Petition for EAW on crash wall

WHEREAS, the Bryn Mawr Neighborhood Association (BMNA) has strongly supported the development of the Southwest LRT (Green Line Extension) by involvement and resolutions in excess of ten years; and

WHEREAS, the Metropolitan Council has recently and suddenly announced a commitment to BNSF to add a crash wall in Bryn Mawr without opportunity for public review or input; and

WHEREAS, this sudden and significant addition to the project, without environmental review, raises questions and concerns over the impact of the crash wall on wildlife, sound and visual separation; and

WHEREAS, the crash wall threatens to again divide the Bryn Mawr neighborhood in the manner of Highway 394 and create an additional symbolic barrier between northern and southern Minneapolis neighborhoods.

NOW THEREFORE BE IT RESOLVED, that the Bryn Mawr Neighborhood Association petitions the Metropolitan Council to order the preparation of an Environmental Assessment Worksheet before adding the crash wall to the SWLRT (Green Line Extension) project, and on October 11, 2017, the BMNA passed a resolution in support of this petition.

Date: October 17, 2017 Time: 6:00-8:00 PM Meeting location: Harrison Neighborhood Association, 503 Irving Ave N, Minneapolis, MN 55405 Name of Stakeholder: Bassett Creek Valley Redevelopment Oversight Committee (ROC) Participants: 20 from Harrison and Bryn Mawr SPO Staff: Sophia Ginis, Rachel Auerbach

Main Themes:

- Solicit feedback on possible aesthetic design direction for the proposed corridor protection wall
- Provide an overview of the environment analysis being undertaken

Summary of meeting:

Sophia gave the same presentation to this group as the BMNA had just received. She reviewed design ideas to date for texture, color, graphics and plantings. She also explained the feedback that had been received from Bryn Mawr and the Bassett Creek Valley Working Group. The ROC agreed that the wall design should be kept simple so that it fades into the background. They liked the idea of graphics where the wall is closer. ROC was concerned people would attempt to walk on top of the wall and suggested a curved wall design.

Sophia reviewed that FTA and the Council are conducting environmental evaluation processes that will:

- Address Minnesota Environmental Policy Act and NEPA requirements
- Evaluate proposed changes to Project design since the Final EIS published
- Consider the presence of the proposed wall to documented impacts and mitigation
- Determine if additional environmental evaluation is required
- Document will be available to the public

Topics that the review will include were also discussed as well as our anticipated schedule. A brief overview of the 106 Process and anticipated adverse effect were also discussed.

Vida presented the Bryn Mawr Board resolution to the ROC for consideration. The committee members were divided on whether to pass the resolution. They voted, and the resolution did not pass. They asked to see our analysis and then would reconsidered the topic if needed.

ROC members were also invited to attend the upcoming walking tours and the plan for a November Open House was mentioned. ROC members agreed to help publicize the walking tours.

Follow-up

- Update them on environmental review
- Check back-in on aesthetic development in 2018 (as they don't meet again until then)



Basset Creek Valley Working Group

October 4, 2017 Southwest Project Office 6465 Wayzata Blvd, Suite 500 St. Louis Park, MN 55426 6:00pm -8:45pm

Meeting Summary

Committee Members: Sarah Nettleton, Barry Schade, Tim Bildsoe, Ben Ptacek, Keith Prussing, Vida Ditter, Margaret Anderson Kelliher, Christopher Hoffer

Staff present: Southwest Project Office: Sophia Ginis, Kelcie Campbell, Sarah Ghandour, Rachel Auerbach, Ryan Kronzer, Greg Mathis. City of Minneapolis: Paul Miller. Perkins+Will: John Slack. WSB: Cory Schultz. CDG: Chelsea Moore-Ritchie

1. Welcome and Introductions

Sophia Ginis called the meeting to order and asked for a round of introductions, including where members are from and their interests. Sophia briefly walked through the agenda and schedule overview.

2. Overview of Design Teams (P+W and AECOM) Expertise

John Slack of Perkins+Will and Cory Schultz of WSB gave an overview of their expertise and previous work on the project.

3. Working Group Roles and Responsibilities

The working group appointed Sarah Nettleton as chair. They reviewed the working principles and no changes were suggested.

4. Schedule & Community Engagement Overview

Sophia reviewed upcoming activities and the planned schedule. The committee discussed their next meeting and a corridor tour date.

Committee members asked general questions about the wall. Margaret asked how much of the specifications of the wall had been spelled out in BNSF negotiation. Staff answered that the dimensions of the wall had been determined. Barry asked if there is a target budget for the wall. John answered that since the wall is at 20 percent design, there is no target amount yet. The wall is \$20 million overall. Margaret asked if BNSF is sharing the cost of the project. Staff explained that they are not contributing to the cost. Barry asked who is being protected by the wall, and staff answered that the wall is designed as a protective barrier for LRT users if a freight train should have an incident.

5. Overview of Corridor Protection Wall



Ryan reviewed the wall design to date for background. The SWLRT tracks, from approximately Bryn Mawr to Royalston Avenue/Farmers Market Station, will be located along BNSF property. As part of the agreement between BNSF and Metropolitan Council, BNSF required a wall.

Margaret asked if berms could serve the same purpose while being more cost sensitive and aesthetically pleasing. Ryan responded that a berm would require more BNSF property and is not currently an option.

Committee members discussed ideas and concerns. Committee members expressed concern about graffiti/tagging and maintenance along the wall. Staff responded that when choosing the material, they will consider graffiti and maintenance. Committee members were concerned about opportunities for animal travel, and suggested that it could make sense to include animal crossings where water runs through. Staff will look into it. Noise and sound absorption issues were brought up several times as a concern.

Margaret mentioned that many people cross at grade under 394, and asked if a legal grade crossing was considered. Ryan responded that most at-grade railroad crossing occur at roads, and since this is going over railroad and two LRT lines, an at-grade crossing would not be safe.

Briefing on Section 106 Review

Kelcie and Sophia reviewed that the BNSF right-of-way is a historic property. A preliminary analysis is anticipating an adverse effect under Section 106. Vida asked what would happen if there is an adverse effect that can't be mitigated under the 106 process, and Greg responded that there is a commitment to minimize or mitigate adverse effects.

Sophia and Kelcie reviewed the Post-Rod evaluation that would occur with a completion target in December. Barry asked why an EAW was not being completed, as that would be better for public perception. Kelsey responded that the first step is an assessment for FTA to confirm the environmental review process, and they will decide if additional requirements are necessary.

Aesthetic Design Opportunities Discussion

Staff presented possibilities for design of the wall including textures, reveals, metal, coping, pilasters, color, graphics, and landscaping. Due to maintenance issues, murals and full wall length graphics are outside the scope of the wall.

The committee discussed what they liked and disliked of the designs that had been presented. All agreed that vines were a good option to consider. Most committee member suggested that we should pursue a more tradition style like the blocks on the first texture slide. It was also suggested to consider an abstract pattern. Overall the committee agreed that the focus should be to have the wall recede and not be too busy. Committee member suggested that the pattern should not be something that will become dated quickly.

Next Steps



Sophia thanked the committee. The schedule had already been discussed earlier in the meeting. The committee will meet in late October to review design proposals. The Chair adjourned the committee.



Bassett Creek Valley Working Group

Friday, October 27, 2017

Southwest Project Office 6465 Wayzata Blvd, Suite 500 St. Louis Park, MN 55416 4:00 PM – 6:00 PM

Meeting Summary

Members present: Sarah Nettleton, Barry Schade, Vida Ditter, Tim Bildsoe, Ben Ptacek, Damon Farber

Staff and consultants present: SWLRT Jim Alexander, Sophia Ginis, Sarah Ghandour, Ryan Kronzer, Kelcie Campbell, Rachel Auerbach. Perkins+Will: John Slack. WSB: Cory Schultz. CDG: Chelsea Moore-Ritchie

1. Welcome and Introductions

Committee Chair Sarah Nettleton welcomed the group and introduced the meeting schedule. The meeting was called to review wall design and placement suggestions following the group's October walking tour.

2. Overview of Railroad Negotiations

Jim Alexander, the SWLRT Project Manager, joined the first part of the meeting to give an overview of the project negotiations with BNSF. He discussed BNSF's recent work with the California high speed rail and corridor protections as well as the industry's resistance to selling or leasing property or assets. While the environmental review needs to be complete before the agreements are executed the negotiations are coming to a close.

Committee member Vida Ditter brought up concerns for adding another barrier that blocks crossings for animals. She asked if the wall could be arched such as the stone arch bridge to allow animal access. Mr. Alexander replied the wall needs to be continuous to prevent not only a train from crossing the barrier, but debris as well. Various committee members also asked about how far they can push back against BNSF or other railroad companies. In this case, Mr. Alexander explained that the Met Council has exhausted all other options for deterring the wall. He also explained the details of the tail track to the committee. The committee thanked him for his candor and for sharing his insight into the process.

3. October 12 Working Group Tour Recap

The committee provided thoughts and feedback from the corridor tour. Many expressed that the tour was helpful in visualizing the height and distance of the wall, elevation changes, and current conditions (existing barriers, trash, current infrastructure, invasive species) of the area. Multiple members expressed that the texture of the wall would not be important in most areas because of the distance, and they prefer the money to be spent elsewhere. Members noted that with the height changes from one side of the wall to the other, small animals crossing were a moot point. Ben Ptacek noted that the



far east side of the wall won't be as much of an issue since it rises as a retaining wall, but that there are a few pinch points that will be a challenge. Sarah Nettleton mentioned the great views from Bryn Mawr Meadows and the importance of preserving them. She also brought up the invasive species in the area and asked about the possibility of replanting. Ryan Kronzer said that the Park Board was planning to attend the meeting and that this area will be included in the master plan process. John added that the Park Board has just starting the design process in the north and Sophia added that the park master plan feedback process was underway. John also mentioned that much of the problematic plants are on the BNSF right-of-way, and little could be done on their property.

4. Environmental Review Update

Kelcie Campbell gave an update of the environmental review process as well as status update. The intent is to share finding this with the working group as soon as possible, but they are working with FTA to do a thorough QAQC to ensure good work is done on both sides. Kelcie stated that there's a potential December timeframe for getting this information to the committee.

Barry Schade expressed concern that the environmental review process was only doing the minimum to satisfy federal guidelines, and that he and the Bryn Mawr Neighborhood Association (BMNA) are "urging the Met Council to do a good job of the environmental review process." Sarah Nettleton asked that the BMNA petition be passed out to the committee for reference, however, the working group decided to take no action. Barry asked that the committee be kept informed on the process. Sophia added that some documents such as the 106 process might happen after the bulk of the design work is done, but that the committee can still meet once these documents have been completed. She also noted that the environmental review doesn't limit many of the design elements. Kelcie added that the work of the committee on the design of the wall is likely above and beyond any outcomes of the environmental review process.

5. WORKSHOP: Presentation of Design Concepts and Discussion

John Slack from Perkins+Will and Cory Schultz from WSB provided an overview of the design concepts to date. They reviewed suggested locations for different aesthetic wall treatments, landscaping, small animal crossings and historic interpretive elements. Committee members reviewed textures, graphics, plantings and colors.

Committee members requested additional cross sections and visuals to be provided for the open house. It was discussed that no grasses could be placed between the wall and LRT fence per Metro Transit maintenance policy, but vines were fine.

The Committee members discussed lighting along the corridor and were split on the extent of lighting needed; some wanting significantly more light for safety, while others wanting to preserve the natural area, the dark sky being a part of the landscape and important to the health of the prairie.

Damon Farber brought up the budget for the project. No specific budget was provided, but Sophia assured the committee that the ideas being proposed were within the realm of possibilities for the project and that the wall treatments would be added as a change order to the construction package.

Vida pointed out the necessity for walkway access from transit to the impound lot, and Sarah Ghandour assured her that this circulation had already been built into the plan. Vida also wanted to make sure that landscaping does not impede sight lines needed for safety.



Cory Schultz provided a basic overview of wall treatments and asked the committee for their feedback. The majority of the committee noted the importance of keeping large stores of the correct color paint on hand to cover graffiti. When it came to the color of the wall, most committee members were in agreement that a darker wall color would help it recede into the landscape.

The design of the small animal crossing was also discussed. Cory showed the current design which has been tentatively approved by BNSF. The design would create a ramp along the LRT barrier wall that animals would follow until they reach the 1'6" \times 2' opening in-between the joins for the barrier wall. Vida brought up concerns that larger animals such as deer couldn't get through, but Sophia explained that we don't want to create a condition where people can go through, putting them in danger and BNSF won't allow it.

The committee discussed what they liked and disliked about the design options. Most committee members felt that the design team was on the right track and that vines and landscaping were important. Committee members were concerned about kids playing on top of the wall, but there was no consensus on ways to address it.

7. Meeting Schedule - November 15 Community Open House

Open house November: 15th, 5-7pm Open house debrief/ refine final design directions:

• Tuesday, December 5th 5:30-7:30

Final Concept Review

• Tuesday, December 19th 5:30-7:30

8. Questions/Open Discussion

- Kelcie and Sophia went over the section 106 process. The 106 process focuses on minimizing
 and mitigating adverse effects to historic elements. Interpretive elements around the wall could
 be used to relay the history of the area. Vida asked if interpretive signs could be put along the
 trail, and Greg answered that yes, that would be one way to mitigate adverse effects. Barry
 added that Neil Trembley and Keith Prussing would be great resources for this.
- The group transitioned to discussion of animal passage. Sarah commented that perhaps money could be saved for something else, and the group agreed that money would be better spent elsewhere.
- The group began discussing perceptions. Vida expressed that she is worried about perceptions and animosity between different constituents of the city.
- Tim brought up the open house, expressing that it is better to go in with options and ask attendees what they like instead of going in with a decision already made. Sophia responded that the questions asked at the open house will be the same questions that the working group was asked, and that there will be opportunities for input at the open house. Working group members suggested voting for options at the open house, and Sophia responded that voting will happen. Attendees will be able to put stickers on the options that they prefer.

Summary of Corridor Protection Walking Tours Location: Southwest LRT Project Corridor

Date: October 23, 2017 Time: 4:30-6:00 PM Participants: 10 SPO Staff: Sophia Ginis, Rachel Auerbach, Sarah Ghandour, Trevor Roy

Date: October 26, 2017 Time: 12:00-1:30 PM Participants: 8 SPO Staff: Sophia Ginis, Ryan Kronzer, Trevor Roy

Date: November 8, 2017 Time: 7:30-9:00 AM Participants: 8 SPO Staff: Sophia Ginis, Brian Runzel, Steve Kummer, Trevor Roy

Main Themes:

- Provided members of the public an opportunity to tour the area where corridor protection wall is proposed to be constructed; and
- Responded to questions and concerns from attendees about the proposed wall or overall project.

Summary of meetings:

- Attendees gathered at the intersection of Kenilworth and North Cedar Lake Trails, where staff went over general tour information and safety precautions.
- Staff led groups to four stops along the proposed wall segment, showing the location and height of the wall in each area as well as proximity to trails. Additional topics discussed were lighting and safety features along the trail. Details about the Royalston area was given to participants at the last stop if they wished to keep walking.
- Staff answered questions throughout the tour about the design of the wall, how graffiti will be dealt with, the trail system, and the environmental review processes.
- During all three tours, participants commented on how the wall seems like a less significant impact when seen in the current setting.
- Other comments on the tours focused on how graffiti would be handled, schedule/opportunity to provide aesthetic input, crossing locations, noise and previous project details.

Follow-Up:

• Continue providing opportunities for the public to learn about the wall



SWLRT Corridor Protection Wall Open House

Bryn Mawr Elementary School, 252 Upton Ave S, Minneapolis, MN 55405 November 15, 2017

This event was an open house format with no formal presentation. Comments were received on comment cards, post-it notes, or written on boards. Participates also voted for design options.

65 People attended23 Comments were received95 Individual votes were cast

*All comments are recorded verbatim from comment cards and post-it notes. No grammatical, word choice changes or spelling has been corrected. If handwriting is unclear, then correct spelling is used and the most contextual word choice is assumed or marked illegible.

Comment Cards/General Post-it Notes

- 01. Forecast Public Art is happy to serve as a resource regarding aesthetics and potential public art elements on or in the vicinity of the wall.
- 02. I don't like the wall at all
- 03. Don't build it through Kenilworth Trail!
- 04. Please move this project forward. Much of the concern smells of "Red Herrings" Those who oppose the SWLRT continue to attempt to de-rail this project. Important to B.C.V. and cities, including Minneapolis, along this corridor
- 05. Please inform nearby residents (Bryn Mawr) if results of further environmental impact study regarding the wall. It will add to the feeling of being walled off from the rest of the city, restrict movement and block wildlife movement and potentially add noise. We would like to mitigate all of this as much as possible.
- 06. Thank you for holding this session on the wall. It's very helpful to see what it may actually be. However, it is still the wrong route! Tunnel may damage chain of lakes beyond repair. Go back to the drawing board on the route thru Minneapolis.
- 07. Concerned that drones and autonomous cars and other technology will render this expensive and permanent infrastructure obsolete before long. Making it easier to leave our Bryn Mawr neighborhood will also render incentive for local business development. Property values will also be impacted, better or worse. Maybe better for me!
- 08. Mistakes can be remedied, so 40 to 70 years Minneapolis purchased a right of way. Sorry it missed the mark, they did not have a crystal ball into the future. Muse we tied up/down/strungup by that past. Has no one yet discovered a way to stop BSNF in it's tracks.
- 09. 200 passengers a few feet away from a 650 ton freight train! We need a crash wall. Strongly support!
- 10. NO LRT!
- 11. No station parking equals cars parking on residential streets
- 12. Blue emergency call buttons (1) at station (2) in skyway ped-bridge
- 13. Can we add a bike locker at the Bryn Mawr station to store bikes for communities?

Comments Received



- 14. Widen the Penn Bridge for pedestrians at left 6' each way
- 15. Can we accommodate a bike lane on the bridge and can the elevator accommodate many bikes on it?

<u>Texture</u>





Comments Received



Comments Received



Option 1: 9 votes

Comments:

16: Not conducive to graffiti

17: None of the above kjan

18: Doesn't work w/ vines

Option 2: 16 votes

Comment: Can paint over graffiti easiest

Option 3: 2 votes

Option 4: 1 vote

Option 5: 3 votes

Additional Comments

19: None of above Kjan

20: OIL TRAINS + LRT = BLAST

21: 200 passengers 3 feet away from 650 ton freight trail = we need a crash wall. Thanks.

Design Options


Comments Received



Option 1 Vines: 29 votes Option 2 Graphics: 8 votes Option 3 Abstract Graphics: 4 votes Comments:

22: None of the above Kjan

23: Like Best color + texture to work w/vines

<u>Color</u>



Comments Received



Option 1 Light: 0 votes Option 2 Medium: 4 votes Comments:

- 24. Consider multicolor scheme that blends. Also: consider no solid wall, but structural steel with plant life to coverage. Like this (illegible)
- 25. None of the above Kjan
- 26. Which looks best w/ vines gray or charcoal

Option 3 Dark: 23 votes





Flyer for Event





SWLRT Proposed Corridor Protection Pop-Up Events

North Cedar Lake Trail/Kenilworth Parkway Intersection November 29 and 30, 2017

Two pop-up events were held in November 2017 along the trail to share information with commuter and recreation trail users. The two pop-up events were held:

- Wednesday, November 29, 11:30 a.m. 12:30 p.m.
- Thursday, November 30, 3:30 p.m. 4:30 p.m.

The pop-up events were advertised using the Project's Twitter account for which has 495 followers. Twenty-five (25) people attended the pop-ups. Verbal comments were received about the project and three (3) individual votes were cast to reflect their design preferences.

Texture

Option 1: 2 votes Option 2: 1 vote

Summary of Verbal Comments

- Dark colors are preferred
- Use a texture that deters graffiti
- Vines are greatly preferred and seen as a method to deter graffiti



Bassett Creek Valley Working Group

Tuesday, December 5, 2017 Southwest Project Office 6465 Wayzata Blvd, Suite 500 St. Louis Park, MN 55416 5:30 PM – 7:30 PM

Meeting Summary

Members present: Sarah Nettleton, Barry Schade, Vida Ditter, Damon Farber.

Staff and consultants present: Southwest Project Office: Sophia Ginis, Sarah Ghandour, Ryan Kronzer, Kelcie Campbell. Perkins+Will: John Slack. WSB: Cory Schultz. CDG: Adrian Diaz.

1. Welcome and Introductions

The group did a quick round of introduction. Sophia Ginis gave an overview of the agenda.

2. Environmental Review Update

Kelcie Campbell gave an update of the environmental review process, explaining that in late November, the Federal Transit Administration and the Southwest LRT project office decided to prepare a Supplemental Environmental Assessment (SEA) related to the addition of the proposed corridor protection wall. The document also covers the State's Environmental Assessment Worksheet (EAW). She explained that an EAW is essentially a comparable level of environmental review as the SEA, only at the Minnesota level. It will be one document when published with some of the EAW questions as an appendix if needed. The scope will focus on only the design changes made after the FTA issued a Record of Decision. It will include a review of the proposed corridor protection wall as well as other topics. The SEA will be published for public review and a 45-day comment period.

The group asked Kelcie if anything would be placed on hold while the environmental review was being conducted. Kelcie responded that is was unclear yet if there would be an impact to the current schedule. The environmental review needs to be complete before the wall is added to the project.

Committee member commented that the articles in the newspaper about the environmental review statement were not clear.

3. Open House Debrief

The committee viewed open house boards that showed the public's opinions on the wall's design, a summary of comments, and discussed what they heard. The committee commented that the public's preference was similar to theirs.



4. 106 Consultation Meeting Debrief

Kelcie Campbell gave an overview of the 106 Consultation meeting. She said most of the meeting centered around discussion of design for the wall. Kelcie proceeded to explain the 106 consulting parties' design opinions were similar with the Committee and open house results.

Kelcie explained that most individuals at the 106 Consultation meeting were also in favor of implementing a darker color since it would help the wall recede into the landscape. Additionally, the people at the 106 meeting supported a block texture. A committee member mentioned that they were glad to see everyone on the same page for the design.

SPO staff also explained that MPRB had expressed a desire for landscaping in the park to occur through the master planning process to be in-line with what may be in the park in the future. The group discussed analyzing vegetation options through the Park Board Master Plan so as to not override the Park Board's past or current work. The committee mentioned residents may not be too happy to work with the Park Board as implementation of the Master Plan may happen significantly in the future.

Kelcie spoke about the different 106 mitigation options for the wall, explaining the group thought a more dynamic physical interpretation was preferred.

5. Wall Design

Based on the feedback to date John Slack and Sophia Ginis asked if the block texture should be the one used. If so, should it be both sides, or should any other textures be used? Committee members stated that it should be on both sides and the whole wall. Other textures were not needed. The same texture on both sides would provide a nice aesthetic look for both residents and transit users. Committee members asked if the texture selected would be a "stamp" or actually built into the whole design. John Slack clarified that the texture would be a simple "reveal stripes."

The group unanimously agreed that vines should be used on both sides of the wall where there is space. The group reviewed the roll plot and suggested where vines might need to be added on the eastern portion. SPO agreed to see if there is space. The group agreed that the placement on the west side seemed sufficient and will review final placement at the next meeting. The group reviewed locations where the OCS will be on the wall and vines spacing would need to be considered. The group just asked that SPO plant that space as much as possible.

Since vines were preferred over graphics the group discussed if there should be graphics anywhere on the wall. The group discussed the importance of having graphics that represented the surrounding community and discussed possible ideas such as reflecting the rail road, nature, or draw inspiration from the wickets. The committee discussed that having something simple would be best. The group was interested in the having the name of the station and possibly having a different texture just at the Bassett Creek Valley Station. The group was shown existing planned graphics for the wickets at the Bassett Creek Station and further agreed the name of the station would be more than enough.

The group was provided with a palette of potential colors for the wall. Based on requests, John Slack showed the group a rendering of the wall in the winter. He also highlighted that native trees would be planted between the wall and trail in the Bryn Mawr Station area and showed those rendering. John



mentioned that the type of tree species was not yet selected. The group continued to discuss the way each color would appear in nature instead of an indoor room.

Committee member Vida mentioned she preferred the browner grey color because it would blend in with the ground and nature. The other committee members said they preferred a cooler grey color. The committee discussed having a site visit to see how each color looked outdoors—they decided they would prefer the design team just go out. The committee agreed that all the dark pallet options would be ok and want to hear design team's recommendation after their field visit.

The committee recommended that the project stockpile paint for the wall to handle graffiti in the future. The project office discussed how it would be possible to do that. Committee members asked how the wall's color would change overtime and how that would affect painting in the future and discussed about how in 10-15 years the match color may be different, but it should still be matched.

6. Next Steps

- Final Concept Review, Tuesday, December 19, 5:30-7:30 PM
- There will be another committee meeting when the SEA is published

7. Adjourned 7:30 PM



Bassett Creek Valley Working Group

Tuesday, December 19, 2017 Southwest Project Office 6465 Wayzata Blvd, Suite 500 St. Louis Park, MN 55416 5:30 PM – 7:30 PM

Meeting Summary

Members present: Vida Ditter, Margaret Anderson Kelliher, Tim Bildsoe, Ben Ptacek, Damon Farber, Barry Schade, Sarah Nettleton.

Staff and consultants present: Southwest Project Office: Sophia Ginis, Sarah Ghandour, Ryan Kronzer, Dan Pfieffer, Kelcie Campbell. Perkins+Will: John Slack. WSB: Laura Amundson, MnDOT: Greg Mathis. MPRB: Michael Schroeder. CDG: Julie Aldrich

1. Welcome and Introductions

Sophia Ginis welcomed the group and introduced the meeting schedule. She indicated Paul Miller would not be present for the meeting but would reach out to the Steering Committee for an update. The meeting was called to review wall design, landscaping planting locations, and the Basset Creek Station wall signage.

2. General Updates

Sophia provided a summary of updates to the project schedule. She explained the bid date changed due to the need to complete the environmental review process; the date has been moved from January 9, 2018 to May 3, 2018. Damon Farber inquired what the Award of Contract date will be; Ryan indicated it would be a few months after bids were due and likely late summer or early fall. Sarah G commented that project construction would begin the latter half of 2018. Kelcie stated that they are working on an environmental assessment that would wrap up late winter or early spring and they will provide an update to schedule at that time.

3. Final Design Review-Landscaping

John Slack with Perkins+Will provided an overview of the landscaping related developments discussed the committee's third review of the plan. He showed the group a roll plot plan view of the corridor and identified locations for specific landscape improvements, wall treatments, and enhanced lighting. John pointed out a specific area on the plan that showed where landscaping could be added to the park but explained that it was on park board property and not currently in the plans but was left on the document at the request of the committee.

John reviewed proposed vine planting locations throughout the corridor. Vines would be planted on both sides of the wall but there are some places where vines are primarily one side due to right of way. He identified areas on the plan showing landscaping off the wall, closer to trails and which would include



trees and shrubs. He stated more green has been added at the west end at the utility pole and landscaping at the ground plane is intended for bicyclists and pedestrians so would likely include grasses.

John explained that vine planting locations have been expanded based on areas where they have the greatest chance of survival. Vines are not shown where there are OCS pole conflicts. Vines will be planted in a soil pocket, which John indicated they are still working to further define but that he hopes will be continuous through the corridor planting zones. The size of the pocket will be 2'width x 2' depth x 20' length with gaps between pockets. Damon asked John to explain the dimensions of the pocket and how they arrived at these dimensions. John indicated the dimensions of the soil pocket are based on soil volume per plant. He further explained the root systems will be bound to the soil pockets since there is no soil below and the ballasts are kept clean.

Vida inquired if there is enough protection from the cold for vines. Damon explained the plants need to be dormant and freeze or would otherwise begin growing in winter which would kill them. Michael Schroeder commented a larger concern will be the thermal conductivity of the wall. Damon suggested the wall should incorporate insulation to prevent heat transfer. John responded they are early in the development of details and could look into this.

John reviewed the planting species selections with the team. He commented they would use the best species but there are few appropriate options to choose from. John showed an image of a mature planting and explained Boston Ivy is the recommendation due to its drought tolerance and long-term growth density. Damon commented that where posts exist plants will be kept 50' clear of the OCS, but that the LRT downtown required only 15' clear from tree branches and asked why can't we get closer? Sarah G answered that they can get a little closer. Damon responded he would like them to be closer at Bryn Mawr. Sarah G explained that vines are different than trees and can creep further so they don't want them to be too close; she indicated that at Hiawatha the trees have been taken down where they impacted clear zones. She further commented that they want to be intentional so there are no removals later. Damon responded it is good to be intentional and so the intention should be to get as much in as possible. He explained the cost is negligible and that we should do all we can instead of worrying about what we can't do. John commented 50' spacing was determined awhile back and next steps in the design process will refine where plants are located. He also mentioned that Damon had a good point about setback and they would plant as closely together as they can.

John provided an overview of seasonal planting character and showed rendered images depicting a typical planting along the wall in winter and in summer. John showed images of Aspen trees and mentioned the team is leaning towards using Aspen trees. He asked Damon and Michael if they had any thoughts on the use of Aspens and added that Aspens are being utilized throughout much of the project. Damon commented that Aspens will sucker (spread) and that the SW corridor has a good plan.

Barry asked if they will be using native shrubs. John answered they will use native shrubs that are tall in stature and fill out as the intent is to buffer; he commented the height will be similar to prairie plants.

Texture

Sophia introduced the next topic of discussion which was the texture for the wall. She showed images of the committees preferred wall texture wall texture applied to the dimensions of wall and explained LRT side will have some variation in vertical height. John Slack reviewed some of the reasons the committee had selected that texture; a higher-design approach would be lost in a wall less than 4' high.



Color

John Slack provided an overview of the previous discussions regarding color selection. He explained the group started with a range of color options and decided on a dark tone. They reviewed and voted on samples at the previous meeting and have since taken the samples out into the field to view in natural light. Sophia commented that Greg was looking at the colors from a 106 perspective. Sophia mentioned they all thought they liked the sample furthest left but that turned out to be too blue. Barry suggested a bronze tone worked better. Sophia commented that a sample may look one way on the ground plane and look very different when up high. She then asked if people had preferences. Damon responded that all colors would work except the one we had excluded.

Wall Treatment at Basset Creek Station

Sophia introduced the next topic which was to review the wall treatment at the Basset Creek Valley Station. She stated that the group had indicated a graphic at the station was desirable and explained there were four options to review. She then showed each of the four options.

Sarah N asked how the lettering relates to the windowsill of the LRT and if it will be seen from the inside of the trains. Ryan answered it may be difficult to see if standing. Sarah N commented she liked the option with large lettering, as she wants a more interesting element and it will be seen at the station. Barry added that he liked it too and that it was a nod to a historic subway station. Sophia added that she heard most that people wanted a focal point for people coming to the station to add visual interest. John Slack commented that this is the closest point to the wall and the one spot to do something different. Margaret commented she is a fan of telling people where they are and likes the place name. She added she liked the small lettering better than the large. Barry suggested the first option contributes to a sense of space and liked the first option. Ben mentioned that he preferred the first option and asked if there is a material change in the recessed lettering or paint color. Sarah G confirmed there would be no change in color.

Laura commented that Cory rendered to have a modest indent about ½" and that it appeared the letters in adjacent reveals were not intended to be gilded. Vida asked the group to consider metal instead of paint. Margaret commented that she does not like gilded but does like the contrast. John Slack confirmed contrast is desired and Damon Farber responded the lettering should be recessed or painted to have depth. Tim commented he liked the bigger letters because it could be seen from a distance and is very visible. Sarah G reminded the group the station was renamed to provide a sense of place to this station. Sarah Nettleton commented that she liked the larger letters because they were more dramatic and helpful for wayfinding. Margaret asked if there could be another option because the small option seemed too small and the large option seemed too large. Barry asked who will be looking at the wall. Damon responded the lettering won't be seen from the trail, just the station Margaret asked if people will cross the track to take photos and inquired if the larger artful sign will be something people want to take their picture next to it.

Barry suggested the group confirm the preferred treatment option. Damon said he liked the second option with two sets. Sarah G commented for the small lettering option 3 sets might be possible. Barry said he liked the larger option. Margaret said she liked more texture and lines and that the large option seemed industrial. Ben said he liked the large if there was more contrast in the pattern. Sarah G commented that they would work on an in-between size of lettering for consideration.

4. Steering Committee Resolution



Barry and Sarah N told the group they had written down what the committee wanted. Barry said he has memorialized the meetings to clarify the what, why, how and thought it would be helpful to give to others. He added the design needs follow-up and there are a few unresolved issues.

Damon Farber commented that at the last meeting there had been a discussion about what can and can't be done on park board property and that he wanted to be on the record as asking for as much buffer as possible in keeping with the intent. Michael commented this work gives good direction to the NSAMP team working at Bryn Meadows. Sarah N added that they want to support that process.

Barry commented they had not discussed maintenance and is an open question. Michael responded his staff won't be in the guideway. Sarah G commented the vines are Metro Transit responsibility, Metro Transit only allows certain staff to be in guideway but the area off the wall is less clear and they need to discuss more.

Sarah N asked the group if there were any further thoughts. Margaret moved to vote. Vida seconded the motion to vote. Sarah N asked for 'ayes' and several members responded. Sarah asked for Opposed and no one responded. Sarah N stated the resolution would carry.

5. Next Steps and Working Group Feedback

Sophia provided an overview of next steps and commented that would bring the group back together when the SEA.

Sophia commented that at this point in that they like to review the process with the group and ask what worked, what didn't, and what can be learned. Damon responded he thought this meeting process went smoothly and it was helpful to build on the rapport of the Kenilworth Landscape group as they were familiar with the expectations and products. Tim commented he thought it was easy to understand the examples and decision-making process. Barry commented he thought the process was good and that it seemed many of the staff were the same. Sarah N added she appreciated the hard work to prepare. Sophia thanked the group for their participated and dedication. She stated that decisions can be made faster when there is a group like this to digs into the details and again thanked them for their help though this process. She closed the meeting by explaining that we see them again for a review of the environmental documentation.

6. Questions/Discussion

7. Adjourn

Meeting adjourned at 6:55pm.

Appendix E Rusty Patched Bumble Bee Memorandum



Internal Memorandum

DATE: November 1, 2017

TO: Bill Wheeler (Federal Transit Administration)

FROM: Kelcie Campbell (Metropolitan Council)

SUBJECT: The Rusty Patched Bumble Bee (*Bombus affinis*) High Potential Zones and Habitats Within the Limits of Disturbance of the Southwest LRT (METRO Green Line Extension) Project

Introduction

The rusty patched bumble bee (*Bombus affinis*) (RPBB) was proposed for federal listing in the Federal Register on September 22, 2016. The final rule listing the RPBB as federally endangered became effective on March 21, 2017. The listing became effective after the issuance of the Southwest Light Rail Transit (LRT) (METRO Green Line Extension) Final Environmental Impact Statement (FEIS), which was published in May 2016 and the Record of Decision (ROD) in July 2016. Since the publication of the ROD, there have been technical modifications to the Project that were identified during final design and through the contractor selection process. Several of these changes warranted further analysis as they occurred outside of the previous study area.

The purpose of this memorandum is to provide a summary of the geographic range of the RPBB and habitats found within the high potential zones of the proposed Southwest LRT Project limits. This memorandum and supporting documentation summarizes the Federal Transit Administration's (FTA's) analysis regarding potential impacts to the RPBB and can serve as the basis upon which the U.S. Fish and Wildlife Service (USFWS) will concur with FTA's determination regarding impacts to the RPBB.

Rusty Patched Bumble Bee

According to the USFWS, known populations of the RPBB exist within the Twin Cities metropolitan area. The majority of the Project site is located within an area identified in the low potential zone for harboring the RPBB. There are also several segments of the Project within the high potential zone that follows the Southwest LRT corridor roughly from I-394 and Dunwoody Blvd, south through the Lake of the Isles in Minneapolis to County Road 25 and Beltline Blvd. Figure 1 shows a general location map of the entire Southwest LRT area with segments color-coded to correspond with zones relevant to the RPBB, e.g. red (High Potential Zones), and yellow (Low Potential Zones).

The RPBB is described in USFWS Guidance as a species with affinities for native grassland with abundant flowering forbs, woodlands, marshes, parks, gardens, residential areas, and undisturbed soil for overwintering.

Per USFWS Guidance, RPBB habitat is further defined as follows:

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- 1. "[The RPBB] needs areas that support sufficient food (nectar and pollen from diverse and abundant flowers), nesting sites that are predominantly free from ground-disturbing activities and are near floral resources, and overwintering sites for hibernating queens. Due to the early emergence of [RPBB] (roughly, mid-March through April), woodlands that support early blooming spring ephemerals are likely important habitats ..."
- 2. "Poor habitat can be defined as areas without a diversity and/or abundance of floral resources, areas with compacted soils, sod-forming grasses, or large monoculture agricultural fields. Some examples of poor habitat include open water, and pavement. Areas that meet the following descriptions are not suitable for the rusty patched bumble bee for nesting, overwintering, or foraging:
 - permanently flooded areas/open water
 - paved areas
 - mowed lawns
 - areas planted to annual row crops, such as corn and soybeans
 - forest where invasive shrubs are dominant and spring ephemeral flowers are absent
 - areas mowed too frequently to allow development of diverse wildflower resources (e.g., road shoulders)"

The active season for habitat use is mid-March through mid-October. According to the USFWS, the RPBB "utilize open areas containing nectar and pollen sources that are nearby their colony nest site. The rusty patched bumble bee requires floral resources near its nest sites. Studies of other bumble bee species found that those species typically forage less than 0.6 miles (1 km) from their nests."

High Potential Zones and Habitats within the Project Limits of Disturbance

Data from the USFWS of RPBB High Potential Zones for the northeast United States were overlaid with the Southwest LRT limits of disturbance (LOD) to determine what area of the Project intersects with the high potential zones for presence of the RPBB. Approximately 117 acres of the LOD fall within the high potential zone and approximately 124 acres of the LOD fall within the anticipated high potential zone (see Figure 1 and Table 1). The Council conducted a site visit of the Project corridor on October 18, 2017 to identify areas that are considered potential RPBB habitat within the High Potential Zone. The High Potential Zone is currently being modified by the USFWS due to a new species occurrence; therefore, the corridor from the Beltline Station to US 169 will also be considered within the High Potential Zone.

The remainder of the Project area lies within the low potential zone for the RPBB. The existing habitat was overlaid with the high potential zone within the LOD using Minnesota Land Cover Classification System (MLCCS) from the Minnesota Department of Natural Resources and data from the field review conducted by the Council and USFWS personnel. The habitats and acreages within the LOD that lie within the high potential zone are described in Table 1.

TABLE 1

Habitat within the High Potential Zone within the Limits of Disturbance

HABITAT TYPE	ACRES OF FLORAL HABITAT IN LOD AND HIGH	PERCENT LAND COVER OF LOD IN HIGH POTENTIAL	HABITAT DESCRIPTION
	POTENTIAL ZONE ¹	ZONE	
Forested/Shrub Areas	13.4	6%	Areas dominated by trees and shrubs including Green ash, Maple, Cottonwood, Walnut, Oak, and other types of tree species. Shrub species included common buckthorn, honeysuckle, and Siberian elm.
High quality floral habitat	4.7	2%	Areas dominated by goldenrod, spotted knapweed, bird's foot trefoil, coneflowers, and other flowering species.
Impervious cover and other transitional areas (railroad bed, roadways, trails, and areas adjacent to these features)	222.9	92%	Areas include impervious surfaces such as trails, roadways, and ballast for the railroad tracks. Vegetation in these areas include manicured lawns and landscaping, shrubs and grasses that were not considered high quality floral habitat.
Wetlands and Aquatic Resources	0	0%	Wetland areas would include cattails, reed canary grass, and other species found in wetland areas.
Total	241	100%	

Construction Schedule

The construction start of the overall Southwest LRT Project is scheduled to begin in Spring 2018. The construction of the Project within the high potential zone (between Bassett Creek Valley Station and Beltline Blvd Station) is expected to be from Spring 2018 through Spring 2022. The floral habitat areas identified in this memorandum that may be impacted during construction during the active season (April to October); therefore, to minimize and reduce the potential for conflict to active bee's, floral areas will be mowed before local food sources (i.e. nectar producing vegetation) become available.

¹ This also includes the anticipated High Potential Zone.

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Potential Impacts to the RPBB

The Southwest LRT Project area overlaps with the RPBB high potential zone and contains suitable habitat such as high quality floral habitat. The amount of potential suitable RPBB habitat within the high potential zone is approximately 2% of the total 241 acres within the LOD. Based on the presence of potential habitat within the LOD, FTA presumes presence of the RPBB where the Project area overlaps with the high potential zone. Construction of the Project will involve clearing and grubbing of certain areas that will result in short-term loss of vegetated areas. This loss of habitat is considered short-term because these areas will be revegetated upon the completion of the Project.

Proposed Mitigation

Based on the presumed presence of the RPBB within the LOD within the high potential zone, the following conservation measures are being proposed to minimize the loss of habitat within the Project corridor within the high potential zone:

- Reseeding with native seed mix throughout Project area (see Table 2 for a list of preferred plant species nectar sources by the RPBB in the Great Plains States that are also present in the proposed seed mixes)
- Contractor is required to prepare an invasive species and noxious weeds management plan
- Minimizing tree/vegetation removals
- Kenilworth Landscape Design includes pollinator planting areas and flowering meadow prairie

Other potential conservation measures to minimize or mitigate for habitat impacts within the high potential zone are as follows, if USFWS recommends additional conservation measures:

- Minimize mowing during the active season, keep some areas unmowed (leave refugia), and use a high cutting height (ideally 12-16 inches)
- Incorporate additional wildflower planting/restoration areas within the SWLRT corridor

TABLE 2

List of Preferred Nectar Sources for the RPBB Coincident with Proposed Kenilworth Landscaping

RUSTY-PATCHED BUMBLE BEE PREFERRED NECTAR SOURCES (GREAT PLAINS; MN, IA AND MO)		PROPOSED KENILWORTH SEED MIX	CORRIDOR WIDE SEED MIXES
Scientific Name	Common Name		
Agastache spp	Native giant hyssop species	Х	Х
Asclepias spp	Milkweed species	X	X
Baptisia alba	Wild white indigo		
Baptisia bracteata	Cream indigo		
Cirsium discolor	Native field thistle		
Cirsium muticum	Native swamp thistle		
Dalea candida	White prairie clover	X	X

RUSTY-PATCHED BUMBLE BEE PREFERRED NECTAR SOURCES (GREAT PLAINS; MN, IA AND MO)		PROPOSED KENILWORTH SEED MIX	CORRIDOR WIDE SEED MIXES
Scientific Name	Common Name		
Dalea purpurea	Purple prairie clover	X	Х
Primula spp	Shooting star species		
Echinacea spp	Coneflower species	X	Х
Eupatorium maculatum	Joe-pye weed	X	Х
Gentiana spp	Gentian species	X	
Geranium maculatum	Wild geranium	X	
Hydrophyllum virginianum	Virginia waterleaf	X	
Impatiens capensis	Jewelweed		Х
Liatris spp	Blazing-star species	X	
Lupinus perennis	Wild lupine	X	
Monarda fistulosa	Bee balm/wild bergamot	X	Х
Pedicularis canadensis	Wood betony		
Penstemon digitalis	Smooth penstemon		
Penstemon grandiflorus	Large-flowered penstemon	X	
Pycnanthemum virginianum	Mountain mint	X	Х
Solidago speciosa	Showy goldenrod	X	Х
Solidago spp	Goldenrod species	X	Х
Symphyotrichum novae- angliae	New England aster		Х
Veronicastrum virginicum	Culver's root	X	
Amelanchier spp	Serviceberry	X	
Amorpha canescens	Leadplant	Х	Х
Ceanothus americanus	New Jersey tea		
Cephalanthus occidentalis	Buttonbush		
Diervilla lonicera	Dwarf bush honeysuckle	X	

RUSTY-PATCHED BUMBLE BEE PREFERRED NECTAR SOURCES (GREAT PLAINS; MN, IA AND MO)		PROPOSED KENILWORTH SEED MIX	CORRIDOR WIDE SEED MIXES
Scientific Name	Common Name		
Prunus spp	Plums and cherries	Х	
Ribes spp	Gooseberry and currants		
Rosa spp	Wild roses	Х	
Salix spp	Willows		
Spirea spp	Spirea		
Tilia americana	American basswood		
Vaccinium macrocarpon	Large cranberry		

Conclusions and Next Steps

Metropolitan Council recommends that FTA request concurrence from the USFWS on a determination of "may affect, not likely to adversely affect" determination.

CC: Caroline Miller, Metro Transit

