Submitted to
Metropolitan Council

Submitted by
TranSystems
March 21, 2014

FINAL REPORT

SWLRT Engineering Evaluation of Freight Rail Relocation Alternatives

Table of Contents

I. Introduction 1
II. Background 2
A. TC&W Network and Operations 2
B. Freight Rail Industry Changes 4
III. Scope of Engineering Evaluation 6
IV. Review of Past Studies 7
A. St. Louis Park Railroad Study (March 1999) 7
B. TCWR Freight Rail Realignment Study (November 2009) 7
C. Minnesota Comprehensive Statewide Freight and Passenger Rail Plan (January 2010) 7
D. Freight Rail Study – Evaluation of TCWR Routing Alternatives (November 29, 2010) 8
E. Short Elliot Hendrickson (SEH) Technical Memos 8
F. United Transportation Union Letters (October 4 and 7, 2013) 9
G. Operations Analysis Technical Memorandum (November 4, 2013) 9
H. Draft Environment Impact Statement (October 2012) 9
I. The East Metro Rail Capacity Study (October 2012) 9
J. Map Research 9
K. Various Project Open House Minutes and Comments 9
V. Description of Alternatives 10
A. Kenilworth Corridor 10
B. Far Western Minnesota Connection (Appleton to Benson) 11
C. Western Minnesota Connection (Granite Falls to Willmar) 12
D. Chaska Cutoff 13
E. Highway 169 Alignment to BNSF 14
F. MN&S Spur North Connection with BNSF 15
G. UTU Route 16
H. MN&S Spur South Connection with UP 17
I. Midtown Corridor 18
VI. Alternatives Analysis 20
A. Screening Criteria 20
B. Tier I Analysis 21

C. Tier II Analysis 23
VII. Comparison of Viable Routes 30
A. Cost and Benefits 30
B. At-grade Crossings 31
C. Proximity to Homes and Schools 32
VIII. Conclusions and Recommendations 34

List of Figures

Figure 1: Southwest LRT Route (Source: Met Council) 1
Figure 2: Twin Cities Regional Freight Network (Source: MnDOT) 3
Figure 3: TC&W Railroad Network 4
Figure 4: Existing Kenilworth Corridor 10
Figure 5: Far Western MN Connection 11
Figure 6: Western MN Connection 12
Figure 7: Chaska Cutoff 13
Figure 8: Hwy 169 Alignment to BNSF 14
Figure 9: NM&S Spur North 15
Figure 10: UTU Route 16
Figure 11: MN&S Spur South 18
Figure 12: Midtown Corridor 19
Figure 13: Previously Proposed MN&S Spur North Connections 26
Figure 14: TranSystems' Concept for MN&S Spur North 27

List of Tables

Table 1: TranSystems Screening Criteria 20
Table 2: Tier 1 Screening Summary 21
Table 3: Tier II Analysis Summary 23
Table 4: Viable Route Comparison Summary 30
Table 5: Viable Routes - Costs and Benefits 30
Table 6: Viable Routes – Grade Crossing Summary 32
Table 7: Viable Routes – Housing Proximity 32
Table 8: Viable Routes – School Proximity 33

Executive Summary

The Kenilworth Corridor is the Local Preferred Alternative (LPA) for the Southwest Light Rail (SWLRT) extension. The corridor is currently used as an active freight rail route by the Twin Cities & Western Railroad (TC&W).

TranSystems was contracted by the Metropolitan Council to prepare a report that included a review of a series of previous studies that examined various freight rail alternatives. Based on professional judgment and industry standards the goal of the review was to identify viable options. Any significant obstacles to implementation and other potential impacts were to be taken into account. TranSystems attended four open house meetings during the process to obtain additional and up to date public perceptions of the overall project.

The evaluations of the following railroad alternatives were requested.

- Alternative(s) deemed feasible during the review of prior studies
- A series of alternatives that connected the Bass Lake Spur to the BNSF Wayzata Subdivision via the Minnesota Northfield and Southern (MN&S) Spur that runs through St. Louis Park, Minnesota.
- Any new alternative(s) that TranSystems might identify that might have been overlooked earlier and examined at a conceptual level.

At this level of study there are two viable freight rail options: (1) the Kenilworth Corridor with the SWLRT and trail co-located in the same corridor and (2) the TranSystems MN&S Spur north concept.

What TranSystems was not contracted to do and thus the study did not contain was

- Anything regarding the preferred route of the SWLRT, as it is already established
- A noise and vibration study of viable routes
- A traffic study of vehicles that looks at the effects of various street closures and relocations on the viable routes
- Survey of the viable routes; the project, in part, employed aerial survey from Hennepin County as the basis for design
- Examination of certain environmental documents, such as those related to either the Golden Auto Remediation efforts or the efforts to mitigate the wetlands in the Iron Triangle area.

The MN&S Spur is currently owned and operated by the Canadian Pacific Railway Co. TC&W has operating rights over this track to serve customers on an as-needed basis. Canadian Pacific has published design standards for their main line track. To advance this design from an academic exercise to a possible practical solution, these design criteria should be recognized and agreed to by TC&W. Once there is an agreement on the design criteria, the project can then move forward from the "conceptual" stage to 30% design – a logical next step.

The next logical steps might include:

- Agree on a design standard for further concept development

- Environmental resource review, including
    - Noise and Vibration studies along the viable routes
    - Traffic studies to examine the effects of street closures and relocation on the viable routes
- On ground survey to assure design accuracy of the viable routes
- Dynamic modeling; once the design is at a 30% level, the simulation of buff, draft and other in-train forces can be scientifically examined.

Whether the freight rail is transferred to the MN&S Spur north or remains on the modified Kenilworth Corridor, there are a number of safety improvements that should be included as a part of this overall project. They consist of, but not limited to: (1) Centralized Traffic Control (CTC) to expedite train movements and provide broken rail protection for the route, (2) electronic detection devices such as hotbox and broken wheel detection and (3) equipment necessary to assure compliance with the yet to be finalized Positive Train Control (PTC) requirements.

All comments received on the draft report were assembled and can be accessed by visiting the Metropolitan Council's website: http://metrocouncil.org/Transportation/Projects/Current-Projects/Southwest-LRT/Publications-And-Resources/Engineering/SWLRT-Public-Comments-on-Draft-Reports-Freight-Rai.aspx

I. Introduction

The Metropolitan Council has a vision for providing light rail transit to the southwestern suburbs of the Twin Cities and the locally preferred alternative (LPA) for the Southwest Light Rail (SWLRT) service, as described in the Draft Environmental Impact Statement completed in 2012, is via the Kenilworth corridor, shown in Figure 1. One obstacle for attaining this vision is the Twin Cities & Western (TC&W) freight rail traffic currently using the Kenilworth corridor.

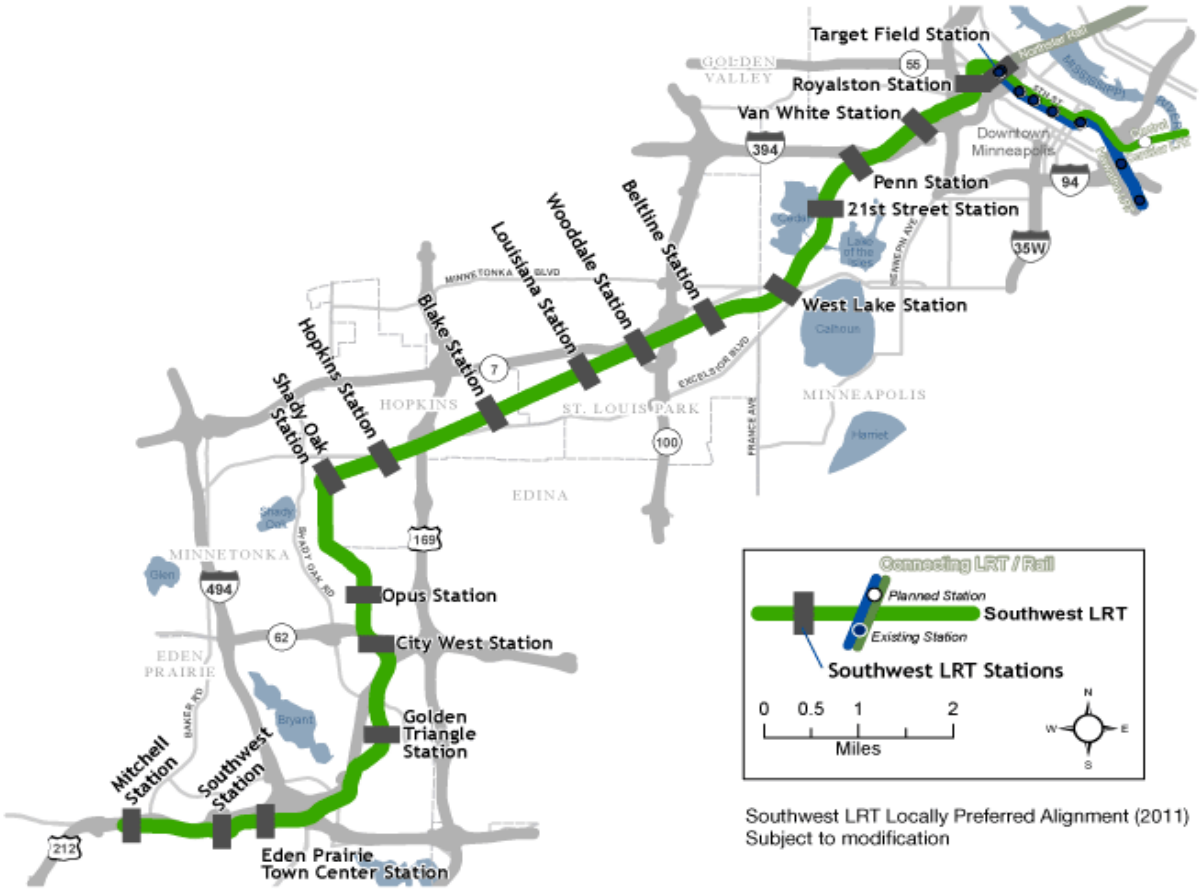


Figure 1: Southwest LRT Route (Source: Met Council)

Co-location of freight rail, light rail and a trail in the corridor is problematic due to some areas with narrow rights of way and also due to the preference to segregate freight traffic from transit. Therefore, the Met Council, and other organizations have undertaken studies to determine a viable alternative route for TC&W's freight rail traffic dating back to 1999 and, perhaps, earlier. It is important that it is understood that the South West Light Rail Transit project could be delayed until the freight rail issue is resolved.

This SWLRT Engineering Evaluation of Freight Rail Relocation Alternatives is intended to guide decision-makers regarding the corridor selected for SWLRT.

II. Background

The rail system in Minnesota has long played an important and significant role in the transportation of freight in Minnesota – carrying 30% of all freight tonnage. It is estimated that 5% of the nation's freight rail traffic passes through the Minneapolis/St. Paul complex. Minnesota has the eighth highest number of track miles per state in the U.S.

A strong and vibrant rail system supports economic development, enhances environmental sustainability and increases the business marketability of Minnesota. Many of the State's major industries rely on the freight rail system to effectively provide the means of delivering products which helps to make the State economically competitive with neighboring states. With the expectation of higher energy costs, increasingly strained capacity on roadway infrastructure, and additional regulations on the nations' motor freight carriers, the importance of the nation's railroads will continue to grow.

Most of the railroad track in Minnesota is privately owned – one exception to this general rule is a portion of the Kenilworth Corridor that is part of this exercise. The freight rail network in the Twin Cities area is shown in Figure 2.

A. TC&W Network and Operations

The TC&W began operations in 1991 over a network originally constructed in the 1870's by the Hastings and Dakota Railway. Other interim owner-operators of the rail network include Milwaukee Rail, Soo Line, and Canadian Pacific Railroad. This series of ownership is similar to changes throughout the railroad industry in North America over the past several decades. TC&W operates over 300 miles of track in Minnesota and eastern South Dakota, as shown on Figure 3. Because it interchanges with all four of the Class I carriers that operate in Minneapolis/St. Paul area–BNSF, UP, CP and Canadian National (CN)–as well as the Minnesota Commercial Railway (MNNR), TC&W offers its customers a number of shipping options. Such competition keeps freight costs low, which is a boon to the region's economy and global competitiveness. TC&W has nearly doubled its volumes since 1995, now handling approximately 27,000 carloads annually. Of the 27,000 carloads handled by TC&W in 2013, approximately 80% were "eastbound loads" that were interchanged to other Class I railroads in the greater Minneapolis/St. Paul area. There is not much change anticipated in TC&W's agriculture-based traffic. The widening of the Panama Canal and the changing ethanol market on the east coast could have an effect on this "direction of traffic."

There appears to be no disagreement that TC&W is highly valuable to the Minneapolis area and the region. Rail service provided by TC&W to Minnesota and South Dakota shippers of grain, coal, ethanol, and other products enhances the region's competitive advantage in a global marketplace. All parties are in agreement that freight rail service to businesses on the TC&W network should be maintained. The status quo for rail operations, however, must be maintained until the United States Surface Transportation Board (STB) approves discontinuance over the current route. Among other issues, the STB would assess the impacts to the operator and shippers when considering rerouting freight traffic. Of course, the public and communities along any potential re-route have concerns, as well. To date, no reroute alternative has gained the approval of all stakeholders.

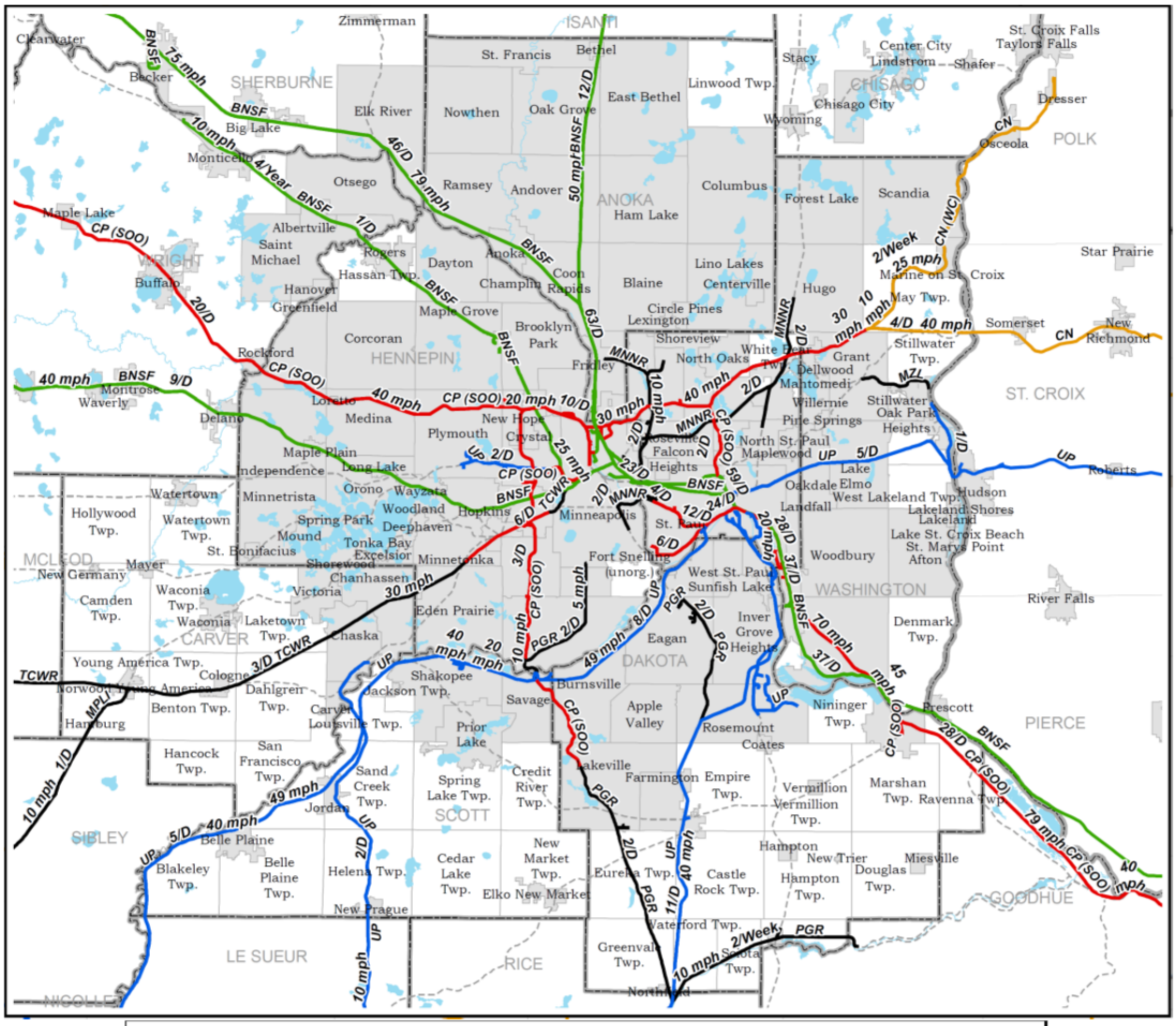


Figure 2: Twin Cities Regional Freight Network (Source: MnDOT)

Figure 3: TC&W Railroad Network

B. Freight Rail Industry Changes

The Staggers Act, passed in 1980, deregulated the railroads, which spawned a series of consolidations, mergers, abandonments and spin offs. Ultimately these transactions have shaped the rail network that exists today. Deregulation also encouraged competition, which prompted the railroads to implement operating changes which have made freight rail transportation more efficient and safer than ever.

Unit trains (a train that is transported intact from origin to destination without switching) have been used for decades in transportation of coal. The railroads and their shippers have adopted this method of transportation with additional commodities for the economies it provides. Agricultural products are prime examples. The number of cars in a unit train has also increased in recent years. A 100-car unit train of coal was once the limit, but now coal trains often carry 125 cars or more. Unit grain trains are commonly 115 cars. Intermodal traffic has become much more prevalent in recent years, which takes advantage of rail's economy for long haul movements, but also trucks' flexibility for handling the first and last miles. Taking the efficiency of the unit train a step further, the Class 1 railroads sometimes will offer a financial incentive to add a transit time component to the shipping cycle. This is generally referred to a "shuttle" train operation.

The rail industry has also increased safety provisions including investments in infrastructure and equipment which have reduced train accidents rates (i.e., total accidents per million train miles). Additionally, new technologies have been developed and implemented to increase the safety of rail transportation. Examples include detectors along the tracks which identify defects in passing railcars, ground-penetrating radar to detect subsurface conditions that could compromise the track, and detectors which identify defects in the track itself or rail wheels traveling down the tracks. The Association of American Railroads reports a decline of over 40% in the train accident rate between

2004 and 2012; 2013 is expected to continue this trend. The Rail Safety Improvement Act of 2008 mandates positive train control (PTC), systems that will automatically slow or stop trains before certain train-to-train accidents occur. [1]

The freight rail industry will continue to evolve and react to market conditions and it will, undoubtedly, continue to grow. In 2009, the Association of American Railroads projected that freight rail traffic in the United States would grow by 88% by 2035. With the long reach of the rail network, changes near and far can impact rail operations in the Minneapolis area. For instance, the expansion of the Panama Canal to accommodate larger ships may increase barge traffic on the Mississippi River and its tributaries which, in turn, may increase rail traffic to and from ports on the Minnesota waterways.

[1] While the final regulations that describe PTC have yet to be issued by the Federal Railroad Administration (FRA), it is believed that the BNSF Wayzata Subdivision will be covered under the PTC umbrella; therefore PTC will have an effect on any reroute that uses the BNSF Wayzata Subdivision tracks.

III. Scope of Engineering Evaluation

TranSystems was contracted by the Metropolitan Council to prepare a report that included a matrix summarizing the freight rail relocation alternatives and conclusions, findings and recommendations on viable relocation alignments. The analysis was to be based on professional judgment and industry standards such as American Railway Engineering Maintenance Association (AREMA), Minnesota Statutes and other railroad design criteria. Any significant obstacles to implementation and other potential impacts were taken into account. This work was to be done in conjunction with the affected railroads.

The evaluations were to include operational cost drivers, identification of community and other impacts and an assessment of possible operational adjustments**.** At the request of the Metropolitan Council, TranSystems personnel attended public open houses held in both Minneapolis and Saint Louis Park to better understand public reaction to the alternatives under study.

IV. Review of Past Studies

The Metropolitan Council directed TranSystems to revisit all previously identified freight rail routing options to assess their viability and to provide an informed and impartial opinion. Numerous rail-related studies have been conducted in recent years. TranSystems reviewed the following studies in order to obtain background information and to understand the various alternatives for freight rail routing that have already been proposed. The following information summarizes the main documents that were referenced during initial information gathering efforts.

A. St. Louis Park Railroad Study (March 1999)

This report summarizes the history of and anticipates the future for railroads through the City of St. Louis Park. The goal of the study was to identify improvements which would limit the impact of freight rail traffic through the City. The study recommended improvements to the Minneapolis, Northfield & Southern (MN&S Spur) line through St. Louis Park, including new connections to the east-west routes of BNSF's Wayzata Subdivision and Canadian Pacific's (CP) Bass Lake Spur (over which TC&W operates), elimination of the Skunk Hollow switching wye, an upgrade of the line, and mitigation methods to improve safety and minimize impacts to neighborhoods. Additionally, the study suggests that planning efforts for introduction of both commuter and light rail commence.

According to the study, the MN&S Spur, which is now operated by Soo Line, a division of CP, carried approximately 60,000 carloads of potash and lumber over the north-south route through St. Louis Park as recently as 1979. Between 1979 and 1999 those volumes dropped to about 8,000 annual carloads.

B. TCWR Freight Rail Realignment Study (November 2009)

This study reviewed six routes for TC&W's freight rail, summarizes the pros and cons of each and estimates the capital costs for implementing the routes. The report recommended that the MN&S Spur route be progressed through environmental and preliminary engineering analysis. The report was not explicit, however, regarding the methods for developing costs. It provided a range of estimated costs to continue use of the Kenilworth route, ($20 to $120 million) with the high end of the range 2.5 times greater than the MN&S Spur route ($48 million) – although the method of arriving at these costs was not clear. Cost, presumably, was one reason the MN&S Spur route was deemed preferable, even though the low end of Kenilworth's cost range was just 42% of the estimated cost for the MN&S Spur route.

C. Minnesota Comprehensive Statewide Freight and Passenger Rail Plan (January 2010)

The Plan provides a vision for rail transportation in Minnesota with a 20-year planning horizon. It emphasizes the need to invest in rail network improvements in order to keep pace with forecasted growth, to maintain and improve competitiveness, to improve safety, and to alleviate traffic volumes on roadways. The Plan predicts that statewide freight rail (measured by tonnage) will increase by 25% by 2030; in the Twin Cities, the estimate is over 42%. Among other suggestions, the Plan recommends a $24.4 million upgrade to the MN&S Spur line so that CP could use the line to bypass bottleneck areas elsewhere in the rail network. While the volumes on the MN&S Spur have diminished over the last few decades, with upgrades to the line, CP could route more trains over this line in order to provide a route for trains that need not be switched at its St. Paul Yard, which is in the heavily congested area of

Hoffman Junction. While the Plan acknowledges on-going analysis of the TC&W freight relocation, it does not delve into the details of the study.

Regarding safety, the Plan describes assessment with measurements of crashes, injuries and fatalities. Active warning devices and positive train control (PTC) were named as primary methods for attaining safety improvements.

D. Freight Rail Study – Evaluation of TCWR Routing Alternatives (November 29, 2010)

Not fully satisfied that the *TCWR Freight Rail Realignment Study* adequately evaluated the alternatives prior to dismissing all but the MN&S Spur Corridor, the City of St. Louis Park requested additional information on the routes. This study is the response to that request, providing more detail on the Chaska Cutoff, Midtown and Highway 169 Corridors. While this study estimates costs for each of the alternatives in excess of $120 million and identifies shortcomings and anticipated challenges with each, the study did not designate any as fatally flawed.

E. Short Elliot Hendrickson (SEH) Technical Memos

1. Technical Memo #1 (December 8, 2010)

The memo provides background to the railroad industry, an overview of railroad standards, and a commentary on freight studies performed to date. It summarized findings on five routes studied, but broke the Kenilworth route into seven different alternatives for co-location of freight, LRT and trail. SEH deemed all studied options to be non-viable except for the Western Connection (for which SEH thought freight subsidies could compensate TC&W for additional operating costs) and two of the Kenilworth co-location options (first, freight, LRT and trail all at-grade and second, trail relocated). The MN&S Spur North Corridor was not addressed in detail in this technical memo because a freight rail study was in process at the time, so it was not ruled out as non-viable.

2. Technical Memo #2 (February 2, 2011)

Technical memo #2 provides more rationale for the conclusions of Technical memo #1.

3. Technical Memo #3 (February 9, 2011)

Upon consideration of the additional costs TC&W would incur over the Western Connection, and the comparable compensation they would need in subsidies, SEH concluded that the Western Connection was not viable after all. They further elaborated on the two Kenilworth options deemed viable and provided co-location concepts for consideration, including an exhibit that demonstrated the anticipated setbacks for Cedar Lake Townhomes compared to existing conditions.

4. Technical Memo #4 (April 18, 2011)

Technical memo #4 compares the Kenilworth route to the MN&S Spur route with respect to cost, grade crossings, and property impacts. It makes clear that even if the Kenilworth Corridor becomes the permanent home to TC&W freight traffic, St. Louis Park will still be impacted with freight trains on the MN&S Spur route (and there is no guarantee that that traffic will not increase). It points out that a relocation off of the Kenilworth eliminates all road crossings with greater than 9,000 vehicles daily, referring to the busy at-grade road crossings at Beltline and Wooddale. SEH identifies a number of

mitigating measures that could be taken to lessen the impact to St. Louis Park if the TC&W trains are routed over the MN&S Spur.

F. United Transportation Union Letters (October 4 and 7, 2013)

The United Transportation Union represents many of the train crews that man the trains in the greater Minneapolis/St. Paul area and as such have extensive knowledge of railroad assets – both past and present. The Union suggests an adaptation of the MN&S Spur route in which the connection to the BNSF Wayzata Subdivision is replaced with an alternative route through Nesbitt Yard and Theodore Wirth Corridor.

G. Operations Analysis Technical Memorandum (November 4, 2013)

This technical memo reports the results of simulation modeling for TC&W freight over the Kenilworth route and two options for the MN&S Spur route. Results showed that the time of travel is comparable over the routes in question. Fuel usage was expected to be slightly greater over the MN&S Spur route, but not to an extent that it would have a significant detrimental financial impact on TC&W.

H. Draft Environment Impact Statement (October 2012)

The DEIS was primarily performed to analyze the decision of whether or not to pursue the Southwest light rail. The document is primarily concerned with the proposed SWLRT line but does evaluate LRT over the Kenilworth two ways: with freight rail relocated to the MN&S Spur North route and with freight rail co-located on the Kenilworth. The DEIS reports that a "perpetual easement over the remediated property for the proposed freight rail connection was granted by Hennepin County to the city of St. Louis Park for the sole purpose of rail or rail transit use".

I. The East Metro Rail Capacity Study (October 2012)

In the *East Metro Rail Capacity Study*, performed by TranSystems and a host of contributing consultants, the 36% freight growth which is anticipated through East Metro will impair freight train speeds markedly unless significant infrastructure improvements are made. Many of the possible improvements which could improve fluidity, however, would require the cooperation of CP, BNSF and Union Pacific (UP) since they all operate in the area and optimization of the rail network requires that the railroads' property lines be redrawn to some extent. To date, no agreement among the railroads nor commitment to invest in the improvements has been made.

J. Map Research

In addition to review of formal reports, TranSystems gained understanding of the history of the railroad operations in the Minneapolis area via a review of freight rail maps (obtained from MnDOT's website).

K. Various Project Open House Minutes and Comments

The Met Council held open house meetings in Minneapolis and St. Louis Park on January 7 and 9, 2014 and February 10 and 12, 2014 to continue public involvement activities associated with the SWLRT project. TranSystems attended these open houses, reviewed the transcripts of the meetings, and read the comments submitted by the public in order to gain an understanding of community concerns.

V. Description of Alternatives

A. Kenilworth Corridor

Hennepin County acquired the Kenilworth corridor from CP in 1984 for the purpose of implementing transit. TC&W's freight rail traffic currently utilizes the Kenilworth corridor and has since 1998. The track geometry and condition keep this section of track at Class 2, which restricts speeds to 25 mph. TC&W has opted to operate through the corridor at just 10 mph. This route provides TC&W access to interchange with BNSF, UP, CP, CN and MNNR. From St. Louis Park over the Bass Lake Spur and to the connection with BNSF's Wayzata Subdivision via Kenilworth, this corridor is less than four miles from the MN&S Spur bridge over the Bass Lake Spur to the switch to the BNSF Wayzata Subdivision.

The Bass Lake Spur portion of this corridor, which would also be part of the Midtown Corridor, has two busy at-grade crossings in St. Louis Park: Belt Line Boulevard, with 14,100 cars daily, and Wooddale Avenue, with 11,300 cars daily, according to MnDOT's interactive traffic mapping application. The Kenilworth portion of the corridor has two additional at-grade crossings at Cedar Lake Parkway and 21st Street West, but vehicular traffic at these crossings is significantly lower with just 2,650 and 824 vehicles daily, respectively, per the U.S. DOT Crossing Inventory Information. (MnDOT's traffic mapping application did not provide AADT at these railroad crossings.) The Bass Lake Spur portion of the corridor contains siding tracks that the TC&W uses to store railcars. It should be noted that this capacity should be replaced if the freight is removed from this corridor.

Figure 4: Existing Kenilworth Corridor

The Kenilworth Corridor has been an acceptable route for TC&W traffic. The problem retaining freight over this corridor is that it also houses the Kenilworth Trail and has been slated for the SWLRT route. Portions of the right of way are narrow, so accommodation of all three transportation modes at grade would be challenging. Furthermore, at the time freight was relocated from the Midtown Corridor to the

Kenilworth, the plan had been that this was merely a temporary solution until LRT was instituted here and freight relocated a second time. Since finding an acceptable alternative freight route has been challenging, various co-location options have been suggested, including elevating LRT or putting it underground with either a shallow or deep tunnel. Relocating the trail is another consideration. If any options for co-location of freight and light rail in the Kenilworth corridor would eliminate the storage tracks, providing additional yard tracks elsewhere on the TC&W should be considered part of the project's scope and cost.

For purposes of the study, the Kenilworth Corridor essentially poses two options: the no-build scenario and a co-location of freight and LRT scenario.

See Appendix A for timetable information on this corridor.

B. Far Western Minnesota Connection (Appleton to Benson)

Under this scenario, TC&W would run its traffic over the BNSF line between Appleton and Benson. While the distance between Appleton and TC&W's current connection with BNSF's Wayzata Sub is about 10 miles shorter than its existing route, since most of TC&W's customers are east of Appleton, this option results in out of route miles. Traffic originating on TC&W's Minnesota Prairie Line would be especially impacted. After being taken east to Norwood, it would need to go west 118 miles to Appleton, then serpentine back east over BNSF. Carloads originating/terminating along TC&W's mainline east of Milan would all endure a longer total route, incurring greater labor, track, fuel, car and locomotive costs and, perhaps more importantly, slowing delivery by at least a day, perhaps as much as three days.

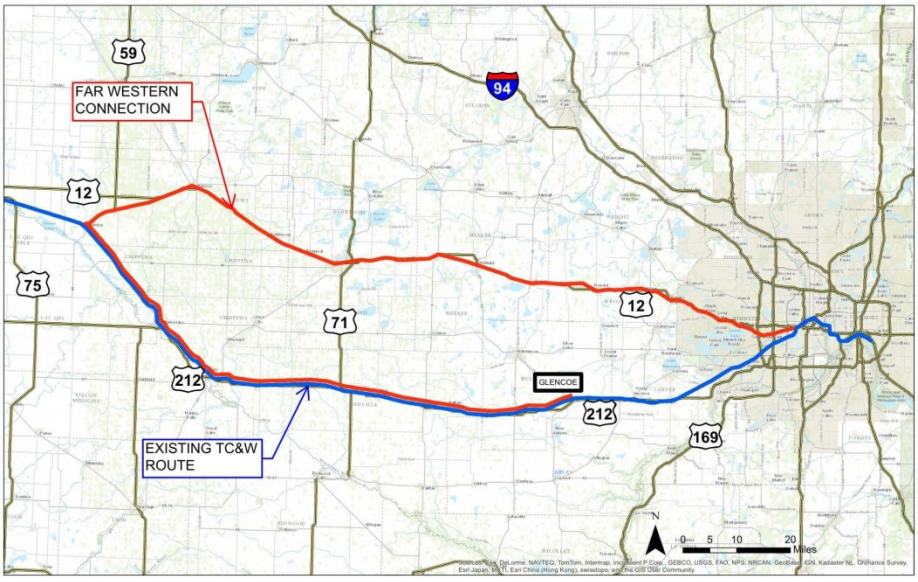


Figure 5: Far Western MN Connection

Even if this route were not operationally detrimental to TC&W, its concept is premised on the assumption that BNSF would allow TC&W to run on its already congested Wayzata Sub from Benson to Minneapolis, a distance of about 120 miles. While the BNSF has agreed in concept to increase

TC&W's trackage rights from the Kenilworth connection to an MN&S Spur connection, a distance of about two miles, the representative who spoke with TranSystems was unwilling or unable to commit to extending the rights any further than that. There currently is no economic justification for BNSF to increase TC&W's trackage rights to this extent. Accordingly, it is unlikely that TC&W will obtain the necessary trackage rights.

Since the Far Western Connection poses both operational impediments and implementation challenges, the route is deemed fatally flawed and will not be evaluated further.

C. Western Minnesota Connection (Granite Falls to Willmar)

The Western Minnesota Connection is similar to the Far Western Minnesota connection, except TC&W would run its traffic over the BNSF line between Granite Falls and Willmar, rather than Appleton and Benson. From Granite Falls to South St. Paul over the Western Minnesota Connection is about five miles longer than the existing route. Like the Far Western Minnesota Connection, this connection would result in costly out of route miles to TC&W for traffic originating/terminating east of the new connection at Granite Falls, which would undermine its competitiveness. For example, two of TC&W's largest customers, Southern Minnesota Beet Sugar Cooperative of Renville and South Central Grain & Energy of Buffalo Lake, are located about 15 and 45 miles east of Granite Falls, respectively. Trains to these major customers would have to travel 20 and 50 miles longer, which could add a day to the cost and delivery. (Out of route miles for traffic on the Minnesota Prairie Line could be minimized, though, if TC&W were to also run over BNSF track from Hanley Falls to Granite Falls.)

The high cost of operating the route creates a fatal flaw with the plan and, like the Far Western Connection, it is uncertain that BNSF would actually grant the trackage rights for the route. For the same reasons as with the Far Western Minnesota Connection option, this route is fatally flawed and will not be evaluated further.

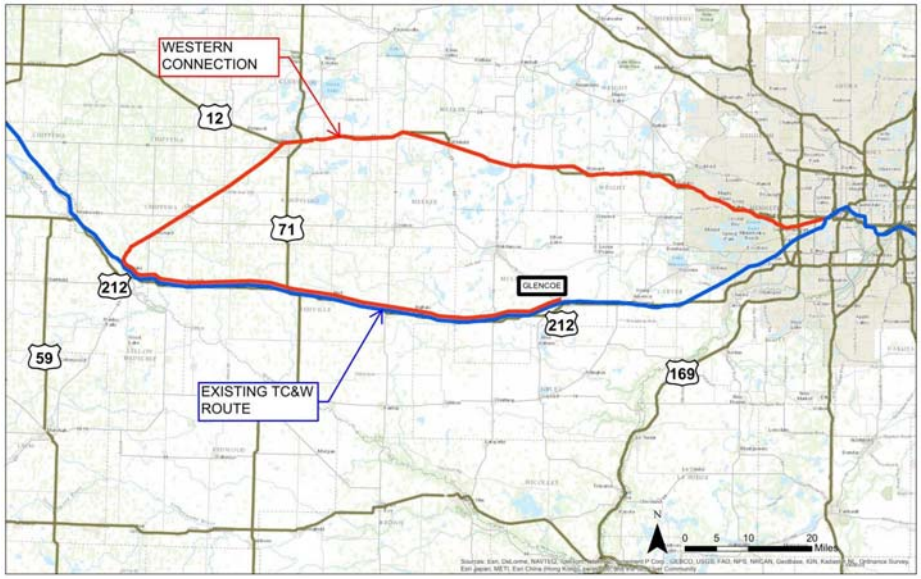


Figure 6: Western MN Connection

D. Chaska Cutoff

The Chaska Cutoff is an abandoned railroad route that runs parallel to Highway 212 from Bonson Junction (east of Cologne) to Chaska. It then crossed the Minnesota River and connected with UP in Shakopee. The approximate route distance from Cologne to the Twin Cities, 42 miles, is comparable to the existing Kenilworth route. Because the corridor has been abandoned as a rail route, right of way has reverted to adjacent property owners and would need to be re-acquired to establish rail service. The route requires construction of over 11 miles of new or reconstructed track and construction of a new rail bridge over the Minnesota River. If the project were to use federal funding, the NEPA process must be undertaken.

Were the infrastructure already in place, the Chaska Cutoff could work for TC&W's operations, assuming that the UP would agree to offer the short line trackage rights from Shakopee to St. Paul. While there are some advantages to UP if this route was reestablished, there are a number of disadvantages to the other competing railroads. While the distance traveled for UP unit grain trains would be reduced, the complexity of the interchange with the other carriers–CN, CP, BNSF, and MNNR–would be substantially increased.

The light rail project could be delayed until the freight rail is re-established. Our understanding is that the SWLRT time horizon is much shorter than this, so the Chaska Cutoff is inconsistent with that goal. Furthermore, TC&W has voiced its disinterest in owning and accepting responsibility for additional track miles. These considerations present major obstacles to implementation of this route; therefore, this route is fatally flawed and will not be evaluated further.

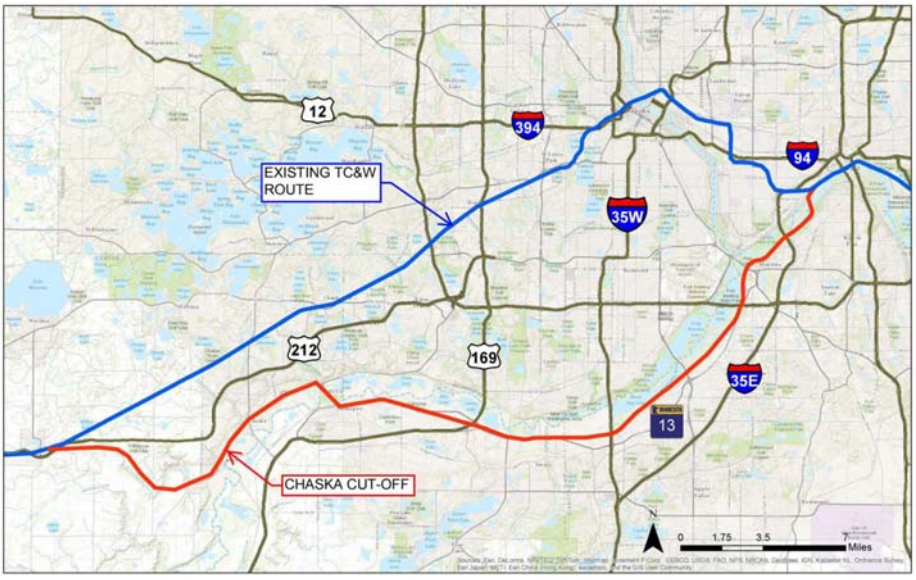


Figure 7: Chaska Cutoff

E. Highway 169 Alignment to BNSF

The Highway 169 route is a former railroad right of way that was abandoned a number of years ago and much of the right of way purchased by the State agencies and used for the new Highway 169 alignment. The alignment went from TC&W's track in Hopkins north and east to connect with the BNSF Wayzata Subdivision just west of Louisiana Avenue. The distance from Hopkins to its current connection with BNSF's Wayzata Sub would be less than half a mile longer over the Highway 169 route. TC&W has very few customers, perhaps just one, on its line east of Hopkins, so there would be little out of route mileage. While there hasn't been much traffic recently, TC&W does also serve customers on the MN&S Spur south of Saint Louis Park and would want to continue to have access to them. That traffic would incur out of route miles, but only about 2.5 miles. There would also have to be access maintained for TC&W to serve customers north of St. Louis Park and would need access to them. Accordingly, the existing track on the Bass Lake Spur and Skunk Hollow switching wye would need to be maintained (or Skunk Hollow switching wye replaced with a more direct interchange) even if the Highway 169 corridor were used for TC&W's connection with other carriers in the St. Paul terminal.

The corridor has since been converted to Cedar Lake Trail and housing developments in addition to highway right of way. The roadway infrastructure adjacent to this corridor has been highly developed, as well, including Highway 169 interchanges with Excelsior Boulevard and Highway 7. If the project were to use federal funding, the NEPA process must be undertaken. Property would also need to be acquired for the project.

These considerations present major obstacles to implementation of the route; therefore, this route is fatally flawed and will not be evaluated further.

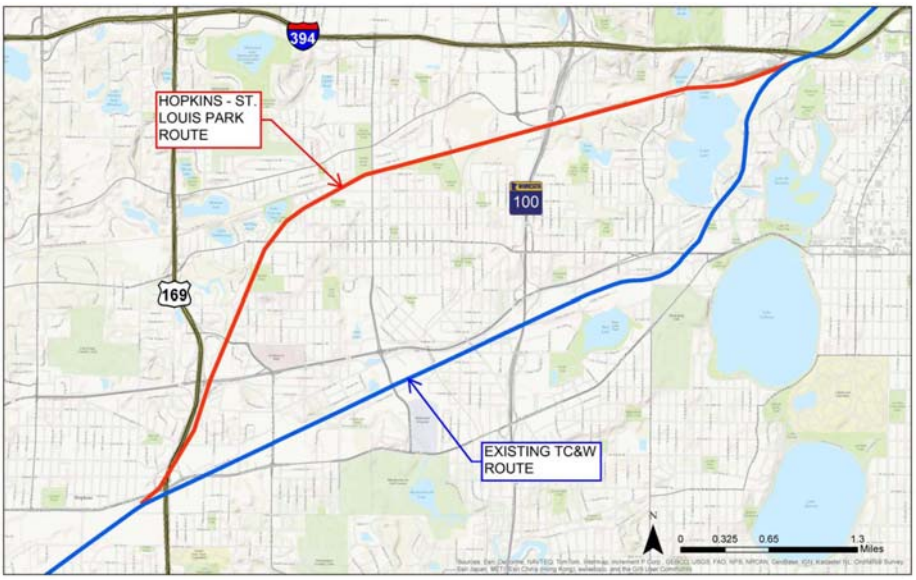


Figure 8: Hwy 169 Alignment to BNSF

F. MN&S Spur North Connection with BNSF

The MN&S Spur through St. Louis Park was assumed to be the permanent route for TC&W's freight route when the Midtown Corridor was acquired by Hennepin County for future transit use and freight was relocated to the Kenilworth Corridor. At that time the move was believed a temporary solution and, it appears, that no in-depth study was made into the challenges for making the connection between the Bass Lake Spur and the MN&S Spur. The MN&S Spur route is currently an active freight route for CP, though current traffic levels are quite low, normally just one train a day in each direction with, perhaps, ten to fifteen cars per train. Due to the low volume, CP has maintained the route at Class I, which restricts speeds to 10 mph. As part of the DEIS, a conceptual interchange for the tracks was proposed. Since then, several other options have been suggested. (For initial screening, these differences will not be analyzed, but rather the corridor evaluated as a single option.) The MN&S Spur North route also entails reinstitution of a former rail connection between the MN&S Spur and the BNSF's Wayzata Sub (Iron Triangle). TC&W's route from St. Louis Park to its current point of interchange with the BNSF, via the MN&S Spur, is just over four miles. Accordingly, should connection issues be overcome and track geometry work, the MN&S Spur route would be comparable to the Kenilworth from an operations perspective. The MN&S Spur route also entails a new connection between the Bass Lake Spur and the MN&S Spur going south. This feature would allow the TC&W's operation of traffic to the south be greatly improved over current conditions. Granted, this traffic has been negligible in recent years.

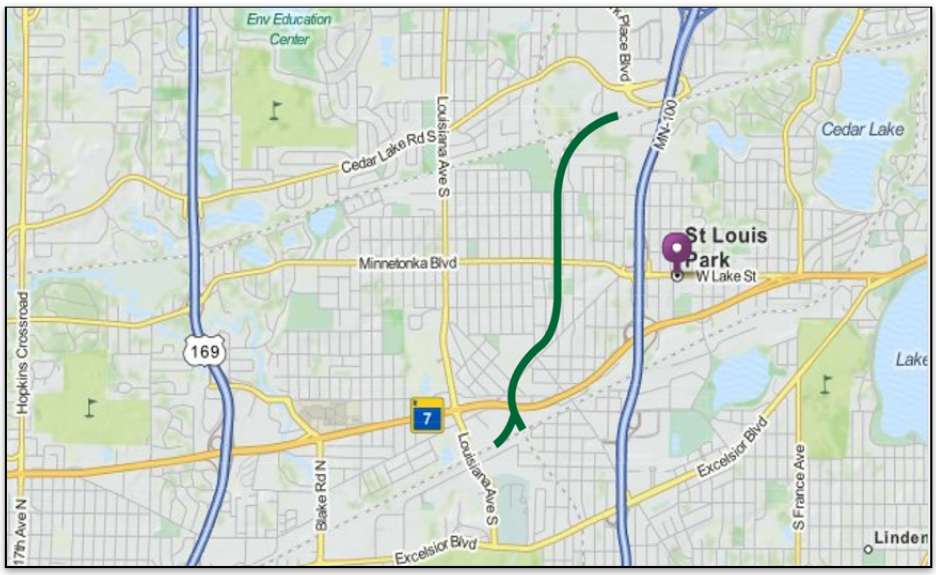


Figure 9: MN&S Spur North

The BNSF is receptive to TC&W's traffic entering the Wayzata Sub at the MN&S Spur, rather than at Kenilworth, but insists that an approximately 10,000-foot siding be installed on its line to help handle the traffic. Furthermore, if the MN&S Spur route were used, the TC&W would lose track storage capacity from the Bass Lake Spur. Accordingly, if the MN&S Spur route is pursued, the BNSF siding and additional yard tracks elsewhere on the TC&W should be considered part of the freight relocation project.

See Appendix A for timetable information on this corridor.

G. UTU Route

The UTU route makes use of the MN&S Spur, but instead of making a connection with the BNSF at the former "Iron Triangle" interchange, it continues north via the MN&S Wirth corridor and through Nesbitt Yard. It connects with the BNSF Wayzata Sub east of the current Kenilworth connection. The route would require track reconstruction and replacement over portions of the corridor no longer exist. The viability of UTU route is contingent upon overcoming any interchange issues of the MN&S Spur North route. This route is about 1.5 miles longer than the MN&S Spur North route and has sharper curves. The route would, undoubtedly, be operated at slower speeds than on the BNSF mainline. At a high level, the necessary track work north of the BNSF line appears to be more extensive than reinstating the Iron Triangle and constructing a siding on BNSF's Wayzata Subdivision, where the right of way provides ample room for the expansion. For these reasons, the UTU route is deemed inferior to the MN&S Spur North route and it is not considered necessary to study it further.

If, however, the MN&S Spur North route would be deemed viable, except that BNSF rescinds its acceptance of TC&W traffic at a MN&S Spur interchange or an insurmountable obstacle is encountered with reconstruction of the Iron Triangle connection, the UTU route could be revisited at such time.

These considerations present major obstacles to implementation of the route; therefore, this route is fatally flawed and will not be evaluated further.

Figure 10: UTU Route

H. MN&S Spur South Connection with UP

This route takes TC&W traffic south from Saint Louis Park over the MN&S Spur, through Edina, Bloomington, across the Minnesota River and connecting to the UP on its Mankato Subdivision at Savage, Minnesota. This route was designed as a "passenger train route" and has only 90 lb. rail and thus would need an almost complete rebuild to accommodate today's modern freight trains. As discussed previously for the MN&S Spur North route to BNSF, the MN&S Spur is currently an active freight route for CP, but with very low volumes. Due to the low volume, CP has maintained the route at Class I, which restricts speeds to 10 mph. The route crosses the Minnesota River at Savage on a swing span bridge owned by TC&W, which would need to be upgraded or replaced if substantial tonnage was to move over this line. The MN&S Spur currently crosses over the UP's Mankato Subdivision tracks; there is not an interchange in place.

In order to reach the Twin Cities terminal, TC&W would take the Mankato Sub north. This route from Saint Louis Park to Hoffman interlocking is about 15 miles longer than TC&W's current route: 32 miles (12 on MN&S Spur and 20 on UP), as compared with 17 miles via the Kenilworth Corridor and BNSF's Wayzata Sub (or 18 miles via Kenilworth, BNSF and MNNR). The UP points out that a significant and growing percentage of the TC&W traffic–over 40% of TC&W's carloads–is made up of unit grain trains which ultimately are taken south and west on the UP Mankato Subdivision. This traffic would enjoy a shorter total route, which would tend to reduce transportation costs for the shippers and make the shippers on TC&W's network more competitive regionally and nationally. Not only would some shippers enjoy a shorter overall trip and avoid the congested terminal, most carloads could avoid the congested area of Target Field . With 60% of traffic traveling 15 miles further and 40% traveling 25 fewer miles, freight traffic would shave a mile off its routes on a weighted average basis. (TC&W's portion of the route, however, would have a weighted average increase of seven miles.)

There are advantages to Union Pacific to establish this new interchange in order to (1) shorten the total route for their customers, as well as to (2) reduce traffic in the congested Twin Cities terminal. The tracks on the Mankato Subdivision, though, are often occupied due to the high level of industrial switching performed on the line. In order to increase the capacity to minimize TC&W's train delay on the route, UP suggests two long sidings be constructed between Savage and the yards in St. Paul. UP agrees that the terms of the trackage rights must protect TC&W's interchange capabilities with CP, BNSF and MNNR. Other freight infrastructure needed for MN&S Spur south connection to work includes: upgrade of 12 miles of the MN&S Spur, including CTC, refurbishment or replacement of the TC&W bridge over the Minnesota River, and a wye connection to the UP Mankato Subdivision. Since the line is an existing freight corridor where the upgrade was on existing railroad right of way, the necessary infrastructure improvements could be expedited. But there are engineering challenges because of the physical layout – curves and grades will become an issue. It appears that there are a number of 8 degree reversing curves along the route and any attempt to modify them might entail conflicts with neighboring Parks and wetlands. The railroad right of way appears to be just 66 feet for much of the route. Either a retaining wall would be needed, or in order to avoid a retaining wall, additional property would have to be attained. Miles of the track as it nears the Minnesota River appears to be within wetlands boundaries, so the retaining walls would impact these wetlands during and after construction. The MN&S Spur South route would have a maximum grade of 1.0%, maximum curve of 8 degree-30 minutes, and maximum compensated grade of 1.34%. In order to improve upon this

geometry, additional right of way would be required. Since adjacent properties include the Hyland Lake Park Reserve and the Minnesota Valley National Wildlife Refuge, acquisition of the necessary property would be difficult and would entail mitigation for the impact to these environmental resources.

The existing swing span bridge over the Minnesota River would need to be inspected to determine whether it could be refurbished to accommodate significant rail traffic or whether it should be replaced.

In Savage, it appears that the connection to UP's Mankato Subdivision to the east could be readily accommodated. The connection to the west which is necessary to achieve the routing benefits to UP's west-bound traffic, however, appears to be problematic. There are several industrial tracks for Flint Hills Resources, Whitebox Riverport and CHS Grain Terminal at the point of the proposed interchange which would have to be reconfigured or relocated in order to accommodate a new interchange to the west.

Due to these serious implementation challenges, TranSystems does not recommend further evaluation of the route.

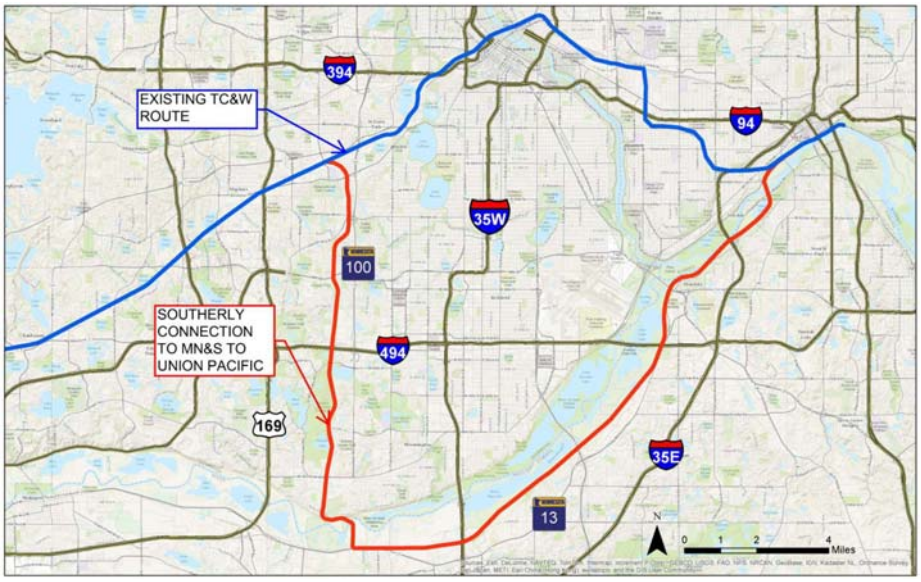


Figure 11: MN&S Spur South

I. Midtown Corridor

The Midtown, or 29th Street, Corridor was TC&W's route to the metro area before it was relocated to the Kenilworth Corridor in 1998. Track has since been removed and a trail constructed. This corridor is in a trench and a series of overhead bridges, some historic, provide grade separation from the north-south streets in the area. Per the *Evaluation of TCWR Routing Alternatives,* these structures currently provide just 19 feet of clearance. (Minnesota guidelines call for 22 feet of vertical clearance and many railroads insist on 23.5 feet for new structures. Granted, these structures are not "new", so may not need to meet those more stringent standards.) Construction of Highway 55 and the Hiawatha LRT effectively severs the corridor between Cedar Avenue and 26th Avenue South. East of Highway 55, the Midtown Corridor would connect with existing CP tracks on which MNNR operates. These tracks have

some at-grade and some grade-separated roadway crossings. The track crosses the Mississippi River on an existing bridge to connect with the St. Paul terminal. The route to CP's St. Paul Yard using the Midtown Corridor would be slightly shorter than the existing route via the Kenilworth and BNSF's Wayzata Sub. Furthermore, there is significantly less traffic over the tracks operated by MNNR than the Wayzata Sub. It would also bypass Target Field, which is a bottleneck in the system.

TranSystems concurs with Hennepin County Regional Railroad Authority's (HCRRA) assessment in the *TCWR Freight Realignment Study* that significant capital costs would be required to reinstate freight rail traffic over the corridor due to existing infrastructure for Highway 55 and Hiawatha LRT. The exact nature of needed improvements and estimated costs, however, were not evaluated in an initial screening.

In addition to the infrastructure investment, reinstituting the Midtown Corridor for freight service would face permitting challenges since the corridor is listed on the National Register of Historic Places and two of the bridges are on parkland. Furthermore, rail freight through Midtown may complicate or thwart plans for a streetcar in the corridor. Due to these serious implementation challenges, TranSystems does not recommend further evaluation of the route.

Figure 12: Midtown Corridor

VI. Alternatives Analysis

The Alternatives Analysis was conducted through a tiered process. Tier I was an overall assessment of the nine proposed freight routes. It was a review of the alternatives based on operational, commercial and implementation considerations. The second tier (Tier II) continued the evaluation using additional criteria for technical design and engineering, safety, community impacts and cost.

A. Screening Criteria

In order to be deemed viable, any potential alternative must meet the following Tier I criteria:

- The proposed route must not impose undue hardship on the freight rail operation.
- The proposed route must not significantly impair commercial opportunities for the shippers or the railroad nor unduly thwart their competitiveness.
- The proposed route must not present obstacles to implementation which would unduly delay the re-route or the light rail project.

Once alternatives which do not meet the above criteria were eliminated from consideration, additional Tier II criteria were assessed on the remaining alternatives:

- The proposed infrastructure must be sound, meeting industry standards for safety.
- The proposed route must not unduly impact the surrounding community.

TranSystems estimated infrastructure costs or used estimates prepared by other consultants, if available and deemed reasonable, for alternatives meeting the Tier II screening criteria.

Table 1: TranSystems Screening Criteria

Screening	Element	Metric or measurement
Tier I	Operational Considerations	• Maximum train speed • Total travel time • Operating costs (e.g., crew, maintenance, fuel, equipment costs) • Preservation of existing and future freight operations • Total freight capacity
	Commercial Considerations	• Preservation of railroad interchanges • Access to existing freight customers
	Implementation Considerations	• Extent of right of way acquisition required • Permitting issues
Tier 2	Technical Design and Engineering	• Maximum degree of horizontal curves • Maximum vertical grade • Maximum compensated grade • Constructability
	Safety Considerations	• Number of at-grade road crossings • Number of potential train-vehicular conflicts at at-grade crossings
	Community Impacts	• Property acquisition (Total Acres, Number, or Land Use)

Screening	Element	Metric or measurement
		• Traffic Impacts (Road Closures, Out of Route Travel, Etc)
	Costs	• Construction • Right of way

B. Tier I Analysis

The first tier (Tier I) was an overall assessment of the ten proposed freight routes based on operational, commercial and implementation considerations.

Table 2: Tier I Screening Summary

Proposed Freight Route	Operations	Commercial Considerations	Implementation Considerations
Kenilworth Corridor – No-build	○	○	●
Kenilworth Corridor – Co-location	○	○	◐
Far Western MN connection with BNSF (Appleton-Benson)	●	●	●
Western MN connection with BNSF (Granite Falls-Willmar)	●	●	●
Chaska Cut-off	◐	◐	●
Hwy 169 Alignment to BNSF	◐	◐	●
MN&S Spur North	◐	○	◐
UTU route	◐	○	●
MN&S Spur South	◐	◐	●
Midtown Corridor	○	○	●

○ Strongly supports goal ◐ Supports goal ● Does not support goal

In the initial screening, the Far Western and Western Minnesota connections are ruled out because they add significant time and miles to TC&W's route, making them cost prohibitive to operate. Undermining TC&W's competiveness is a fatal flaw.

The Midtown Corridor, Chaska Cutoff, former railroad alignment along Highway 169, and MN&S Spur South would all provide reasonable operating conditions for TC&W. In fact, the first two offer some advantages to their current route, including a shorter route for some or all of the traffic and avoidance of the bottleneck near Target Field. The MN&S Spur South route offers a shorter route for some of TC&W's customers, but a longer route for others, and avoids Target Field. Also, the Midtown Corridor maintains TC&W's access to sidings on the Bass Lake Spur. The fact that the first three of these routes no longer are existing rail or "rail banked" corridors poses obstacles that would add years to the implementation schedule, if they would be approved at all. In order to provide curvature no greater than the existing route through Kenwood or the MN&S Spur North, the MN&S Spur South route would require acquisition of significant parkland acreage. While not "fatal" flaws, these considerations are enough for TranSystems to suggest these options not be advanced for further study.

Since the Kenilworth Corridor is the existing route and the goal is to provide operations at least as favorable as they exist today, it is deemed to meet that goal. The Kenilworth – No-Build scenario does not allow for LRT implementation in the corridor. This would severely delay the LRT project by requiring further studies to be performed. Co-location of freight and LRT in the Kenilworth Corridor would be challenging but the obstacles to implementation are not insurmountable. Accordingly, only the co-location option for the Kenilworth is recommended for Tier II analysis.

While the MN&S Spur North and UTU routes could be operated much like the Kenilworth Corridor, the loss of use of the sidings on Bass Lake Spur would impair TC&W's operations, so these options were not deemed to support the goal for operations. This shortcoming could be overcome; however, if these plans allowed for additional storage tracks on the TC&W network, preferably between Norwood and Hopkins so that the capacity is available for use with all carloads from TC&W's main line and also from the Minnesota Prairie Line.

While the UTU route does support operational goals, it is not deemed necessary to consider it for further study because it is similar, but inferior to, the MN&S Spur North route. It is similar in that its viability is contingent upon all the same issues the MN&S Spur North is subject to, including curves, grades and community impacts through Saint Louis Park. It is considered inferior because it entails a longer route with more costly infrastructure requirements on the north end of the route. Furthermore, some of the upgrades necessary would infringe upon parklands, which present an obstacle to implementation.

Based upon the Tier 1 screening, TranSystems concludes that only the Kenilworth Co-Location and the MN&S Spur North, with its many variations, be taken forward for further consideration.

C. Tier II Analysis

The Tier II analysis continued the evaluation using additional criteria for technical design and engineering, safety, community impacts and cost.

Table 3: Tier II Analysis Summary

Proposed Freight Route	Tier I Screening			Tier II Screening			
	Operations	Commercial	Implementation Obstacles	Engineering	Safety	Community	Cost
Kenilworth Corridor – Co-Location	○	○	◐	○	○	◐	$20 to $330 Million*
MN&S Spur North	◐	○	◐				
DEIS connection	The MN&S Spur North has various concepts for achieving the necessary rail connections which were assessed separately in Tier 2 Screening.			●	◐	◐	N/A
Modified MN&S Spur connection				●	◐	◐	N/A
Brunswick East connection				◐	◐	●	N/A
Brunswick West connection (at-grade and elevated)				◐	◐	●	N/A
Brunswick Central connection (at-grade and elevated)				◐	◐	●	N/A
TranSystems Alternate connection				○	○	◐	$220 to $240 Million

○ Strongly supports goal ◐ Supports goal ● Does not support goal

*Kenilworth costs shown represent a range of previously reported cost estimates for the trail relocation on low end and "Deep Tunnel" on high end, respectively. These costs were developed by consultants other than TranSystems. This does not reflect the cost associated with LRT construction or relocations or upgrade of the existing freight rail.

1. Kenilworth Corridor

a) Engineering

Since the Kenilworth route is in operation today, it is clearly a viable route for TC&W's freight rail. The approximate maximum grade, which is near 21st Street West on the Kenilworth is1.05%, the maximum

curve is 6 degrees and the maximum compensated curve (which takes into account the horizontal curve and grade changes combined) is 1.29%. Beyond the Kenilworth, TC&W trains run through the MNNR yard at which its approximate maximum grade, curve and compensated grades are .70%, 7 degree 30 min., and 1.30%, respectively. The Kenilworth is maintained to Class 2 standards, which restricts freight speeds to 25 mph.

The engineering challenge with the Kenilworth is when light rail is added to a narrow corridor already housing freight rail and a trail. All three could be accommodated at-grade, except for sections of the corridor that get as narrow as 59.5 feet. In these areas, light rail could be restricted to one track, a method that has been used with some success in Denver. Alternatively, the trail could be relocated, for instance, on the opposite side of Cedar Lake. Another alternative would be for the freight and light rail lines to be separated with a barrier wall with the bicycle trail overhead. Other consultants are studying the possibility of putting the light rail below grade with either a shallow or deep tunnel. TranSystems did not review any of these alternatives in depth, but believe none of the above-ground options present an insurmountable engineering challenge. TranSystems will defer to Burns & McDonnell to offer conclusions regarding the engineering for the shallow tunnel option.

b) Safety

From a freight perspective, the Kenilworth is a safe route at low speeds. Recently a $3 million project was completed to temporarily address maintenance issues. There are two at-grade crossings on the Kenilworth, at Cedar Lake Parkway and at 21st Street West. There are two located on the Bass Lake Spur, at Wooddale Avenue and Belt Line Boulevard. The two on the Bass Lake Spur have significantly more vehicular traffic, so the train-vehicle exposure is higher.

Safety along the Kenilworth could be further enhanced with implementation of CTC and defect detection systems if freight rail continued to operate in the corridor. In order to provide a fair comparison, the cost of such safety measures should be added to the previously reported cost of the Kenilworth option or excluded from the cost of the MN&S Spur North alternative.

c) Community

As evidenced by comments made by citizens at Minneapolis town hall meetings, the Kenwood community is very proud of the neighborhood, the housing stock, the natural resources and the award-winning multi-use trail. Minneapolis citizens attending the public meeting in Minneapolis, as a whole, voiced some level of acceptance of continued freight traffic on this route. Many expressed greater concern over the introduction of light rail in the corridor. Some suggested that a more populous area would generate greater light rail ridership and economic development; therefore, the light rail route should be reconsidered. Others expressed flexibility with co-locating freight rail, light rail and the trail. Others were open to options for moving the trail, elevating the trail, or putting the light rail underground. There was significant support voiced for a "deep tunnel" option in the town hall meetings.

Introducing LRT into the Kenilworth Corridor, in addition to the existing freight rail traffic, results in a number of community impacts including noise of LRT trains, vehicular delays at grade crossings for LRT trains, the loss of trees and other vegetation in the corridor to make room for additional tracks and visual impacts of the new infrastructure. Additionally, LRT stations, such as the proposed station at Belt Line Boulevard, could be negatively impacted since a slow-moving freight train could prevent some LRT

patrons from accessing the station for several minutes at a time. This negative impact could be mitigated to some extent, however, with the implementation of CTC. The CTC system could help identify the least disruptive location for waiting for access onto the BNSF Wayzata Subdivision.

d) Cost

The cost for continuing freight rail on the Kenilworth corridor is minor, including the maintenance to maintain Class 1 track standards. The costs for co-locating the light rail with freight rail and the bike trail are significantly more. These costs vary widely depending upon the way co-location is achieved. Moving the trail may be the least costly, though right of way acquisition for a trail may take longer than construction of the light rail line. Reducing the light rail to a single track particularly in narrow sections would not cost more than the light rail line itself and could avoid the need to relocate the trail. Higher cost options would include elevating the light rail, elevating the trail or constructing a tunnel for light rail. Since other consultants are studying these options, TranSystems has not estimated these costs. Costs developed by others range from $20 to over $330 million.

2. MN&S Spur North – DEIS Connection and Modified DEIS Connection

a) Engineering

The concept for an MN&S Spur connection that was included in the DEIS had grades of 1.82% compensated and a series of reversing curves of 8, 5 and 5 degrees, with little tangent between two of the curves. TranSystems agrees with the TC&W that the route has a number of engineering challenges that may need to be resolved. The modified connection attempted to correct some of these issues (e.g., reducing the ruling grade from an 8 degree curve to 6 degree curve and the compensated grade to 0.91%, but was not a significant enough improvement to gain railroad support. Accordingly, both of these options are considered to have fatal flaws, therefore the evaluation of safety, community and cost is not considered necessary.

3. MN&S Spur North – Brunswick East, West, Central Connections

a) Engineering

The various Brunswick options, at-grade and elevated, correct the AREMA deficiencies found in the DEIS and modified DEIS concepts. The maximum grades of these options ranged from 0.4% to 1.05% with curves no more than 6 degrees. The reversing curves allowed 150 feet of tangent between curves, meeting industry standards. All of the Brunswick options replace the Skunk Hollow switching wye with a direct connection to the MN&S Spur southbound.

b) Safety

By meeting AREMA standards, the Brunswick options meet minimum safety standards and can be considered safe for freight train operations.

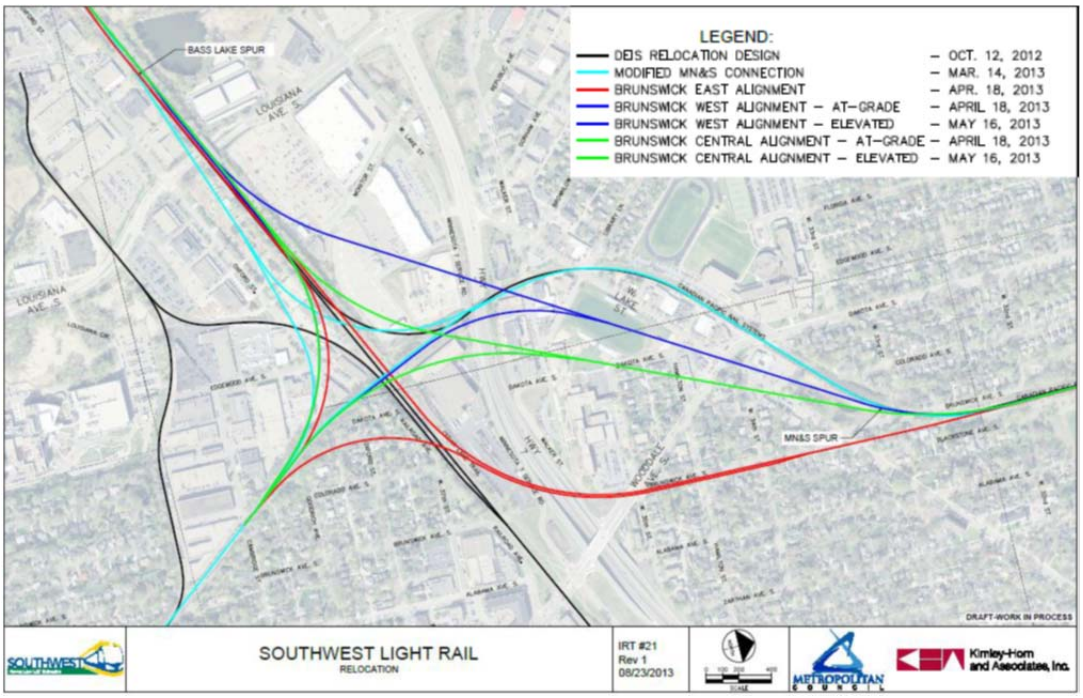


Figure 13: Previously Proposed MN&S Spur North Connections

c) Community

As can be seen in Figure 13, the Brunswick West alignments pass through the Saint Louis Park High School stadium field and Xcel Energy's facility. The Brunswick Central alignment passes near the stadium field, the Park Spanish Immersion School and community center. While the Brunswick East alignment avoids most of the community buildings and keeps TC&W freight trains removed from the high school campus, it does introduce freight rail to several additional blocks of residential area. The Saint Louis Park community has rejected all MN&S Spur North options, including the Brunswick options, for rerouting TC&W traffic if another viable option exists. This opposition was voiced by Mayor Jeff Jacobs on behalf of the entire city council at the February 12, 2014 town hall meeting.

Safety in the Park representatives argue passionately that additional trains on the MN&S Spur would be unsafe due to the proximity of the high school and grade school and the level of pedestrian traffic around schools. Furthermore, they believe that a high berm or structure would effectively segregate the neighborhoods of Saint Louis Park. TranSystems agrees that the proposed connection would be improved upon from a community impact perspective if it could be engineered to not directly interfere with so many community buildings. The efforts required to relocate the TC&W railroad through developed areas has proven to be difficult. Assuming that the existing tracks would not be used for rail traffic is unreasonable and, therefore, would not be considered as a solution. Relocating schools would not be a simple matter, either, but in our opinion would be easier than moving the existing rail line.

4. MN&S Spur North – TranSystems Connection

a) Engineering

Using available GIS data, TranSystems developed a concept for a new connection between the Bass Lake Spur and MN&S Spur which meets AREMA standards and creates less interference with the community than the Brunswick options. The maximum grade eastbound is 0.47%, which is lower than the eastbound grade of the Kenilworth; maximum grade westbound is 0.85% which is comparable to the Kenilworth; maximum curve is 5 degrees, comparable to curves on the Kenilworth; and maximum compensated grade is 1.03%, again comparable to the Kenilworth route. (Note that the TC&W's loaded coal traffic taken westbound can handle a steeper grade than its loaded grain trains taken eastbound because they use distributed power.) One hundred feet of tangent track is allowed between the reversing curves.

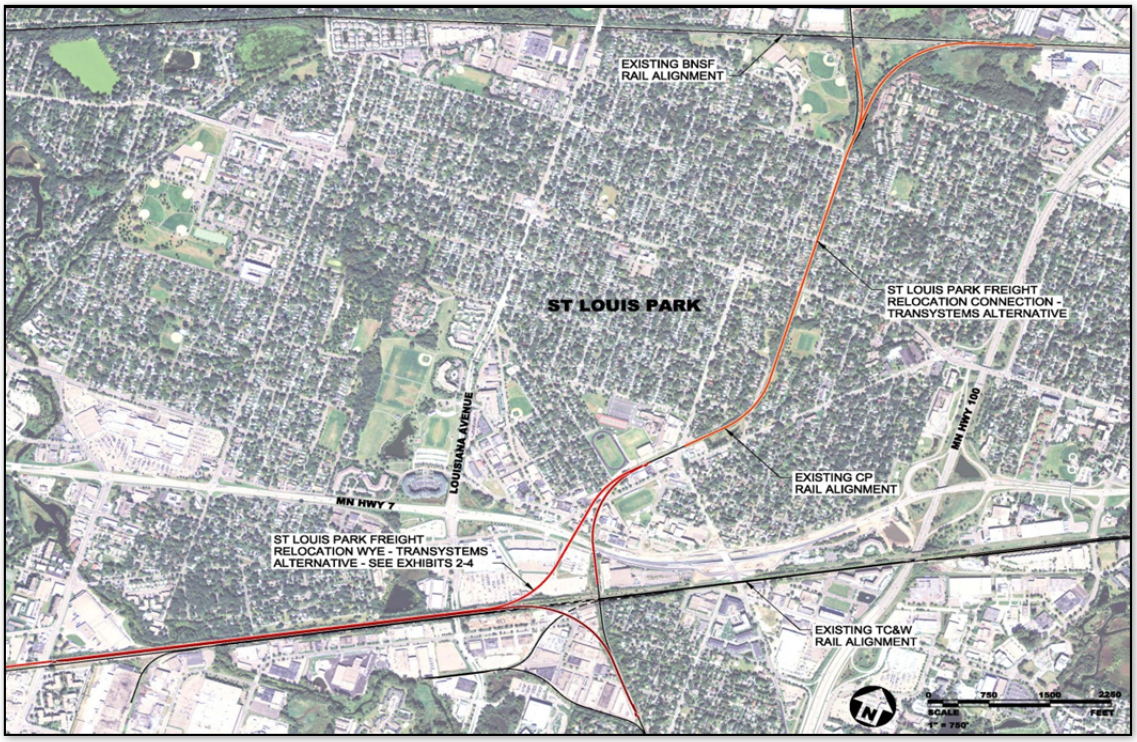


Figure 14: TranSystems' Concept for MN&S Spur North

Instead of taking the tracks down Brunswick Avenue or through the football field, the concept TranSystems developed entails a structure over MN-7 and through the Golden Auto area, making use of more of the existing MN&S Spur track thereby minimizing the introduction of new "proximity to tracks" issues. To the south, the at-grade Skunk Hollow switching wye is replaced with an elevated structure similar to the one proposed to the north. The plan closes at-grade crossings at Walker, Lake, West 28th and West 29th Streets. A new roadway adjacent to the highway, grade separated from the railroad tracks, would provide access for the schools buses that regularly transport students between the various school buildings and for emergency vehicles. West 27th Street, which currently does not cross the tracks, will be made into a through street passing under the tracks. As part of the concept, the

MN&S Spur in Saint Louis Park would be upgraded from Class 1 to Class 3 standards, which includes the replacement of jointed rail with continuous welded rail and replacement of ties. The approach to the Minnetonka bridge will be leveled out to provide a more gradual grade both north and south of the structure so that longer trains can be maneuvered safely. A retaining wall is needed to allow for the track raise in order to stay within the railroad's existing 66-foot right of way in this area. (This retaining wall could be eliminated from the plan if properties east of the tracks were acquired to provide an adequate slope away from the tracks, or approximately 45 single-family homes, predominantly on Blackstone Avenue South.)

This concept is illustrated in Appendix B.

b) Safety

As stated above, the concept has been designed to AREMA standards and is suitable for freight operations at 25 mph. If desired, an inner guard rail system can be installed between the two rails of the track in order to prevent railcars from derailing. The closure of four at-grade crossings limits the vehicle-train exposure. In order to deter trespassing and to protect pedestrians, the railroad right of way through Saint Louis Park will be fenced, forcing pedestrians to cross only at protected grade crossings. In order to provide additional pedestrian mobility across tracks, the concept calls for a pedestrian bridge in the vicinity of the high school. Technological advances of CTC and broken rail detection will be implemented in order to enhance the safety of the line.

c) Community

Because this re-route utilizes MN&S Spur tracks which run between and near to the high school and one of Saint Louis Park's grade schools, TranSystems anticipated that the community would not readily embrace this routing and Mayor Jacobs confirmed that expectation by formally opposing the plan, along with all plans to reroute freight rail through their city, at the February 12, 2014 town hall meeting. Though the concept interferes with community buildings less than some of the Brunswick options, it does interfere with a few local, commercial ventures, STEP (the community's emergency assistance and food shelf), and the single rail customer in Skunk Hollow. These businesses would have to be relocated. The interchange from Bass Lake Spur north impacts the northwest corner of Excel Energy.

TranSystems believes the elimination of the Skunk Hollow switching wye will be advantageous to the Saint Louis Park community. A direct southbound connection to the MN&S Spur will eliminate the switching which is necessary to send railcars that way today and which blocks roadways in the process. It also will open the area up around the proposed light rail station and north of the Methodist Hospital for potential development. TranSystems understands that the hospital is planning an expansion and could do so here, retaining and growing employment opportunities in Saint Louis Park, rather than losing them to another community with more available space.

d) Cost

TranSystems estimates the cost of its MN&S Spur North route at $112 million. This cost includes both a north and southbound connection between the Bass Lake Spur and MN&S Spur, a new connection between the MN&S Spur and BNSF's Wayzata Subdivision, upgrade of the MN&S Spur in this area to Class 3 track standards, roadway and crossing improvements, a pedestrian bridge, fencing throughout the area and CTC. Beyond the immediate corridor, the cost estimate includes the cost of a 10,000-foot

siding on the BNSF and approximately 18,000 feet of yard track in a location to be determined on the TC&W track. An engineering and 25% contingency allowance has been applied. The cost estimate does not include the cost for property needed for the project. The SPO assisted in providing adjustments to the cost estimate developed by TranSystems to allow for items excluded from the $112 million, such as property, but also additional items to make the cost basis comparable to the methods used for the co-location options. These adjustments increase the total cost of the MN&S Spur North option to $220 to $240 million. See Appendix C for details.

VII. Comparison of Viable Routes

Based upon the analysis above, TranSystems deems both the Kenilworth Co-Location option and MN&S Spur North – TranSystems Concept to be viable routes for TC&W traffic. The differences noted in track grade and curvature would not be expected to produce significant differences in either freight rail operations. TranSystems further compared these two viable options to help determine whether one was preferable to the other.

Table 4: Viable Route Comparison Summary

Proposed Freight Route	Tier I Screening			Tier II Screening			
	Operations	Commercial	Implementation Obstacles	Engineering	Safety	Community	Cost
Kenilworth Corridor	○	○	◐	○	○	◐	$20 to $330 Million*
MN&S Spur North – TranSystems Concept	◐	○	◐	○	○	◐	$220 to $240 Million

○ Strongly supports goal ◐ Supports goal ● Does not support goal

A. Cost and Benefits

Each of the two viable routes allow for light rail to be implemented over the Kenilworth corridor and for TC&W to maintain service to their current customers without overwhelming impacts to their operations. In addition to that, there are some additional benefits that should be weighed against the costs.

Table 5: Viable Routes - Costs and Benefits

Description	Kenilworth Co-Location	MN&S Spur North
Cost	$20 to $330 Million	$220-240 Million
LRT on Kenilworth & Protect TC&W traffic	Yes	Yes
TC&W operational improvement for southbound traffic	Potentially*	Yes
Advances MnDOT vision for MN&S Spur as bypass route	No	Yes

*A number of options have been previously proposed for co-location on the Kenilworth. The co-location option set forth in the DEIS assumes the LRT station at Skunk Hollow would be north of the tracks and does not call for replacement of the Skunk Hollow switching wye with a

direct freight connection going south on the MN&S Spur. Any option that places the LRT station south of the freight tracks in this area, such as the shallow tunnel option, would need to provide for this direct connection. TranSystems has not verified whether this connection has been included in the cost estimates provided by others.

The cost range for the Kenilworth co-location option was developed by other consultants. It is not clear whether the estimates on the high end of the range provide for a southbound connection with the MN&S Spur or safety upgrades, such as CTC and defect detection systems, which are included in the MN&S Spur North option. (It is assumed, however, the cost of these desirable features is not captured in the low-end estimate.) Similarly, it is undetermined whether a feasible phasing plan has been developed for the tunnel options for co-location or whether such a phasing plan is captured in the cost estimates.

TranSystems developed a cost estimate for the concept it developed for the MN&S Spur North option which totaled $112 million, but which excluded a number of items, such as values for property "takes". The SPO adjusted TranSystems' cost estimate for such items in order to develop a cost which would allow for an "apples to apples" comparison. See Appendix C for detail of TranSystems' estimate and adjustments made by the SPO. This $112 million base cost estimate not only includes infrastructure costs for the new connections and upgrade of existing MN&S Spur tracks, a new siding for BNSF, and TC&W yard tracks to replace lost siding storage capacity, but also safety improvements of CTC and PTC signaling, inner guard rails, a pedestrian overpass and right of way fencing. Furthermore, the cost estimate covers a phasing plan which entails the construction of a shoo-fly track, temporary diversion of CP traffic over the Kenilworth during construction, and re-use of track material from the Skunk Hollow switching wye and temporary tracks as inner guard rail, yard tracks and siding.

The MN&S Spur North route calls for a new direct connection from Bass Lake Spur to the MN&S Spur southbound. (The southbound connection is not absolutely necessary to achieve the freight relocation over MN&S Spur North, but has been included in that option since a connection must be preserved and the existing Skunk Hollow switching wye is cumbersome to maneuver and would interfere with planned LRT operations with the LRT station located south of the freight rail tracks.) With this connection, TC&W could take complete trains south on the MN&S Spur to customers at Savage, eliminating the switching of a handful of cars at a time through Skunk Hollow. This is one area of the community's dissatisfaction with existing train operations in Saint Louis Park which could be eliminated by re-routing freight traffic.

In its state rail plan, MnDOT acknowledged that there is troublesome congestion through the Twin Cities terminal. One recommendation made by MnDOT was that the MN&S Spur be upgraded so that it could be used as a bypass route. The MN&S route beyond Savage can provide access to Mason City and, from there, eastbound connections to Chicago and Milwaukee, or continuing south to Kansas City. The MN&S Spur re-route would improve a portion of the line to help to achieve that vision.

B. At-grade Crossings

At-grade crossings present potential conflicts between trains and vehicular traffic. By either closing a crossing or providing a grade separation conflicts points are reduced. For at-grade crossings that remain

open, enhanced warning devices (e.g., flashing lights, bells) and barriers (e.g., gates, medians) are safety measures that can increase safety.

Table 6: Viable Routes – Grade Crossing Summary

Hennepin County Public Crossing Information	Current Conditions over Kenilworth		Proposed over MN&S Spur North	
	# Crossings	Exposure Index	# Crossings	Exposure Index
Subtotal Kenilworth / Bass Lake Spur	4	144,370	0	0
Subtotal MN&S Spur North of Bass Lake	6	28,250	2	45,220
Subtotal MN&S Spur South of Bass Lake	17	149,186	15	147,926
Total Count of Crossings / Exposure	**27**	**321,806**	**17**	**193,146**

TranSystems identified 27 public at-grade crossings in Hennepin County, including four crossings on the Kenilworth/Bass Lake Spur, six on the MN&S Spur north of the Bass Lake Spur and 17 on the MN&S Spur south of the Bass Lake Spur to the county line at the Minnesota River. If the TC&W were re-routed over the MN&S Spur north to BNSF (with the concept developed by TranSystems), all four of the crossings on the Kenilworth, the two in Skunk Hollow and four of the six crossings north of Bass Lake Spur would be eliminated, leaving just 17 crossings.

The Exposure Index is the product of the number of daily freight trains over the tracks and the average daily traffic counts (obtained from the MnDOT's interactive traffic data map or, if not available there, from the FRA's crossing inventory reports). As the table above indicates, the re-route of TC&W trains north on the MN&S Spur results in the lowest relative exposure index. This is achieved by eliminating at-grade crossings of Wooddale Avenue and Beltline Boulevard and by closing and routing trains past roadways with lower traffic volumes.

Appendix D provides a list of all public crossings, the number of trains, and average daily vehicles used to calculate the exposure index.

C. Proximity to Homes and Schools

Stakeholders specifically requested a proximity analysis. TranSystems compared the two potentially viable options for these conditions.

Table 7: Viable Routes – Housing Proximity

Description	Kenilworth	MN&S Spur North
Residences within 150 feet of railroad tracks	367	140

TranSystems obtained parcel data from Hennepin County, but this database did not differentiate residential properties from commercial ones, nor provided number of units for multi-family homes. Instead of using the property records, TranSystems performed an inexact process utilizing the real

estate website Zillow.com to identify residences and Google Earth to measure distances. (Note that distances were measured from the tracks to the home itself, not to the property line or to detached garages, sheds or other outbuildings.)The number of units within condominiums and apartment buildings were estimated, often for only a portion of large complexes if only part appeared to be within 150 feet of the tracks. The Kenilworth's count was higher than the MN&S Spur North route due to the large number of multi-story apartments and condos along the line. The MN&S Spur North route had fewer homes within 150 feet of the tracks since the housing consists entirely of single-family homes, except for three condominium buildings near the Iron Triangle connection.

Using Google Maps and Google Earth to identify schools in the vicinity and to measure their distance from the tracks, TranSystems compiled the following data:

Table 8: Viable Routes – School Proximity

School Information		Feet to:	
Name	**Address**	**Kenilworth**	**MN&S Spur North**
Peter Hobart Elementary School	6500 West 26th	N/A	500 to 1,000
Holy Family School	5925 West Lake Street	over 2,000	500 to 1,000
Saint Louis Park High School	6425 West 33rd	1,000 to 2,000	0 to 100
Park Spanish Immersion School	6300 Walker	500 to 1,000	500 to 1,000
Metropolitan Open School	3390 Library Lane	1,000 to 2,000	0 to 100

VIII. Conclusions and Recommendations

Based on a high-level review of the nine previously identified options for TC&W's traffic, none emerges as a clearly preferred alternative. TranSystems did not identify any completely new routes, but did suggest another version for the MN&S Spur North route that, in our opinion, resolves many of the shortcomings of the other versions previously presented.

The two western re-routes would result in significant operational impacts to TC&W. The Midtown Corridor, Highway 169 Corridor and Chaska Cutoff may have worked for TC&W's traffic, but reinstating rail in those corridors would be extremely difficult–if not impossible–and time-consuming to implement. The MN&S Spur South route would have had mixed impacts to TC&W's traffic, but would face severe obstacles with respect to property acquisition and permitting to improve track geometry to conditions comparable to the existing route. For these reasons, TranSystems recommends that these routes not be advanced for further study.

TranSystems has concluded that the existing Kenilworth Corridor and the MN&S Spur North (using the connection concept developed by TranSystems) are viable options which should be considered. Cost, timeliness of implementation, and adherence to the State's vision for rail are all factors which would need to be weighed. While both present negative impacts, mitigation measures could be identified to minimize them and incorporate into the plan.

The MN&S Spur is currently owned and operated by the Canadian Pacific Railway Co. TC&W has operating rights over this track to serve customers on an as-needed basis. Canadian Pacific has published design standards for their main line track. To advance this design from an academic exercise to a possible practical solution, these design criteria should be recognized and agreed to by TC&W. Once there is an agreement on the design criteria, the project can then move forward from the "conceptual" stage to 30% design – a logical next step.

The next logical steps might include:

- Agree on a design standard for further concept development
- Environmental resource review, including
    - Noise and Vibration studies along the viable routes
    - Traffic studies to examine the effects of street closures and relocation on the viable routes
- On ground survey to assure design accuracy of the viable routes
- Dynamic modeling; once the design is at a 30% level, the simulation of buff, draft and other in-train forces can be scientifically examined.

Whether the freight rail is transferred to the MN&S Spur north or remains on the modified Kenilworth Corridor, there are a number of safety improvements that should be included as a part of this overall project. They consist of, but not limited to: (1) Centralized Traffic Control (CTC) to expedite train movements and provide broken rail protection for the route, (2) electronic detection devices such as hotbox and broken wheel detection, and (3) equipment necessary to assure compliance with the yet to be finalized Positive Train Control (PTC) requirements.

Appendix A. Timetables

MN&S SPUR TRACKAGE

Milepost Location	Station Number	Distance From MN&S Jct.		WESTWARD LOCATIONS EASTWARD	Rule 4.3	Touchtone Dispatcher Call In	
25.7	0687	18.6		AUTO CLUB	J		
				0.8			
24.9	0628	17.8	B	NESBITT			
				3.8			
21.1	0629	14.0		ATWOOD			
				2.9			
18.2		11.1		*WARDEN			
				1.9			
16.3	0633	9.2	R	* ST. LOUIS PARK			
				3.2			
13.1	0635			GOLDEN VALLEY			
				0.6			
12.6		5.4		WESTERN AVE.			
				4.0			
8.6		1.4		NEW HOPE SPUR			
				1.0			
7.6		0.4	T	* CRYSTAL SPUR		034	
				0.4			
7.2	4873	0.0		MN&S JCT. (Jct. Paynesville Sub)			

*Spur switch at east end.

MN&S Spur Trackage is considered part of the Paynesville Sub.

SPEED RESTRICTIONS	MPH
MN&S Spur Trackage - Rule 6.28 applies	10
Through turnout of all switches and tracks other than main track, not otherwise specified	10

RADIO CHANNELS

CP Radio Channel No. 2 (AAR 94) in use between MN&S Jct. and Auto Club.

MOVEMENT AUTHORITY

Between MN&S Jct. and MP 24.0 – Block Register Territory is in use. All train and MW movements must register in and out of this territory with the Minnesota train dispatcher.

Tabular General Bulletin Order (TGBO)
MN&S Spur – Provisions of Rule 6.2 apply.

ENGINE BELL AND WHISTLE SIGNALS

Engine whistle must not be sounded, except in case of an emergency as a warning of imminent and immediate danger to life or property or where required to be sounded regardless of any whistle prohibitions:

CONTINUOUS QUIET ZONE
Minneapolis – MN&S Spur trackage on Terminal Line between MP 2.4 and end of track Continuous Quiet Zone.

RAILROAD GRADE CROSSINGS

Location	Railroad	Type of Signals
MP 3.25 – Penn Ave. (Minneapolis Terminal trackage on MN&S Spur)	BNSF	Stop Signs
MP 12.1	UP	Stop Signs

CAR AND ENGINE RESTRICTIONS

Six axle GE AC4400 and EMD SD90MAC are prohibited on this spur trackage.

Six axle locomotives must not be operated on the following tracks:

Atwood – Former Siding

Soonor – Swamp track and Terminal line

Bridge 1.82, Wirth Parkway overhead – located at east end of Glenwood Jct., has a vertical clearance of 19 feet 1 inch.
NOTE: Employees concerned with the handling of dimensional shipments at this location will restrict movement as required to assure clearance.

EXCEPTED TRACKAGE Per Rule 6.12

MN&S SPUR Western Ave. yard tracks and Soonor (swamp track) and from Soonor MP 13.1 to end of track at Aldrich Ave. on Old Terminal line.

BASS LAKE SPUR TRACKAGE

Milepost Location	Station Number	Distance From Rand		WESTWARD LOCATIONS EASTWARD	Rule 4.3	Touchtone Dispatcher Call In	
428.3				*CEDAR LAKE JCT.*			
				1.4			
429.4	*0633*	*6.7*	**B**	*ST. LOUIS PARK (Jct. MNS Spur Trackage)*			
			R	*2.4*			
431.8	*0711*	*9.1*		*HOPKINS*			
				3.2		**431**	
435.1	*0717*	*12.3*	**T**	*TOWER E 14*	*J*		

Bass Lake Spur Trackage is considered part of the Merriam Park Sub.

SPEED RESTRICTIONS	MPH
Bass Lake Spur – Rule 6.28 applies	
MP 428.3 – Tower E14	25
Coal trains	10
Through turnout of all switches and tracks other than main track, not otherwise specified	10

RADIO CHANNELS

CP Radio Channel No. 4 (AAR 44) in use between Cedar and Tower E14.

Bass Lake Spur Trackage is considered part of the Merriam Park Sub.

MOVEMENT AUTHORITY

Between Cedar Lake Jct. (End of Track) and Tower E14 - Block Register Territory is in use. All train and MW movements must register in and out of this territory with the River train dispatcher.

Tabular General Bulletin Order (TGBO)
Bass Lake Spur – Provisions of Rule 6.2 apply.

CAR AND ENGINE RESTRICTIONS

Six axle locomotives are not permitted on Bass Lake Spur trackage, except when used for coal train movements.

SWITCH POSITIONS

St. Louis Park – Bass Lake – TCW connection switch at MP 428.5 and MNS connection switch at MP 429.4 may be left lined and locked in last position used.

MOVEMENT OVER PUBLIC CROSSING

Trains must stop before occupying road crossings and have a crew member on ground at crossing to warn traffic until occupied.

Beltline Dr. side tracks only	MP 428.50
Wooddale Ave. side track only	MP 429.32
Blake Rd. side track only	MP 430.88

St Louis Park - Louisiana Ave at MP 429.41 equipped with semi-automatic crossing operation. Starting buttons are located adjacent to and on both sides of crossing. Crossing signals will operate for thirty seconds when button is activated. The signals will continue to operate when crossing is occupied. All train and engine movements must stop short of the crossing and member of crew must ascertain that track is clear, activate starting button and note that signals are in stop position before giving signal to proceed over crossing.

Appendix B. Exhibits

bdgaddie
3/20/2014 - 10:24:59 AM G:\KC13\0345\Rail\Exhibits\Exhibit 01_TCW-CP SLP Overall.dgn

EXHIBIT	SHEET TITLE		SCALE	DATE	
1	SPO Freight Relocation Design Modified MN&S Connection TranSystems Alternative	**SWLRT Engineering Evaluation of Freight Rail Relocation Alternatives** Metropolitan Council/Metro Transit Minneapolis, MN	1" = 500'	MARCH 2014	TranSystems

bdgaddie
3/20/2014 - 11:04:26 AM G:\KC13\0345\Rail\Exhibits\Exhibit 02_TCW-CP Wye Solution.dgn

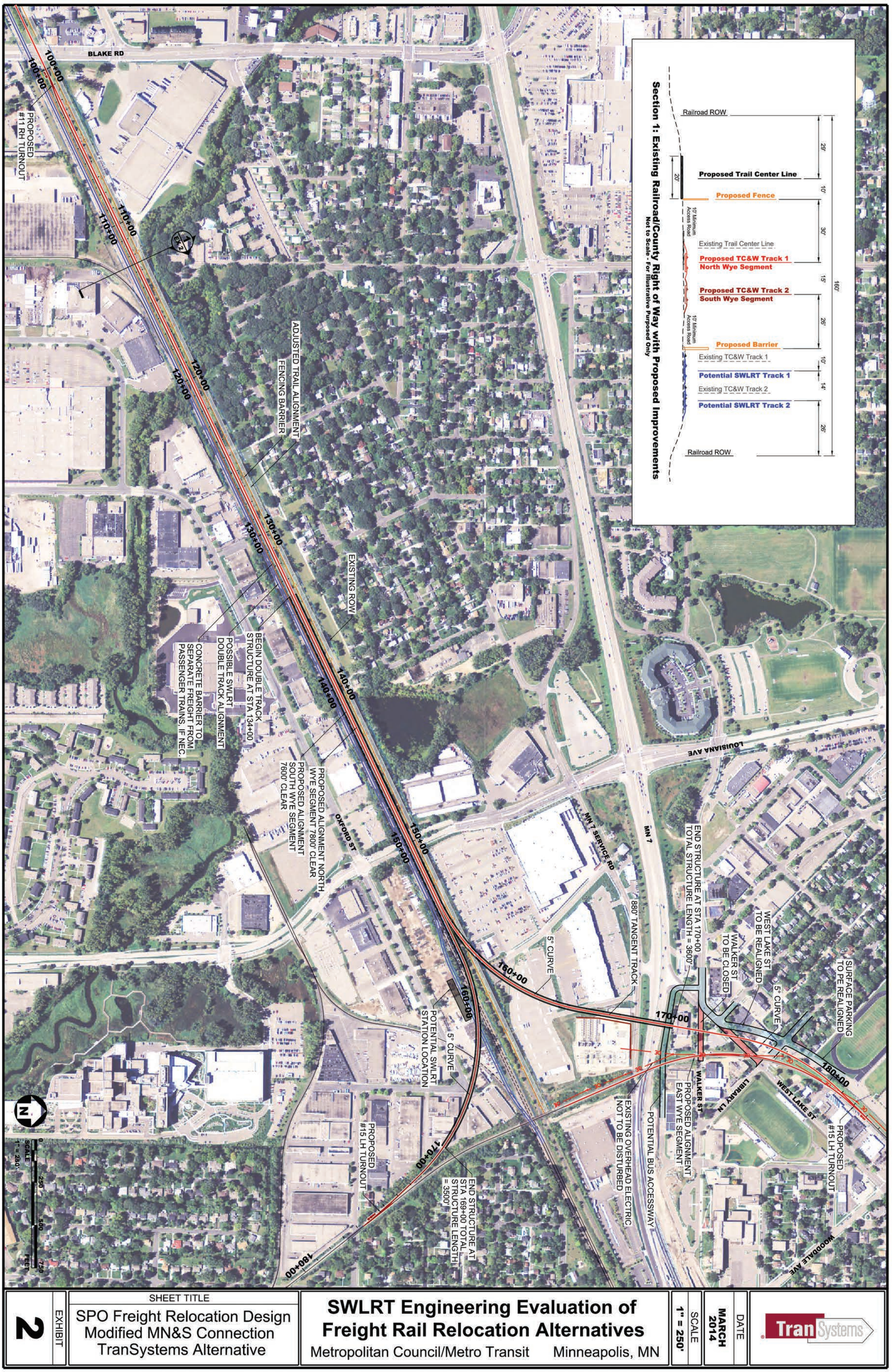
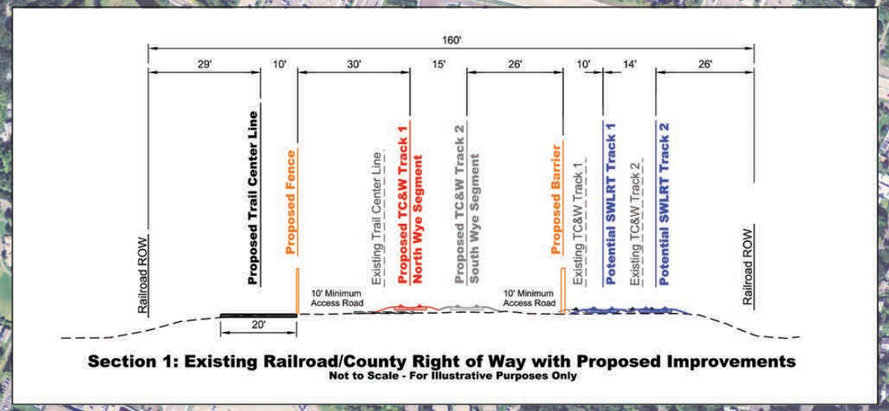
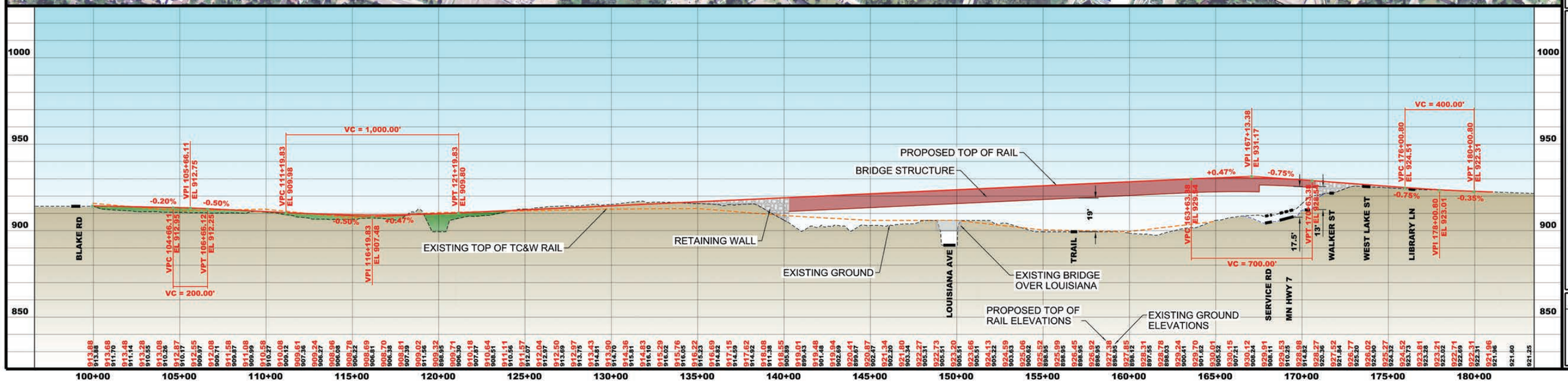


EXHIBIT	SHEET TITLE	SWLRT Engineering Evaluation of Freight Rail Relocation Alternatives	SCALE	DATE
2	SPO Freight Relocation Design Modified MN&S Connection TranSystems Alternative	Metropolitan Council/Metro Transit Minneapolis, MN	1" = 250'	MARCH 2014

TranSystems



Section 1: Existing Railroad/County Right of Way with Proposed Improvements
Not to Scale - For Illustrative Purposes Only



bdgaddie
3/20/2014 - 11:22:01 AM G:\KC13\0345\Rail\Exhibits\Exhibit 03b_TCW-CP Wye_North Wye PP.dgn

TranSystems

DATE
MARCH 2014

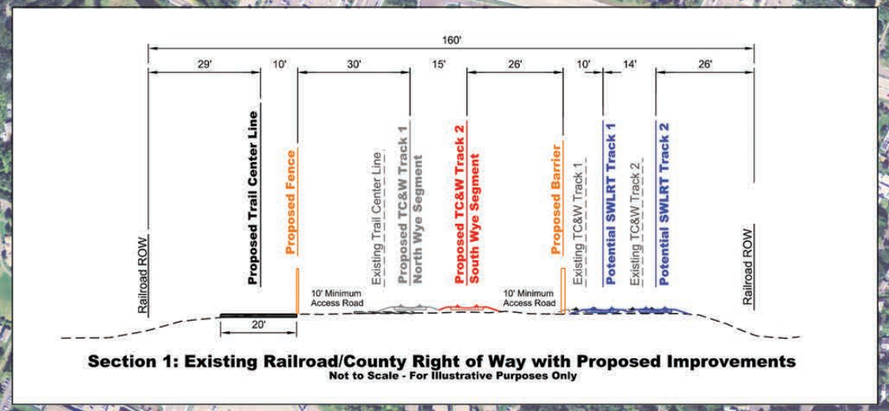
SCALE
1" = 300'

SWLRT Engineering Evaluation of Freight Rail Relocation Alternatives

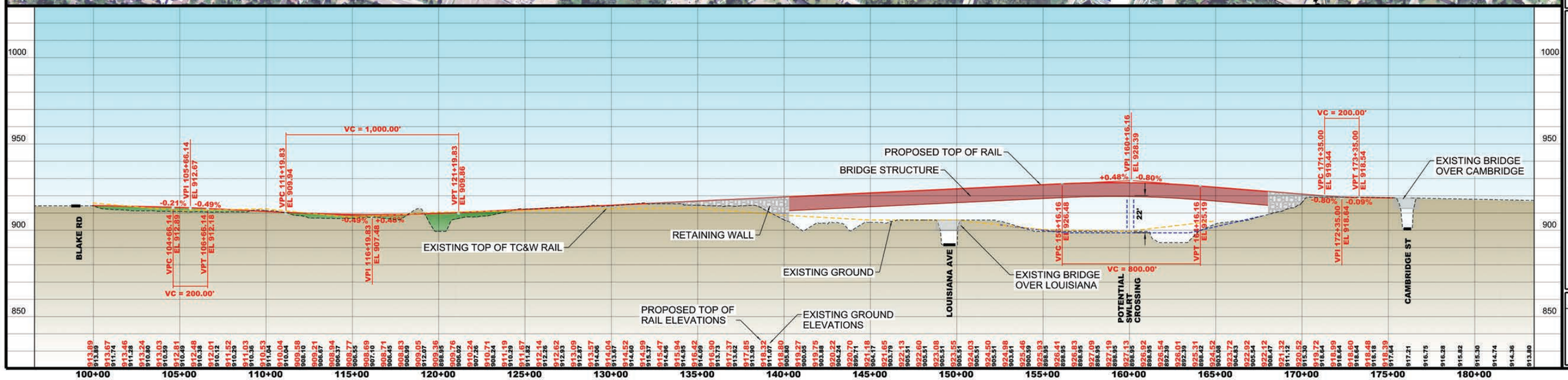
Metropolitan Council/Metro Transit Minneapolis, MN

SHEET TITLE
SPO Freight Relocation Design
Modified MN&S Connection
TranSystems Alternative

EXHIBIT
3



Section 1: Existing Railroad/County Right of Way with Proposed Improvements
Not to Scale - For Illustrative Purposes Only



TranSystems

DATE
MARCH 2014

SCALE
1" = 300'

SWLRT Engineering Evaluation of Freight Rail Relocation Alternatives

Metropolitan Council/Metro Transit Minneapolis, MN

SHEET TITLE
SPO Freight Relocation Design
Modified MN&S Connection
TranSystems Alternative

EXHIBIT
4

bdgaddie
3/20/2014 - 12:51:49 PM G:\KC13\0345\RailExhibits\Exhibit 04b_TCW-CP Wye_South Wye PP.dgn

PROPOSED ALTERNATIVE ALIGNMENT - SEE EXHIBITS 2-4

FLORIDA AVE

DAKOTA AVE

COLORADO AVE

BRUNSWICK AVE

ALABAMA AVE

BLACKSTONE AVE

WOODDALE AVE

WEST LAKE STREET

MINNETONKA BLVD

MN HWY 7

MN HWY 100

29TH STREET

28TH STREET

27TH STREET

180+00

190+00

200+00

210+00

220+00

230+00

240+00

250+00

260+00

PROPOSED VERTICAL CHANGE ON EXISTING CP ALIGNMENT

RAIL STRUCTURE

PROPOSED #15 LH TURNOUT

PROPOSED BRIDGE OVER 27th STREET

PROPOSED CP REALIGNMENT

EXISTING CP RAILROAD

EXISTING ROW

ABANDONED ALIGNMENT

PROPOSED WYE CONNECTION TO THE EXISTING BNSF RAILWAY

EXISTING BNSF RAILWAY

4° 30' CURVE 1560' IN LENGTH

PROPOSED DOUBLE TRACK ALONG EXISTING BNSF RAILWAY

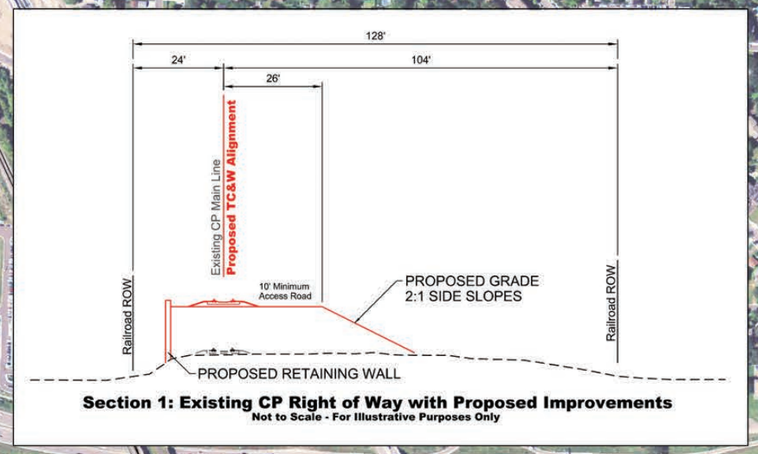
1 EX 5

2 EX 5

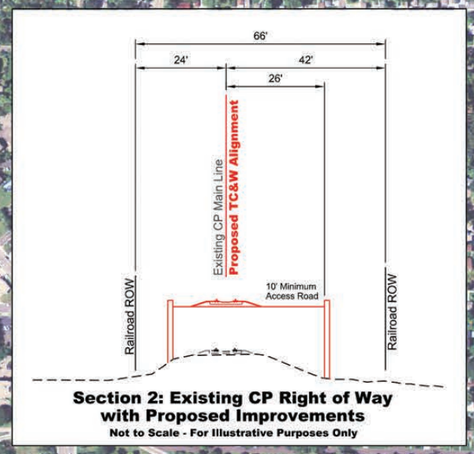
N

SCALE 1" = 300'

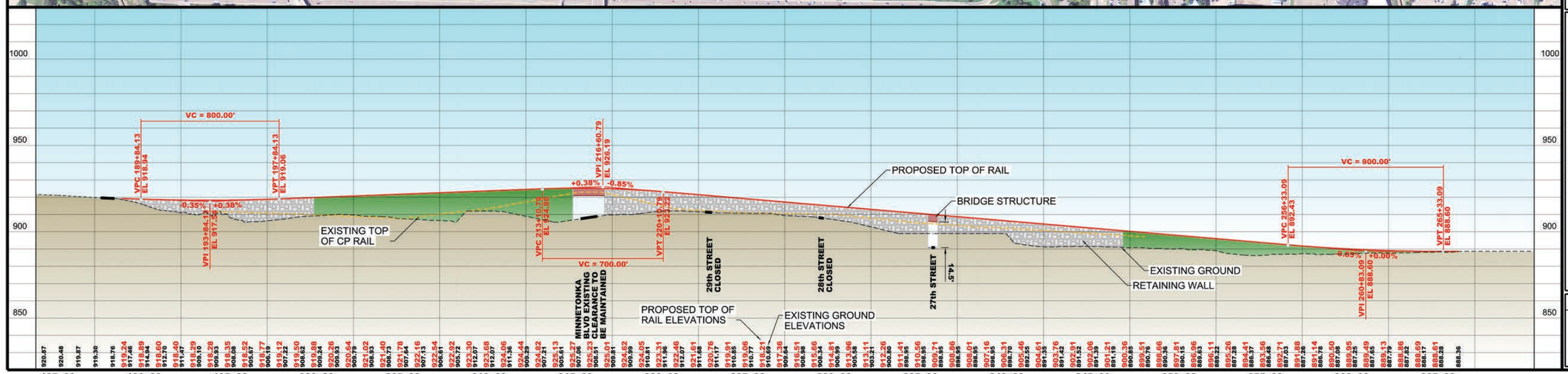
300 0 600 FEET



Section 1: Existing CP Right of Way with Proposed Improvements
Not to Scale - For Illustrative Purposes Only



Section 2: Existing CP Right of Way with Proposed Improvements
Not to Scale - For Illustrative Purposes Only



TranSystems

DATE
MARCH 2014

SCALE
1" = 300'

SWLRT Engineering Evaluation of Freight Rail Relocation Alternatives

Metropolitan Council/Metro Transit Minneapolis, MN

SHEET TITLE

SPO Freight Relocation Design
Modified MN&S Connection
TranSystems Alternative

EXHIBIT
5

bdgaddie
3/20/2014 - 12:33:16 PM G:\KC13\0345\Rail\Exhibits\Exhibit 05b_TCW-CP_BNSF Connection PP.dgn

Appendix C. Opinion of Cost

Appendix C
Engineers' Opinion of Probable Cost
MN&S Spur North Concept

	DESCRIPTION	TOTAL ($ in Millions)
	Concept Improvements	
1.)	Grading, Subgrade Stabilization, and Subballast	$4
2.)	Track Infrastructure	$21
3.)	Bridges	$40
4.)	Culverts, Retaining Wall, Barrier Wall	$9
5.)	Roadway Improvements, Trail Relocation, Fencing for Trail	$4
6.)	Utility Relocations	$1
7.)	Safety Enhancements: Pedestrian Overpass, CTC/PTC, Inner Guard Rail, Fencing	$7
	Subtotal	***$86***
	Engineering at 5%	*$4*
	Contingency at 25%	$22
	TOTAL	**$112**
	Modifications by SPO	
8.)	Common Elements	$39 - $44
9.)	Right of Way	$20 - $25
10.)	Engineering / Contingency	$34 - $39
11.)	Year of Expenditure	$15 - $20
	TOTAL	**$220 - $240**

It is assumed that the salvage value of the removed rail is equivalent to the removal costs and therefore was not included above
The estimate totals do not consider the potential costs for the following:
1 - Additional retaining structure(s) required for SWLRT construction, 2 - Impacts the the existing Xcel substation, 3 - Trail structures needed at the BNSF Wayzata connection, 4 - Additional right of way that may be required

Appendix D. Public At-grade Crossing Information

Appendix D
Public Grade Crossings

			Current Conditions over Kenilworth		Proposed over MN&S Spur North	
Crossing #	**Road**	**AADT***	**# Trains**	**Conflicts**	**# Trains**	**Conflicts**
185192F	Cedar Lake Parkway	2,650	5	13,250	Closed	0
185190S	21st Street West	824	5	4,120	Closed	0
Unidentified	Belt Line Blvd	14,100	5	70,500	Closed	0
379741L	Wooddale Ave	11,300	5	56,500	Closed	0
Subtotal Kenilworth / Bass Lake Spur		**28,874**	**4**	**144,370**	**0**	**0**
854231S	West 28th Street	675	2	1,350	Closed	0
854232Y	West 29th Street	190	2	380	Closed	0
854234M	Dakota Avenue	4,500	2	9,000	7	31,500
854235U	Library Lane	1,960	2	3,920	7	13,720
854236B	Lake Street	3,850	2	7,700	Closed	0
854237H	Walker Street	2,950	2	5,900	Closed	0
Subtotal MN&S Spur North of Bass Lake		**14,125**	**6**	**28,250**	**2**	**45,220**
379744G	Oxford Street	2,700	0.1	270	Closed	0
379745N	Louisiana Avenue South	9,900	0.1	990	Closed	0
854241X	Alabama Avenue	2,750	2	5,500	2	5,500
854242E	Excelsior Blvd	24,500	2	49,000	2	49,000
854243L	West 41st Street	674	2	1,348	2	1,348
854244T	West 42nd Street	674	2	1,348	2	1,348
854245A	Brookside Avenue North	1,900	2	3,800	2	3,800
854246G	Yosemite Avenue South	2,950	2	5,900	2	5,900
854248V	Brookside Terrace	50	2	100	2	100
854249C	West 49st Street	675	2	1,350	2	1,350
854251D	Hansen Road	1,400	2	2,800	2	2,800
854252K	Valley Lane / West 65th	1,450	2	2,900	2	2,900
854253S	Dewey Hill Road	600	2	1,200	2	1,200
854256M	East Bush Lake Road	12,500	2	25,000	2	25,000
854257U	Chalet Road	1,000	2	2,000	2	2,000
854258B	Old Shakopee Road	22,000	2	44,000	2	44,000
694895M	West 111th Street	840	2	1,680	2	1,680
Subtotal MN&S Spur South of Bass Lake		**86,563**	**17**	**149,186**	**15**	**147,926**
Total Count of Crossings / Conflicts			**27**	**321,806**	**17**	**193,146**

*AADT taken from MnDOT interactive traffic mapping application, when available. When not available from MnDOT, AADT taken from FRA grade crossing inventory reports.